

TABLE OF CONTENTS

AUD-1: AUDIO AND SPEECH SOURCE SEPARATION 1: SPEECH SEPARATION

AUD-1.1: RETHINKING THE SEPARATION LAYERS IN SPEECH SEPARATION NETWORKS 76

Yi Luo, Columbia University, United States; Zhuo Chen, Microsoft Corporation, United States; Cong Han, Columbia University, United States; Chenda Li, Shanghai Jiao Tong University, China; Tianyan Zhou, Microsoft Corporation, United States; Nima Mesgarani, Columbia University, United States

AUD-1.2: ON PERMUTATION INVARIANT TRAINING FOR SPEECH SOURCE SEPARATION 81

Xiaoyu Liu, Jordi Pons, Dolby Laboratories, United States

AUD-1.3: COUNT AND SEPARATE: INCORPORATING SPEAKER COUNTING FOR CONTINUOUS SPEAKER SEPARATION 86

Zhong-Qiu Wang, DeLiang Wang, The Ohio State University, United States

AUD-1.4: ULTRA-LIGHTWEIGHT SPEECH SEPARATION VIA GROUP COMMUNICATION 91

Yi Luo, Cong Han, Nima Mesgarani, Columbia University, United States

AUD-1.5: ATTENTION IS ALL YOU NEED IN SPEECH SEPARATION 96

Cem Subakan, Mirco Ravanelli, Mila, Canada; Samuele Cornell, Università Politecnica delle Marche (IT), Italy; Mirko Bronzi, Mila, Canada; Jianyuan Zhong, University of Rochester, United States

AUD-1.6: MULTICHANNEL OVERLAPPING SPEAKER SEGMENTATION USING MULTIPLE HYPOTHESIS TRACKING OF ACOUSTIC AND SPATIAL FEATURES 101

Aidan Hogg, Imperial College London, United Kingdom; Christine Evers, University of Southampton, United Kingdom; Patrick A. Naylor, Imperial College London, United Kingdom

AUD-2: AUDIO AND SPEECH SOURCE SEPARATION 2: MUSIC AND SINGING VOICE SEPARATION

AUD-2.1: SEMI-SUPERVISED SINGING VOICE SEPARATION WITH NOISY SELF-TRAINING 505

Zhepei Wang, University of Illinois at Urbana-Champaign, United States; Ritwik Giri, Umut Isik, Jean-Marc Valin, Arvinth Krishnaswamy, Amazon Web Services, United States

AUD-2.2: NEURO-STEERED MUSIC SOURCE SEPARATION WITH EEG-BASED AUDITORY ATTENTION DECODING AND CONTRASTIVE-NMF 510

Giorgia Cantisani, Slim Essid, Gaël Richard, LTCI, Télécom Paris, Institut Polytechnique de Paris, France

AUD-2.3: COMPLEX RATIO MASKING FOR SINGING VOICE SEPARATION..... 515

Yixuan Zhang, Yuzhou Liu, DeLiang Wang, The Ohio State University, United States

AUD-2.4: TRANSCRIPTION IS ALL YOU NEED: LEARNING TO SEPARATE MUSICAL MIXTURES WITH SCORE AS SUPERVISION 520

Yun-Ning Hung, Georgia Institute of Technology, United States; Gordon Wichern, Jonathan Le Roux, Mitsubishi Electric Research Laboratories (MERL), United States

AUD-2.5: ALL FOR ONE AND ONE FOR ALL: IMPROVING MUSIC SEPARATION BY BRIDGING NETWORKS 525

Ryosuke Sawata, Stefan Uhlich, Shusuke Takahashi, Yuki Mitsufuji, Sony Corporation, Japan

AUD-2.6: AN HRNET-BLSTM MODEL WITH TWO-STAGE TRAINING FOR SINGING MELODY EXTRACTION	530
<i>Yongwei Gao, Fudan University, China; Xingjian Du, Bilei Zhu, ByteDance AI Lab, China; Xiaoheng Sun, Wei Li, Fudan University, China; Zejun Ma, ByteDance AI Lab, China</i>	
 AUD-3: MUSIC SIGNAL ANALYSIS, PROCESSING, AND SYNTHESIS 1: DEEP LEARNING	
AUD-3.1: DEEPFO: END-TO-END FUNDAMENTAL FREQUENCY ESTIMATION FOR MUSIC AND SPEECH SIGNALS	21
<i>Satwinder Singh, Ruili Wang, Yuanhang Qiu, Massey University, New Zealand</i>	
AUD-3.2: DIFFERENTIABLE SIGNAL PROCESSING WITH BLACK-BOX AUDIO EFFECTS	26
<i>Marco A Martínez Ramírez, Queen Mary University of London, United Kingdom; Oliver Wang, Paris Smaragdis, Adobe Inc., United States; Nicholas J. Bryan, Adobe Research, United States</i>	
AUD-3.3: AUTOMATIC MULTITRACK MIXING WITH A DIFFERENTIABLE MIXING CONSOLE OF NEURAL AUDIO EFFECTS	31
<i>Christian J. Steinmetz, Dolby Laboratories and Universitat Pompeu Fabra, Spain; Jordi Pons, Santiago Pascual, Joan Serrà, Dolby Laboratories, Spain</i>	
AUD-3.4: SEQUENCE-TO-SEQUENCE SINGING VOICE SYNTHESIS WITH PERCEPTUAL ENTROPY LOSS	36
<i>Jiatong Shi, The Johns Hopkins University, United States; Shuai Guo, Renmin University of China, China; Nan Huo, Yuekai Zhang, The Johns Hopkins University, United States; Qin Jin, Renmin University of China, China</i>	
AUD-3.5: REVERB CONVERSION OF MIXED VOCAL TRACKS USING AN END-TO-END CONVOLUTIONAL DEEP NEURAL NETWORK	41
<i>Junghyun Koo, Seungryeol Paik, Kyogu Lee, Seoul National University, South Korea</i>	
AUD-3.6: EXTENDING MUSIC BASED ON EMOTION AND TONALITY VIA GENERATIVE ADVERSARIAL NETWORK	46
<i>Bo-Wei Tseng, Yih-Liang Shen, Tai-Shih Chi, National Chiao Tung University, Taiwan</i>	
 AUD-4: MUSIC SIGNAL ANALYSIS, PROCESSING, AND SYNTHESIS 2: ANALYSIS AND PROCESSING	
AUD-4.1: IMPROVING THE ROBUSTNESS OF RIGHT WHALE DETECTION IN NOISY CONDITIONS USING DENOISING AUTOENCODERS AND AUGMENTED TRAINING	51
<i>William Vickers, Ben Milner, University of East Anglia, United Kingdom; Robert Lee, Gardline Geosurvey Limited, United Kingdom</i>	
AUD-4.2: SELF-SUPERVISED VQ-VAE FOR ONE-SHOT MUSIC STYLE TRANSFER	56
<i>Ondřej Cífka, Télécom Paris, Institut Polytechnique de Paris, France; Alexey Ozerov, InterDigital R&D, France; Umut Şimşekli, Inria/ENS, France; Gaël Richard, Télécom Paris, Institut Polytechnique de Paris, France</i>	
AUD-4.3: CAPTURING TEMPORAL DEPENDENCIES THROUGH FUTURE PREDICTION FOR CNN-BASED AUDIO CLASSIFIERS	61
<i>Hongwei Song, Jiqing Han, Harbin Institute of Technology, China; Shiwen Deng, Harbin Normal University, China; Zhihao Du, Harbin Institute of Technology, China</i>	
AUD-4.5: SEGMENTAL DTW: A PARALLELIZABLE ALTERNATIVE TO DYNAMIC TIME WARPING	66
<i>TJ Tsai, Harvey Mudd College, United States</i>	

AUD-4.6: PITCH-TIMBRE DISENTANGLEMENT OF MUSICAL INSTRUMENT SOUNDS BASED ON VAE-BASED METRIC LEARNING	71
<i>Keitaro Tanaka, Waseda University, Japan; Ryo Nishikimi, Kyoto University, Japan; Yoshiaki Bando, National Institute of Advanced Industrial Science and Technology, Japan; Kazuyoshi Yoshii, Kyoto University, Japan; Shigeo Morishima, Waseda Research Institute for Science and Engineering, Japan</i>	
 AUD-5: ACTIVE NOISE CONTROL, ECHO REDUCTION, AND FEEDBACK REDUCTION 1: ECHO CANCELLATION	
AUD-5.1: ASYNCHRONOUS ACOUSTIC ECHO CANCELLATION OVER WIRELESS CHANNELS	246
<i>Robert Ayrapetian, Philip Hilmes, Mohamed Mansour, Trausti Kristjansson, Carlo Murgia, Amazon, United States</i>	
AUD-5.2: COMBINING ADAPTIVE FILTERING AND COMPLEX-VALUED DEEP POSTFILTERING FOR ACOUSTIC ECHO CANCELLATION	251
<i>Mhd Modar Halimeh, Thomas Haubner, Annika Briegleb, Alexander Schmidt, Walter Kellermann, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany</i>	
AUD-5.3: DEEP RESIDUAL ECHO SUPPRESSION WITH A TUNABLE TRADEOFF BETWEEN SIGNAL DISTORTION AND ECHO SUPPRESSION	256
<i>Amir Ivry, Israel Cohen, Baruch Berdugo, Technion - Israel Institute of Technology, Israel</i>	
AUD-5.4: ROBUST STFT DOMAIN MULTI-CHANNEL ACOUSTIC ECHO CANCELLATION WITH ADAPTIVE DECORRELATION OF THE REFERENCE SIGNALS	261
<i>Saeed Bagheri Sereshki, Daniele Giacobello, Sonos Inc, United States</i>	
AUD-5.5: A METHOD FOR DETERMINING PERIODICALLY TIME-VARYING BIAS AND ITS APPLICATIONS IN ACOUSTIC FEEDBACK CANCELLATION	266
<i>Meng Guo, Demant, Denmark</i>	
AUD-5.6: WEIGHTED RECURSIVE LEAST SQUARE FILTER AND NEURAL NETWORK BASED RESIDUAL ECHO SUPPRESSION FOR THE AEC-CHALLENGE	271
<i>Ziteng Wang, Yueyue Na, Zhang Liu, Biao Tian, Qiang Fu, Alibaba Group, China</i>	
 AUD-6: ACTIVE NOISE CONTROL, ECHO REDUCTION, AND FEEDBACK REDUCTION 2: ACTIVE NOISE CONTROL AND ECHO CANCELLATION	
AUD-6.1: ICASSP 2021 ACOUSTIC ECHO CANCELLATION CHALLENGE: INTEGRATED ADAPTIVE ECHO CANCELLATION WITH TIME ALIGNMENT AND DEEP LEARNING-BASED RESIDUAL ECHO PLUS NOISE SUPPRESSION	276
<i>Renhua Peng, Linjuan Cheng, Chengshi Zheng, Xiaodong Li, Institute of Acoustics, Chinese Academy of Sciences, China</i>	
AUD-6.2: ICASSP 2021 ACOUSTIC ECHO CANCELLATION CHALLENGE: DATASETS, TESTING FRAMEWORK, AND RESULTS	281
<i>Kusha Sridhar, University of Texas at Dallas, United States; Ross Cutler, Ando Saabas, Tanel Parnamaa, Markus Loide, Hannes Gamper, Sebastian Braun, Robert Aichner, Sriram Srinivasan, Microsoft, United States</i>	
AUD-6.3: AEC IN A NETSHELL: ON TARGET AND TOPOLOGY CHOICES FOR FCRN ACOUSTIC ECHO CANCELLATION	286
<i>Jan Franzen, Ernst Seidel, Tim Fingscheidt, Technische Universität Braunschweig, Germany</i>	
AUD-6.5: KERNEL-INTERPOLATION-BASED FILTERED-X LEAST MEAN SQUARE FOR SPATIAL ACTIVE NOISE CONTROL IN TIME DOMAIN	291
<i>Jesper Brunnström, Shoichi Koyama, University of Tokyo, Japan</i>	

AUD-6.6: WAVE-DOMAIN OPTIMIZATION OF SECONDARY SOURCE PLACEMENT FREE FROM INFORMATION OF ERROR SENSOR POSITIONS	296
<i>Jian Xu, Kean Chen, Yunhe Li, Northwestern Polytechnical University, China</i>	
 AUD-7: AUDIO AND SPEECH SOURCE SEPARATION 3: DEEP LEARNING	
AUD-7.1: LASAFT: LATENT SOURCE ATTENTIVE FREQUENCY TRANSFORMATION FOR CONDITIONED SOURCE SEPARATION	535
<i>Woosung Choi, Minseok Kim, Korea University, South Korea; Jaehwa Chung, Korea National Open University, South Korea; Soonyoung Jung, Korea University, South Korea</i>	
AUD-7.2: SURROGATE SOURCE MODEL LEARNING FOR DETERMINED SOURCE SEPARATION	540
<i>Robin Scheibler, Masahito Togami, LINE Corporation, Japan</i>	
AUD-7.3: AUDITORY FILTERBANKS BENEFIT UNIVERSAL SOUND SOURCE SEPARATION	545
<i>Han Li, Northwestern Polytechnical University, Technical University of Munich, China; Kean Chen, Northwestern Polytechnical University, China; Bernhard U. Seeber, Technical University of Munich, Germany</i>	
AUD-7.4: WHAT'S ALL THE FUSS ABOUT FREE UNIVERSAL SOUND SEPARATION DATA?	550
<i>Scott Wisdom, Hakan Erdogan, Daniel P. W. Ellis, Google, United States; Romain Serizel, Nicolas Turpault, Universite de Lorraine, France; Eduardo Fonseca, Universitat Pompeu Fabra, Spain; Justin Salamon, Adobe, United States; Prem Seetharaman, Descript, United States; John R. Hershey, Google, United States</i>	
AUD-7.5: SEPNET: A DEEP SEPARATION MATRIX PREDICTION NETWORK FOR MULTICHANNEL AUDIO SOURCE SEPARATION	555
<i>Shota Inoue, University of Tsukuba, Japan; Hirokazu Kameoka, NTT Communication Science Laboratories, Japan; Li Li, Shoji Makino, University of Tsukuba, Japan</i>	
AUD-7.6: CDPAM: CONTRASTIVE LEARNING FOR PERCEPTUAL AUDIO SIMILARITY	560
<i>Pranay Manocha, Princeton University, United States; Zeyu Jin, Richard Zhang, Adobe Research, United States; Adam Finkelstein, Princeton University, United States</i>	
 AUD-8: AUDIO AND SPEECH SOURCE SEPARATION 4: MULTI-CHANNEL SOURCE SEPARATION	
AUD-8.1: LINEAR MULTICHANNEL BLIND SOURCE SEPARATION BASED ON TIME-FREQUENCY MASK OBTAINED BY HARMONIC/PERCUSSIVE SOUND SEPARATION	565
<i>Soichiro Oyabu, Daichi Kitamura, National Institute of Technology, Kagawa College, Japan; Kohei Yatabe, Waseda University, Japan</i>	
AUD-8.2: MULTICHANNEL-BASED LEARNING FOR AUDIO OBJECT EXTRACTION	570
<i>Daniel Arteaga, Jordi Pons, Dolby Laboratories, Spain</i>	
AUD-8.3: DBNET: DOA-DRIVEN BEAMFORMING NETWORK FOR END-TO-END REVERBERANT SOUND SOURCE SEPARATION	575
<i>Ali Aroudi, University of Oldenburg, Germany; Sebastian Braun, Microsoft Corporation, United States</i>	
AUD-8.4: JOINT DEREVERBERATION AND SEPARATION WITH ITERATIVE SOURCE STEERING	580
<i>Taishi Nakashima, Robin Scheibler, Masahito Togami, LINE Corporation, Japan; Nobutaka Ono, Tokyo Metropolitan University, Japan</i>	

AUD-8.5: EXPLOITING NON-NEGATIVE MATRIX FACTORIZATION FOR BINAURAL SOUND LOCALIZATION IN THE PRESENCE OF DIRECTIONAL INTERFERENCE	585
<i>Ingvi Örnolfsson, Torsten Dau, Technical University of Denmark, Denmark; Ning Ma, University of Sheffield, United Kingdom; Tobias May, Technical University of Denmark, Denmark</i>	
AUD-8.6: BLIND EXTRACTION OF MOVING AUDIO SOURCE IN A CHALLENGING ENVIRONMENT SUPPORTED BY SPEAKER IDENTIFICATION VIA X-VECTORS	590
<i>Jiri Malek, Jakub Jansky, Tomas Kounovsky, Zbynek Koldovsky, Jindrich Zdansky, Technical University of Liberec, Czechia</i>	
AUD-9: MUSIC INFORMATION RETRIEVAL AND MUSIC LANGUAGE PROCESSING 1: BEAT AND MELODY	
AUD-9.1: MIND THE BEAT: DETECTING AUDIO ONSETS FROM EEG RECORDINGS OF MUSIC LISTENING	850
<i>Ashvala Vinay, Alexander Lerch, Grace Leslie, Georgia Institute of Technology, United States</i>	
AUD-9.2: DON'T LOOK BACK: AN ONLINE BEAT TRACKING METHOD USING RNN AND ENHANCED PARTICLE FILTERING	855
<i>Mojtaba Heydari, Zhiyao Duan, University of Rochester, United States</i>	
AUD-9.3: SINGING MELODY EXTRACTION FROM POLYPHONIC MUSIC BASED ON SPECTRAL CORRELATION MODELING	860
<i>Xingjian Du, Bilei Zhu, Qiuqiang Kong, Zejun Ma, Bytedance AI Lab, China</i>	
AUD-9.4: IMPROVING AUTOMATIC DRUM TRANSCRIPTION USING LARGE-SCALE AUDIO-TO-MIDI ALIGNED DATA	865
<i>I-Chieh Wei, Academia Sinica, Taiwan; Chih-Wei Wu, Netflix, Inc., USA, United States; Li Su, Academia Sinica, Taiwan</i>	
AUD-9.5: FREQUENCY-TEMPORAL ATTENTION NETWORK FOR SINGING MELODY EXTRACTION	870
<i>Shuai Yu, Xiaoheng Sun, Fudan University, China; Yi Yu, National Institute of Informatics, China; Wei Li, Fudan University, China</i>	
AUD-9.6: STATISTICAL CORRECTION OF TRANSCRIBED MELODY NOTES BASED ON PROBABILISTIC INTEGRATION OF A MUSIC LANGUAGE MODEL AND A TRANSCRIPTION ERROR MODEL	875
<i>Yuki Hiramatsu, Go Shibata, Ryo Nishikimi, Eita Nakamura, Kazuyoshi Yoshii, Kyoto University, Japan</i>	
AUD-10: MUSIC INFORMATION RETRIEVAL AND MUSIC LANGUAGE PROCESSING 2: SINGING VOICE	
AUD-10.1: RELIABILITY ASSESSMENT OF SINGING VOICE F0-ESTIMATES USING MULTIPLE ALGORITHMS	880
<i>Sebastian Rosenzweig, International Audio Laboratories Erlangen, Germany; Frank Scherbaum, University of Potsdam, Germany; Meinard Müller, International Audio Laboratories Erlangen, Germany</i>	
AUD-10.2: END-TO-END LYRICS RECOGNITION WITH VOICE TO SINGING STYLE TRANSFER	885
<i>Sakya Basak, Shrutina Agarwal, Sriram Ganapathy, Indian Institute of Science, Bangalore, India; Naoya Takahashi, Sony Corporation, Japan</i>	
AUD-10.3: SINGING LANGUAGE IDENTIFICATION USING A DEEP PHONOTACTIC APPROACH	890
<i>Lenny Renault, Andrea Vaglio, Romain Hennequin, Deezer, France</i>	

AUD-10.4: ON THE PREPARATION AND VALIDATION OF A LARGE-SCALE DATASET OF SINGING TRANSCRIPTION	895
<i>Jun-You Wang, Jyh-Shing Roger Jang, National Taiwan University, Taiwan</i>	
AUD-10.5: JOINT MULTI-PITCH DETECTION AND SCORE TRANSCRIPTION FOR POLYPHONIC PIANO MUSIC	900
<i>Lele Liu, Veronica Morfi, Emmanouil Benetos, Queen Mary University of London, United Kingdom</i>	
AUD-10.6: KARAOKE KEY RECOMMENDATION VIA PERSONALIZED COMPETENCE-BASED RATING PREDICTION	905
<i>Yuan Wang, Santa Clara University, United States; Shigeki Tanaka, NTT DOCOMO, INC., Japan; Keita Yokoyama, Hsin-Tai Wu, DOCOMO Innovations, Inc., United States; Yi Fang, Santa Clara University, United States</i>	
 AUD-11: AUDITORY MODELING AND HEARING INSTRUMENTS	
AUD-11.1: A CLOSED-LOOP GAIN-CONTROL FEEDBACK MODEL FOR THE MEDIAL EFFERENT SYSTEM OF THE DESCENDING AUDITORY PATHWAY	216
<i>Afagh Farhadi, University of Rochester, United States; Skyler G. Jennings, University of Utah, United States; Elizabeth A. Strickland, Purdue University, United States; Laurel H. Carney, University of Rochester, United States</i>	
AUD-11.2: DHASP: DIFFERENTIABLE HEARING AID SPEECH PROCESSING	221
<i>Zehai Tu, Ning Ma, Jon Barker, University of Sheffield, United Kingdom</i>	
AUD-11.3: COMPUTATIONALLY EFFICIENT DNN-BASED APPROXIMATION OF AN AUDITORY MODEL FOR APPLICATIONS IN SPEECH PROCESSING	226
<i>Anil Nagathil, Florian Göbel, Alexandru Nelus, Ruhr-Universität Bochum, Germany; Ian C. Bruce, McMaster University, Canada</i>	
AUD-11.4: CASCADED ALL-PASS FILTERS WITH RANDOMIZED CENTER FREQUENCIES AND PHASE POLARITY FOR ACOUSTIC AND SPEECH MEASUREMENT AND DATA AUGMENTATION	231
<i>Hideki Kawahara, Wakayama University, Japan; Kohei Yatabe, Waseda University, Japan</i>	
AUD-11.5: PROBING ACOUSTIC REPRESENTATIONS FOR PHONETIC PROPERTIES	236
<i>Danni Ma, Neville Ryant, Mark Liberman, University of Pennsylvania, United States</i>	
AUD-11.6: AN END-TO-END NON-INTRUSIVE MODEL FOR SUBJECTIVE AND OBJECTIVE REAL-WORLD SPEECH ASSESSMENT USING A MULTI-TASK FRAMEWORK	241
<i>Zhuohuang Zhang, Piyush Vyas, Xuan Dong, Donald S. Williamson, Indiana University, United States</i>	
 AUD-12: DETECTION AND CLASSIFICATION OF ACOUSTIC SCENES AND EVENTS 1: FEW-SHOT LEARNING	
AUD-12.1: FEW-SHOT CONTINUAL LEARNING FOR AUDIO CLASSIFICATION	640
<i>Yu Wang, New York University, United States; Nicholas J. Bryan, Adobe Research, United States; Mark Cartwright, Juan Pablo Bello, New York University, United States; Justin Salamon, Adobe Research, United States</i>	
AUD-12.2: ZERO-SHOT AUDIO CLASSIFICATION WITH FACTORED LINEAR AND NONLINEAR ACOUSTIC-SEMANTIC PROJECTIONS	645
<i>Huang Xie, Okko Räsänen, Tuomas Virtanen, Tampere University, Finland</i>	
AUD-12.3: UNSUPERVISED AND SEMI-SUPERVISED FEW-SHOT ACOUSTIC EVENT CLASSIFICATION	650
<i>Hsin-Ping Huang, University of California, Merced, United States; Krishna Puvvada, Ming Sun, Chao Wang, Amazon Alexa, United States</i>	

AUD-12.4: FLOW-BASED SELF-SUPERVISED DENSITY ESTIMATION FOR ANOMALOUS SOUND DETECTION	655
<i>Kota Dohi, Takashi Endo, Harsh Purohit, Ryo Tanabe, Yohei Kawaguchi, Hitachi, Ltd., Japan</i>	
AUD-12.5: SELF-TRAINING FOR SOUND EVENT DETECTION IN AUDIO MIXTURES	660
<i>Sangwook Park, Ashwin Bellur, Johns Hopkins University, United States; David K. Han, Drexel University, United States; Mounya Elhilali, Johns Hopkins University, United States</i>	
AUD-12.6: PROTOTYPICAL NETWORKS FOR DOMAIN ADAPTATION IN ACOUSTIC SCENE CLASSIFICATION	665
<i>Shubhr Singh, Helen L. Bear, Emmanouil Benetos, Queen Mary University of London, United Kingdom</i>	
AUD-13: DETECTION AND CLASSIFICATION OF ACOUSTIC SCENES AND EVENTS 2: WEAK SUPERVISION	
AUD-13.1: A GLOBAL-LOCAL ATTENTION FRAMEWORK FOR WEAKLY LABELLED AUDIO TAGGING	670
<i>Helin Wang, Yuexian Zou, Peking University, China; Wenwu Wang, University of Surrey, China</i>	
AUD-13.2: AN IMPROVED MEAN TEACHER BASED METHOD FOR LARGE SCALE WEAKLY LABELED SEMI-SUPERVISED SOUND EVENT DETECTION	675
<i>Xu Zheng, Yan Song, National Engineering Laboratory for Speech and Language Information Processing, University of Science and Technology of China, China; Ian McLoughlin, ICT Cluster, Singapore Institute of Technology, Singapore; Lin Liu, iFLYTEK Research, iFLYTEK CO., LTD., China; Li-Rong Dai, National Engineering Laboratory for Speech and Language Information Processing, University of Science and Technology of China, China</i>	
AUD-13.3: COMPARISON OF DEEP CO-TRAINING AND MEAN-TEACHER APPROACHES FOR SEMI-SUPERVISED AUDIO TAGGING	680
<i>Léo Cancès, Thomas Pellegrini, Institut de Recherche en Informatique de Toulouse, France</i>	
AUD-13.4: THE BENEFIT OF TEMPORALLY-STRONG LABELS IN AUDIO EVENT CLASSIFICATION	685
<i>Shawn Hershey, Daniel P. W. Ellis, Eduardo Fonseca, Aren Jansen, Caroline Liu, R Channing Moore, Manoj Plakal, Google, United States</i>	
AUD-13.5: UNSUPERVISED CONTRASTIVE LEARNING OF SOUND EVENT REPRESENTATIONS	690
<i>Eduardo Fonseca, Universitat Pompeu Fabra, Spain; Diego Ortego, Kevin McGuinness, Noel E. O'Connor, Dublin City University, Ireland; Xavier Serra, Universitat Pompeu Fabra, Spain</i>	
AUD-13.6: SOUND EVENT DETECTION BY CONSISTENCY TRAINING AND PSEUDO-LABELING WITH FEATURE-PYRAMID CONVOLUTIONAL RECURRENT NEURAL NETWORKS	695
<i>Chih-Yuan Koh, You-Siang Chen, Yi-Wen Liu, Mingsian Bai, National Tsing Hua University, Taiwan</i>	
AUD-14: QUALITY AND INTELLIGIBILITY MEASURES	
AUD-14.1: SESQA: SEMI-SUPERVISED LEARNING FOR SPEECH QUALITY ASSESSMENT	106
<i>Joan Serra, Jordi Pons, Santiago Pascual, Dolby Laboratories, Spain</i>	
AUD-14.2: DETECTING SIGNAL CORRUPTIONS IN VOICE RECORDINGS FOR SPEECH THERAPY	111
<i>Helmer Nylén, Saikat Chatterjee, Sten Ternström, KTH Royal Institute of Technology, Sweden</i>	

AUD-14.3: MBNET: MOS PREDICTION FOR SYNTHESIZED SPEECH WITH MEAN-BIAS NETWORK	116
<i>Yichong Leng, University of Science and Technology of China, China; Xu Tan, Microsoft Research Asia, China; Sheng Zhao, Microsoft Azure Speech, China; Frank K. Soong, Microsoft Research Asia, China; Xiang-Yang Li, University of Science and Technology of China, China; Tao Qin, Microsoft Research Asia, China</i>	
AUD-14.4: NON-INTRUSIVE BINAURAL PREDICTION OF SPEECH INTELLIGIBILITY BASED ON PHONEME CLASSIFICATION	121
<i>Jana Roßbach, Communication Acoustics and Cluster of Excellence Hearing4All, Carl-von-Ossietzky University Oldenburg, Germany; Saskia Röttges, Christopher F. Hauth, Thomas Brand, Medical Physics and Cluster of Excellence Hearing4All, Carl-von-Ossietzky University Oldenburg, Germany; Bernd T. Meyer, Communication Acoustics and Cluster of Excellence Hearing4All, Carl-von-Ossietzky University Oldenburg, Germany</i>	
AUD-14.5: WARP-Q: QUALITY PREDICTION FOR GENERATIVE NEURAL SPEECH CODECS	126
<i>Wissam Jassim, University College Dublin, Ireland; Jan Skoglund, Michael Chinen, Google, United States; Andrew Hines, University College Dublin, Ireland</i>	
AUD-14.6: CROWDSOURCING APPROACH FOR SUBJECTIVE EVALUATION OF ECHO IMPAIRMENT	131
<i>Ross Cutler, Microsoft, United States; Babak Nadari, Technische Universität Berlin, United States; Markus Loide, Sten Sootla, Ando Saabas, Microsoft, United States</i>	
 AUD-15: MODELING, ANALYSIS AND SYNTHESIS OF ACOUSTIC ENVIRONMENTS 1: SOUNDFIELD ACQUISITION AND REPRODUCTION	
AUD-15.1: AMPLITUDE MATCHING: MAJORIZATION-MINIMIZATION ALGORITHM FOR SOUND FIELD CONTROL ONLY WITH AMPLITUDE CONSTRAINT	136
<i>Shoichi Koyama, Takashi Amakasu, Natsuki Ueno, Hiroshi Saruwatari, University of Tokyo, Japan</i>	
AUD-15.2: 3D MULTIZONE SOUNDFIELD REPRODUCTION IN A REVERBERANT ENVIRONMENT USING INTENSITY MATCHING METHOD	141
<i>Huanyu Zuo, Thushara Abhayapala, The Australian National University, Australia; Prasanga N. Samarasinghe, Australian National University, Australia</i>	
AUD-15.3: THE FAR-FIELD EQUATORIAL ARRAY FOR BINAURAL RENDERING	146
<i>Jens Ahrens, Hannes Helmholtz, Chalmers University of Technology, Sweden; David Lou Alon, Sebastià Amengual Garí, Facebook Reality Labs, United States</i>	
AUD-15.4: SPHERICAL HARMONIC REPRESENTATION FOR DYNAMIC SOUND-FIELD MEASUREMENTS	151
<i>Fabrice Katzberg, Marco Maass, Alfred Mertins, University of Lübeck, Germany</i>	
AUD-15.5: DIRECTION PRESERVING WIND NOISE REDUCTION OF B-FORMAT SIGNALS	156
<i>Adrian Herzog, Daniele Mirabilii, Emanuël Habets, International Audio Laboratories Erlangen, Germany</i>	
 AUD-16: MODELING, ANALYSIS AND SYNTHESIS OF ACOUSTIC ENVIRONMENTS 2: SPATIAL AUDIO	
AUD-16.1: REFINEMENT OF DIRECTION OF ARRIVAL ESTIMATORS BY MAJORIZATION-MINIMIZATION OPTIMIZATION ON THE ARRAY MANIFOLD	161
<i>Robin Scheibler, Masahito Togami, LINE Corporation, Japan</i>	
AUD-16.2: ON THE PREDICTABILITY OF HRTFS FROM EAR SHAPES USING DEEP NETWORKS	166
<i>Yaxuan Zhou, Hao Jiang, Vamsi Krishna Ithapu, Facebook Reality Labs, United States</i>	

AUD-16.3: APPLIED METHODS FOR SPARSE SAMPLING OF HEAD-RELATED TRANSFER FUNCTIONS	171
<i>Lior Arbel, Ben-Gurion University of the Negev, Israel; Zamir Ben-Hur, David Lou Alon, Facebook Reality Labs Research, United States; Boaz Rafaely, Ben-Gurion University of the Negev, Israel</i>	
AUD-16.4: PERSONALIZED HRTF MODELING USING DNN-AUGMENTED BEM	176
<i>Mengfan Zhang, Stanford University, United States; Jui-Hsien Wang, Adobe Research, United States; Doug James, Stanford University, United States</i>	
AUD-16.6: EFFICIENT TRAINING DATA GENERATION FOR PHASE-BASED DOA ESTIMATION	181
<i>Fabian Hübner, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany; Wolfgang Mack, Emanuel Habets, AudioLabs Erlangen, Germany</i>	
 AUD-17: MODELING, ANALYSIS AND SYNTHESIS OF ACOUSTIC ENVIRONMENTS 3: ACOUSTIC ANALYSIS	
AUD-17.1: ACOUSTIC REFLECTORS LOCALIZATION FROM STEREO RECORDINGS USING NEURAL NETWORKS	186
<i>Giovanni Bologni, Richard Heusdens, Jorge Martinez, Technical University of Delft, Netherlands</i>	
AUD-17.2: DETECTING ACOUSTIC REFLECTORS USING A ROBOT’S EGO-NOISE	191
<i>Usama Saqib, Aalborg University, Denmark; Antoine Deleforge, Inria Nancy, France; Jesper Rindom Jensen, Aalborg University, Denmark</i>	
AUD-17.3: PREDICTION OF OBJECT GEOMETRY FROM ACOUSTIC SCATTERING USING CONVOLUTIONAL NEURAL NETWORKS	196
<i>Ziqi Fan, University of Florida, United States; Vibhav Vineet, Microsoft Research, United States; Chenshen Lu, University of Florida, United States; T.W. Wu, University of Kentucky, United States; Kyla McMullen, University of Florida, United States</i>	
AUD-17.4: BLIND AMPLITUDE ESTIMATION OF EARLY ROOM REFLECTIONS USING ALTERNATING LEAST SQUARES	201
<i>Tom Shlomo, Boaz Rafaely, Ben Gurion University of the Negev, Israel</i>	
AUD-17.5: ACOUSTIC ANALYSIS AND DATASET OF TRANSITIONS BETWEEN COUPLED ROOMS	206
<i>Thomas McKenzie, Sebastian J. Schlecht, Ville Pulkki, Aalto University, Finland</i>	
AUD-17.6: ON LOSS FUNCTIONS FOR DEEP-LEARNING BASED T60 ESTIMATION	211
<i>Yuying Li, Yuchen Liu, Donald S. Williamson, Indiana University Bloomington, United States</i>	
 AUD-18: AUDIO AND SPEECH SOURCE SEPARATION 5: SOURCE SEPARATION	
AUD-18.1: TOWARDS LISTENING TO 10 PEOPLE SIMULTANEOUSLY: AN EFFICIENT PERMUTATION INVARIANT TRAINING OF AUDIO SOURCE SEPARATION USING SINKHORN’S ALGORITHM	595
<i>Hideyuki Tachibana, PKSHA Technology, Japan</i>	
AUD-18.2: ACCELERATING AUXILIARY FUNCTION-BASED INDEPENDENT VECTOR ANALYSIS	600
<i>Andreas Brendel, Walter Kellermann, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany</i>	
AUD-18.3: ONE-SHOT CONDITIONAL AUDIO FILTERING OF ARBITRARY SOUNDS	605
<i>Beat Gfeller, Dominik Roblek, Marco Tagliasacchi, Google Research, Switzerland</i>	

AUD-18.4: LOW LATENCY ONLINE BLIND SOURCE SEPARATION BASED ON JOINT OPTIMIZATION WITH BLIND DEREVERBERATION	610
<i>Tetsuya Ueda, University of Tsukuba, Japan; Tomohiro Nakatani, Rintaro Ikeshita, Keisuke Kinoshita, Shoko Araki, NTT Corporation, Japan; Shoji Makino, University of Tsukuba, Japan</i>	
AUD-18.6: AUTOREGRESSIVE FAST MULTICHANNEL NONNEGATIVE MATRIX FACTORIZATION FOR JOINT BLIND SOURCE SEPARATION AND DEREVERBERATION	615
<i>Kouhei Sekiguchi, RIKEN / Kyoto University, Japan; Yoshiaki Bando, National Institute of Advanced Industrial Science and Technology, Japan; Aditya Arie Nugraha, Mathieu Fontaine, RIKEN, Japan; Kazuyoshi Yoshii, Kyoto University / RIKEN, Japan</i>	
AUD-19: AUDIO AND SPEECH SOURCE SEPARATION 6: TOPICS IN SOURCE SEPARATION	
AUD-19.1: PHASE RECOVERY WITH BREGMAN DIVERGENCES FOR AUDIO SOURCE SEPARATION	620
<i>Paul Magron, Pierre-Hugo Vial, IRIT, Université de Toulouse, CNRS, France; Thomas Oberlin, ISAE-SUPAERO, Université de Toulouse, France; Cédric Févotte, IRIT, Université de Toulouse, CNRS, France</i>	
AUD-19.2: ADVERSARIAL ATTACKS ON AUDIO SOURCE SEPARATION	625
<i>Naoya Takahashi, Sony, Japan; Shota Inoue, University of Tsukuba, Japan; Yuki Mitsufuji, Sony, Japan</i>	
AUD-19.3: MAXIMUM A POSTERIORI ESTIMATOR FOR CONVOLUTIVE SOUND SOURCE SEPARATION WITH SUB-SOURCE BASED NTF MODEL AND THE LOCALIZATION PROBABILISTIC PRIOR ON THE MIXING MATRIX	630
<i>Mieszko Fraś, Konrad Kowalczyk, AGH University of Science and Technology, Poland</i>	
AUD-19.4: UNIFIED GRADIENT REWEIGHTING FOR MODEL BIASING WITH APPLICATIONS TO SOURCE SEPARATION	635
<i>Efthymios Tzinis, University of Illinois at Urbana-Champaign, United States; Dimitrios Bralios, University of Illinois at Urbana-Champaign, National Technical University of Athens, United States; Paris Smaragdis, University of Illinois at Urbana-Champaign, Adobe Research, United States</i>	
AUD-20: MUSIC INFORMATION RETRIEVAL AND MUSIC LANGUAGE PROCESSING 3: TOPICS IN MUSIC INFORMATION RETRIEVAL	
AUD-20.1: MELON PLAYLIST DATASET: A PUBLIC DATASET FOR AUDIO-BASED PLAYLIST GENERATION AND MUSIC TAGGING	910
<i>Andres Ferraro, Universitat Pompeu Fabra, Spain; Yuntae Kim, Soohyeon Lee, Biho Kim, Namjun Jo, Semi Lim, Suyon Lim, Jungtaek Jang, Sehwan Kim, Kakao Corp, South Korea; Xavier Serra, Dmitry Bogdanov, Universitat Pompeu Fabra, Spain</i>	
AUD-20.2: INVESTIGATING THE EFFICACY OF MUSIC VERSION RETRIEVAL SYSTEMS FOR SETLIST IDENTIFICATION	915
<i>Furkan Yesiler, Music Technology Group, Universitat Pompeu Fabra, Spain; Emilio Molina, BMAT Licensing S.L., Spain; Joan Serrà, Dolby Laboratories, Spain; Emilia Gómez, Joint Research Centre, European Commission, Spain</i>	
AUD-20.3: INSTRUMENT CLASSIFICATION OF SOLO SHEET MUSIC IMAGES	920
<i>Kevin Ji, Daniel Yang, TJ Tsai, Harvey Mudd College, United States</i>	
AUD-20.4: BYTECOVER: COVER SONG IDENTIFICATION VIA MULTI-LOSS TRAINING	925
<i>Xingjian Du, Zhesong Yu, Bilei Zhu, Bytedance AI Lab, China; Xiaoou Chen, Peking University, China; Zejun Ma, Bytedance AI Lab, China</i>	
AUD-20.5: MULTI-TASK SELF-SUPERVISED PRE-TRAINING FOR MUSIC CLASSIFICATION	930
<i>Ho-Hsiang Wu, New York University, United States; Chieh-Chi Kao, Qingming Tang, Ming Sun, Amazon, United States; Brian McFee, Juan Pablo Bello, New York University, United States; Chao Wang, Amazon, United States</i>	

AUD-20.6: TOWARDS EXPLAINING EXPRESSIVE QUALITIES IN PIANO	935
RECORDINGS: TRANSFER OF EXPLANATORY FEATURES VIA ACOUSTIC DOMAIN ADAPTATION	
<i>Shreyan Chowdhury, Gerhard Widmer, Johannes Kepler University Linz, Austria</i>	
AUD-21: MUSIC INFORMATION RETRIEVAL AND MUSIC LANGUAGE PROCESSING 4: STRUCTURE AND ALIGNMENT	
AUD-21.1: SUPERVISED CHORUS DETECTION FOR POPULAR MUSIC USING CONVOLUTIONAL NEURAL NETWORK AND MULTI-TASK LEARNING	940
<i>Ju-Chiang Wang, Jordan B. L. Smith, Jitong Chen, Xuchen Song, Yuxuan Wang, ByteDance, United States</i>	
AUD-21.2: STRUCTURE-AWARE AUDIO-TO-SCORE ALIGNMENT USING PROGRESSIVELY DILATED CONVOLUTIONAL NEURAL NETWORKS	945
<i>Ruchit Agrawal, Queen Mary University of London, United Kingdom; Daniel Wolff, Institute for Research and Coordination in Acoustics/Music, France; Simon Dixon, Queen Mary University of London, United Kingdom</i>	
AUD-21.3: LANGUAGE-SENSITIVE MUSIC EMOTION RECOGNITION MODELS: ARE WE REALLY THERE YET?	950
<i>Juan Sebastián Gómez-Cañón, Universitat Pompeu Fabra, Spain; Estefanía Cano, Sonquito UG, Germany; Ana Gabriela Pandrea, Perfecto Herrera, Emilia Gómez, Universitat Pompeu Fabra, Spain</i>	
AUD-21.4: LEVERAGING THE STRUCTURE OF MUSICAL PREFERENCE IN CONTENT-AWARE MUSIC RECOMMENDATION	955
<i>Paul Magron, Cédric Févotte, IRIT, Université de Toulouse, CNRS, France</i>	
AUD-21.5: LOW RESOURCE AUDIO-TO-LYRICS ALIGNMENT FROM POLYPHONIC MUSIC RECORDINGS	960
<i>Emir Demirel, Queen Mary University of London, United Kingdom; Sven Ahlbäck, Doremir Music Research AB, Sweden; Simon Dixon, Queen Mary University of London, United Kingdom</i>	
AUD-21.6: MULTIMODAL METRIC LEARNING FOR TAG-BASED MUSIC RETRIEVAL	965
<i>Minz Won, Universitat Pompeu Fabra, Spain; Sergio Oramas, Oriol Nieto, Fabien Gouyon, Pandora, United States; Xavier Serra, Universitat Pompeu Fabra, Spain</i>	
AUD-22: DETECTION AND CLASSIFICATION OF ACOUSTIC SCENES AND EVENTS 3: MULTIMODAL SCENES AND EVENTS	
AUD-22.1: LEARNING CONTEXTUAL TAG EMBEDDINGS FOR CROSS-MODAL ALIGNMENT OF AUDIO AND TAGS	700
<i>Xavier Favory, Music Technology Group, Universitat Pompeu Fabra, Spain; Konstantinos Drossos, Tuomas Virtanen, Audio Research Group, Tampere University, Finland; Xavier Serra, Music Technology Group, Universitat Pompeu Fabra, Spain</i>	
AUD-22.2: EFFICIENT END-TO-END AUDIO EMBEDDINGS GENERATION FOR AUDIO CLASSIFICATION ON TARGET APPLICATIONS	705
<i>Paulo Lopez-Meyer, Juan A. Del Hoyo Ontiveros, Hong Lu, Georg Stemmer, Intel Corporation, Mexico</i>	
AUD-22.3: TEXT-TO-AUDIO GROUNDING: BUILDING CORRESPONDENCE BETWEEN CAPTIONS AND SOUND EVENTS	710
<i>Xuenan Xu, Heinrich Dinkel, Mengyue Wu, Yu Kai, Shanghai Jiao Tong University, China</i>	
AUD-22.4: MULTI-VIEW AUDIO AND MUSIC CLASSIFICATION	715
<i>Huy Phan, Queen Mary University of London, United Kingdom; Huy Le Nguyen, HCM City University of Technology, Vietnam; Oliver Chén, University of Oxford, United Kingdom; Lam Pham, University of Surrey, United Kingdom; Philipp Koch, University of Lübeck, Germany; Ian McLoughlin, Singapore Institute of Technology, Singapore; Alfred Mertins, University of Lübeck, Germany</i>	

AUD-22.5: AUDIO-VISUAL EVENT RECOGNITION THROUGH THE LENS OF ADVERSARY	720
<i>Juncheng Li, Kaixin Ma, Carnegie Mellon University, United States; Shuhui Qu, Stanford University, United States; Po-Yao Huang, Florian Metze, Carnegie Mellon University, United States</i>	
AUD-22.6: DCASENET: AN INTEGRATED PRETRAINED DEEP NEURAL NETWORK FOR DETECTING AND CLASSIFYING ACOUSTIC SCENES AND EVENTS	725
<i>Jee-weon Jung, Hye-jin Shim, Ju-ho Kim, Ha-Jin Yu, University of Seoul, South Korea</i>	
 AUD-23: DETECTION AND CLASSIFICATION OF ACOUSTIC SCENES AND EVENTS 4: DATASETS AND METRICS	
AUD-23.1: A CURATED DATASET OF URBAN SCENES FOR AUDIO-VISUAL SCENE ANALYSIS	730
<i>Shanshan Wang, Annamaria Mesaros, Toni Heittola, Tuomas Virtanen, Tampere University, Finland</i>	
AUD-23.2: IMPROVING SOUND EVENT DETECTION METRICS: INSIGHTS FROM DCASE 2020	735
<i>Giacomo Ferroni, Audio Analytic, United Kingdom; Nicolas Turpault, INRIA, France; Juan Azcarreta, Francesco Tuveri, Audio Analytic, United Kingdom; Romain Serizel, LORIA, France; Cagdas Bilen, Sacha Krstulovic, Audio Analytic, United Kingdom</i>	
AUD-23.3: ARTIFICIALLY SYNTHESISING DATA FOR AUDIO CLASSIFICATION AND SEGMENTATION TO IMPROVE SPEECH AND MUSIC DETECTION IN RADIO BROADCAST	740
<i>Satvik Venkatesh, David Moffat, Alexis Kirke, University of Plymouth, United Kingdom; Gözel Shakeri, Stephen Brewster, University of Glasgow, United Kingdom; Jörg Fachner, Helen Odell-Miller, Alex Street, Anglia Ruskin University, United Kingdom; Nicolas Farina, Brighton and Sussex Medical School, United Kingdom; Sube Banerjee, Eduardo Reck Miranda, University of Plymouth, United Kingdom</i>	
AUD-23.4: LSSED: A LARGE-SCALE DATASET AND BENCHMARK FOR SPEECH EMOTION RECOGNITION	745
<i>Wei-quan Fan, Xiangmin Xu, Xiaofen Xing, Weidong Chen, South China University of Technology, China; Dongyan Huang, UBTECH Robotics Corp, China</i>	
AUD-23.5: ENHANCING AUDIO AUGMENTATION METHODS WITH CONSISTENCY LEARNING	750
<i>Turab Iqbal, University of Surrey, United Kingdom; Karim Helwani, Arvinth Krishnaswamy, Amazon Web Services, United States; Wenwu Wang, University of Surrey, United Kingdom</i>	
AUD-23.6: FAST THRESHOLD OPTIMIZATION FOR MULTI-LABEL AUDIO TAGGING USING SURROGATE GRADIENT LEARNING	755
<i>Thomas Pellegrini, Université de Toulouse III ; IRIT, France; Timothée Masquelier, CERCO UMR 5549, CNRS ; Université de Toulouse III, France</i>	
 AUD-24: SIGNAL ENHANCEMENT AND RESTORATION 1: DEEP LEARNING	
AUD-24.1: TOWARDS EFFICIENT MODELS FOR REAL-TIME DEEP NOISE SUPPRESSION	420
<i>Sebastian Braun, Hannes Gamper, Chandan K. A. Reddy, Ivan Tashev, Microsoft, United States</i>	
AUD-24.2: TEACHER-STUDENT LEARNING FOR LOW-LATENCY ONLINE SPEECH ENHANCEMENT USING WAVE-U-NET	425
<i>Sotaro Nakaoka, Li Li, Shota Inoue, Shoji Makino, University of Tsukuba, Japan</i>	

AUD-24.3: LEARNING DISENTANGLED FEATURE REPRESENTATIONS FOR SPEECH ENHANCEMENT VIA ADVERSARIAL TRAINING	430
<i>Nana Hou, Nanyang Technological University, Singapore; Chenglin Xu, National University of Singapore, Singapore; Eng Siong Chng, Nanyang Technological University, Singapore; Haizhou Li, National University of Singapore, Singapore</i>	
AUD-24.4: SPEECH ENHANCEMENT AUTOENCODER WITH HIERARCHICAL LATENT STRUCTURE	435
<i>Koen Oostermeijer, Jun Du, Qing Wang, University of Science and Technology of China, China; Chin-Hui Lee, Georgia Institute of Technology, United States</i>	
AUD-24.5: VARIATIONAL AUTOENCODER FOR SPEECH ENHANCEMENT WITH A NOISE-AWARE ENCODER	440
<i>Huajian Fang, Guillaume Carbajal, Stefan Wermter, Timo Gerkmann, Universität Hamburg, Germany</i>	
AUD-24.6: GUIDED VARIATIONAL AUTOENCODER FOR SPEECH ENHANCEMENT WITH A SUPERVISED CLASSIFIER	445
<i>Guillaume Carbajal, Julius Richter, Timo Gerkmann, Universität Hamburg, Germany</i>	
AUD-25: SIGNAL ENHANCEMENT AND RESTORATION 2: AUDIO CODING AND RESTORATION	
AUD-25.1: AN EXTENSION OF SPARSE AUDIO DECLIPPER TO MULTIPLE MEASUREMENT VECTORS	450
<i>Satoru Emura, Noboru Harada, NTT Corporation, Japan</i>	
AUD-25.2: REAL-TIME SPEECH FREQUENCY BANDWIDTH EXTENSION	455
<i>Yunpeng Li, Marco Tagliasacchi, Oleg Rybakov, Victor Ungureanu, Dominik Roblek, Google, Switzerland</i>	
AUD-25.3: BANDWIDTH EXTENSION IS ALL YOU NEED	460
<i>Jiaqi Su, Yunyun Wang, Adam Finkelstein, Princeton University, United States; Zeyu Jin, Adobe Research, United States</i>	
AUD-25.4: AUDIO DEQUANTIZATION USING (CO)SPARSE (NON)CONVEX METHODS	465
<i>Pavel Záváška, Pavel Rajmic, Ondřej Mokřý, Brno University of Technology, Czechia</i>	
AUD-25.5: SOURCE-AWARE NEURAL SPEECH CODING FOR NOISY SPEECH COMPRESSION	470
<i>Haici Yang, Kai Zhen, Indiana University, United States; Seungkwon Beack, Electronics and Telecommunications Research Institute, South Korea; Minje Kim, Indiana University, United States</i>	
AUD-25.6: ENHANCING INTO THE CODEC: NOISE ROBUST SPEECH CODING WITH VECTOR-QUANTIZED AUTOENCODERS	475
<i>Jonah Casebeer, University of Illinois at Urbana-Champaign, United States; Vinjai Vale, Stanford University, United States; Umut Isik, Jean-Marc Valin, Ritwik Giri, Arvindh Krishnaswamy, Amazon Web Services, United States</i>	
AUD-26: SIGNAL ENHANCEMENT AND RESTORATION 3: SIGNAL ENHANCEMENT	
AUD-26.1: SPEECH ENHANCEMENT WITH MIXTURE OF DEEP EXPERTS WITH CLEAN CLUSTERING PRE-TRAINING	480
<i>Shlomo E. Chazan, Jacob Goldberger, Sharon Gannot, Bar-Ilan University, Israel</i>	
AUD-26.2: A NOVEL NMF-HMM SPEECH ENHANCEMENT ALGORITHM BASED ON POISSON MIXTURE MODEL	485
<i>Yang Xiang, Aalborg University & Capturi A/S, Denmark; Liming Shi, Aalborg University, Denmark; Jesper Lisby Højvang, Morten Højfeldt Rasmussen, Capturi A/S, Denmark; Mads Græsbøll Christensen, Aalborg University, Denmark</i>	

AUD-26.3: PHONEME-BASED DISTRIBUTION REGULARIZATION FOR SPEECH ENHANCEMENT	490
<i>Yajing Liu, USTC, China; Xiulian Peng, Microsoft Research Asia, China; Zhiwei Xiong, USTC, China; Yan Lu, Microsoft Research Asia, China</i>	
AUD-26.4: COMPRESSED REPRESENTATION OF CEPSTRAL COEFFICIENTS VIA RECURRENT NEURAL NETWORKS FOR INFORMED SPEECH ENHANCEMENT	495
<i>Carol Chermaz, University of Edinburgh, United Kingdom; Dario Leuchtman, Simon Tanner, Roger Wattenhofer, ETH Zurich, Switzerland</i>	
AUD-26.6: OPTIMIZING SHORT-TIME FOURIER TRANSFORM PARAMETERS VIA GRADIENT DESCENT	500
<i>An Zhao, Krishna Subramani, Paris Smaragdis, University of Illinois at Urbana Champaign, United States</i>	
 AUD-27: ACOUSTIC SENSOR ARRAY PROCESSING 1: ARRAY DESIGN AND CALIBRATION	
AUD-27.1: ITERATIVE GEOMETRY CALIBRATION FROM DISTANCE ESTIMATES FOR WIRELESS ACOUSTIC SENSOR NETWORKS	331
<i>Tobias Gburrek, Joerg Schmalenstroer, Reinhold Haeb-Umbach, Paderborn University, Germany</i>	
AUD-27.2: ON THE DESIGN OF SQUARE DIFFERENTIAL MICROPHONE ARRAYS WITH A MULTISTAGE STRUCTURE	336
<i>Xudong Zhao, Northwestern Polytechnical University, China; Gongping Huang, Technion - Israel Institute of Technology, Israel; Jacob Benesty, University of Quebec, Canada; Jingdong Chen, Northwestern Polytechnical University, China; Israel Cohen, Technion - Israel Institute of Technology, Israel</i>	
AUD-27.3: ARRAYS OF FIRST-ORDER STEERABLE DIFFERENTIAL MICROPHONES	341
<i>Federico Borra, Alberto Bernardini, Ivan Bertuletti, Fabio Antonacci, Augusto Sarti, Politecnico di Milano, Italy</i>	
AUD-27.4: PLANAR ARRAY GEOMETRY OPTIMIZATION FOR REGION SOUND ACQUISITION	346
<i>Xi Chen, Chao Pan, Jingdong Chen, Northwestern Polytechnical University, China; Jacob Benesty, University of Quebec, Canada</i>	
AUD-27.5: ESTIMATION OF MICROPHONE CLUSTERS IN ACOUSTIC SENSOR NETWORKS USING UNSUPERVISED FEDERATED LEARNING	351
<i>Alexandru Nelus, Rene Glitza, Rainer Martin, Institute of Communication Acoustics, Ruhr University Bochum, Germany</i>	
AUD-27.6: MISALIGNMENT RECOGNITION IN ACOUSTIC SENSOR NETWORKS USING A SEMI-SUPERVISED SOURCE ESTIMATION METHOD AND MARKOV RANDOM FIELDS	356
<i>Gabriel F Miller, Andreas Brendel, Walter Kellermann, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany; Sharon Gannot, Bar-Ilan University, Israel</i>	
 AUD-28: ACOUSTIC SENSOR ARRAY PROCESSING 2: BEAMFORMING	
AUD-28.1: ROTATION-ROBUST BEAMFORMING BASED ON SOUND FIELD INTERPOLATION WITH REGULARLY CIRCULAR MICROPHONE ARRAY	361
<i>Yukoh Wakabayashi, Kouei Yamaoka, Nobutaka Ono, Tokyo metropolitan university, Japan</i>	
AUD-28.2: SPARSE RECOVERY BEAMFORMING AND UPSCALING IN THE RAY SPACE	366
<i>Shiduo Yu, Craig Jin, University of Sydney, Australia; Fabio Antonacci, Augusto Sarti, Polytechnic University of Milan, Italy</i>	

AUD-28.3: COMBINED DIFFERENTIAL BEAMFORMING WITH UNIFORM LINEAR MICROPHONE ARRAYS	371
<i>Gongping Huang, Technion - Israel Institute of Technology, Israel; Yuzhu Wang, Northwestern Polytechnical University, China; Jacob Benesty, University of Quebec, Canada; Israel Cohen, Technion - Israel Institute of Technology, Israel; Jingdong Chen, Northwestern Polytechnical University, China</i>	
AUD-28.4: POLYNOMIAL MATRIX EIGENVALUE DECOMPOSITION OF SPHERICAL HARMONICS FOR SPEECH ENHANCEMENT	376
<i>Vincent W. Neo, Imperial College London, United Kingdom; Christine Evers, University of Southampton, United Kingdom; Patrick A. Naylor, Imperial College London, United Kingdom</i>	
AUD-28.5: A PARAMETRIC UNCONSTRAINED BINAURAL BEAMFORMER BASED NOISE REDUCTION AND SPATIAL CUE PRESERVATION FOR HEARING-ASSISTIVE DEVICES	381
<i>Jie Zhang, University of Science and Technology of China, China</i>	
AUD-28.6: A SIMPLIFIED WIENER BEAMFORMER BASED ON COVARIANCE MATRIX MODELLING	386
<i>Fan Zhang, Chao Pan, Northwestern Polytechnical University, China; Jacob Benesty, University of Quebec, Canada; Jingdong Chen, Northwestern Polytechnical University, China</i>	
 AUD-29: ACOUSTIC SENSOR ARRAY PROCESSING 3: ACOUSTIC SENSOR ARRAYS	
AUD-29.1: CONTROL ARCHITECTURE OF THE DOUBLE-CROSS-CORRELATION PROCESSOR FOR SAMPLING-RATE-OFFSET ESTIMATION IN ACOUSTIC SENSOR NETWORKS	391
<i>Aleksej Chinaev, Sven Wienand, Gerald Enzner, Ruhr-Universität Bochum, Germany</i>	
AUD-29.2: DEFICIENT BASIS ESTIMATION OF NOISE SPATIAL COVARIANCE MATRIX FOR RANK-CONSTRAINED SPATIAL COVARIANCE MATRIX ESTIMATION METHOD IN BLIND SPEECH EXTRACTION	396
<i>Yuto Kondo, Yuki Kubo, Norihiro Takamune, University of Tokyo, Japan; Daichi Kitamura, National Institute of Technology, Kagawa College, Japan; Hiroshi Saruwatari, University of Tokyo, Japan</i>	
AUD-29.3: REDUCING MODAL ERROR PROPAGATION THROUGH CORRECTING MISMATCHED MICROPHONE GAINS USING RAPID	401
<i>Noman Akbar, Glenn Dickins, The Australian National University, Australia; Mark R. P. Thomas, Dolby Laboratories, United States; Prasanga N. Samarasinghe, Australian National University, Australia; Thushara Abhayapala, The Australian National University, Australia</i>	
AUD-29.4: EVALUATION AND COMPARISON OF THREE SOURCE DIRECTION-OF-ARRIVAL ESTIMATORS USING RELATIVE HARMONIC COEFFICIENTS	405
<i>Yonggang Hu, Prasanga N. Samarasinghe, Australian National University, Australia; Sharon Gannot, Bar-Ilan University, Israel; Thushara Abhayapala, Australian National University, Australia</i>	
AUD-29.5: NETWORK-AWARE OPTIMAL MICROPHONE CHANNEL SELECTION IN WIRELESS ACOUSTIC SENSOR NETWORKS	410
<i>Michael Günther, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany; Haitham Afifi, Paderborn University, Germany; Andreas Brendel, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany; Holger Karl, Paderborn University, Germany; Walter Kellermann, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany</i>	
AUD-29.6: SUPERVISED DIRECT-PATH RELATIVE TRANSFER FUNCTION LEARNING FOR BINAURAL SOUND SOURCE LOCALIZATION	415
<i>Bing Yang, Key Laboratory of Machine Perception, Shenzhen Graduate School, Peking University; Westlake University & Westlake Institute for Advanced Study, China; Xiaofei Li, Westlake University & Westlake Institute for Advanced Study, China; Hong Liu, Key Laboratory of Machine Perception, Shenzhen Graduate School, Peking University, China</i>	

AUD-30: DETECTION AND CLASSIFICATION OF ACOUSTIC SCENES AND EVENTS 5: SCENES

AUD-30.1: CROSS-MODAL SPECTRUM TRANSFORMATION NETWORK FOR 760 ACOUSTIC SCENE CLASSIFICATION

Yang Liu, University of Surrey, United Kingdom; Alexandros Neophytou, Sunando Sengupta, Eric Sommerlade, Microsoft, United Kingdom

AUD-30.2: DOMESTIC ACTIVITIES CLUSTERING FROM AUDIO RECORDINGS 765 USING CONVOLUTIONAL CAPSULE AUTOENCODER NETWORK

Ziheng Lin, Yanxiong Li, Zhangjin Huang, Wenhao Zhang, Yufeng Tan, Yichun Chen, Qianhua He, School of Electronic and Information Engineering, South China University of Technology, Guangzhou, China

AUD-30.3: SOUND EVENT DETECTION AND SEPARATION: A BENCHMARK ON 770 DESED SYNTHETIC SOUNDSCAPES

Nicolas Turpault, Romain Serizel, Université de Lorraine, CNRS, Inria, Loria, France; Scott Wisdom, Hakan Erdogan, John R. Hershey, Google Research, United States; Eduardo Fonseca, Universitat Pompeu Fabra, Spain; Prem Seetharaman, Descript, Inc., United States; Justin Salamon, Adobe Research, United States

AUD-30.4: A TWO-STAGE APPROACH TO DEVICE-ROBUST ACOUSTIC SCENE 775 CLASSIFICATION

Hu Hu, Chao-Han Yang, Georgia Institute of Technology, United States; Xianjun Xia, Tencent Media Lab, China; Xue Bai, Xin Tang, Yajian Wang, Shutong Niu, Li Chai, University of Science and Technology of China, China; Juanjuan Li, Hongning Zhu, Feng Bao, Yuanjun Zhao, Tencent Media Lab, China; Sabato Marco Siniscalchi, University of Enna Kore, Italy; Yannan Wang, Tencent Media Lab, China; Jun Du, University of Science and Technology of China, China; Chin-Hui Lee, Georgia Institute of Technology, United States

AUD-30.5: SUBSPECTRAL NORMALIZATION FOR NEURAL AUDIO DATA PROCESSING 780

Simyung Chang, Hyoungwoo Park, Janghoon Cho, Hyunsin Park, Sungrack Yun, Kyuwoong Hwang, Qualcomm AI Research, South Korea

AUD-30.6: SLOW-FAST AUDITORY STREAMS FOR AUDIO RECOGNITION 785

Evangelos Kazakos, University of Bristol, United Kingdom; Arsha Nagrani, Andrew Zisserman, University of Oxford, United Kingdom; Dima Damen, University of Bristol, United Kingdom

AUD-31: DETECTION AND CLASSIFICATION OF ACOUSTIC SCENES AND EVENTS 6: EVENTS

AUD-31.1: IMPACT OF SOUND DURATION AND INACTIVE FRAMES ON SOUND 790 EVENT DETECTION PERFORMANCE

Keisuke Imoto, Doshisha University, Japan; Sakiko Mishima, Yumi Arai, Reishi Kondo, NEC Corporation, Japan

AUD-31.2: A NEW DCASE 2017 RARE SOUND EVENT DETECTION BENCHMARK 795 UNDER EQUAL TRAINING DATA: CRNN WITH MULTI-WIDTH KERNELS

Jan Baumann, Patrick Meyer, Timo Lohrenz, Technische Universität Braunschweig, Germany; Alexander Roy, Michael Papendieck, IAV GmbH, Germany; Tim Fingscheidt, Technische Universität Braunschweig, Germany

AUD-31.3: ROOM ADAPTIVE CONDITIONING METHOD FOR SOUND EVENT 800 CLASSIFICATION IN REVERBERANT ENVIRONMENTS

Jaejun Lee, Seoul National University, South Korea; Donmoon Lee, Seoul National University, Cochlear.ai, South Korea; Hyeong-Seok Choi, Kyogu Lee, Seoul National University, South Korea

AUD-31.4: SOUND EVENT DETECTION BASED ON CURRICULUM LEARNING 805 CONSIDERING LEARNING DIFFICULTY OF EVENTS

Noriyuki Tonami, Ritsumeikan University, Japan; Keisuke Imoto, Doshisha University, Japan; Yuki Okamoto, Takahiro Fukumori, Yoichi Yamashita, Ritsumeikan University, Japan

AUD-31.5: SOUND EVENT DETECTION IN URBAN AUDIO WITH SINGLE AND 810 MULTI-RATE PCEN

Christopher Ick, Brian McFee, New York University, United States

AUD-31.6: AN IMPROVED EVENT-INDEPENDENT NETWORK FOR POLYPHONIC SOUND EVENT LOCALIZATION AND DETECTION	815
<i>Yin Cao, Turab Iqbal, University of Surrey, United Kingdom; Qiuqiang Kong, Fengyan An, ByteDance, China; Wenwu Wang, Mark Plumbley, University of Surrey, United Kingdom</i>	
 AUD-32: AUDIO FOR MULTIMEDIA AND AUDIO PROCESSING SYSTEMS	
AUD-32.1: LIGHTWEIGHT AND INTERPRETABLE NEURAL MODELING OF AN AUDIO DISTORTION EFFECT USING HYPERCONDITIONED DIFFERENTIABLE BIQUADS	1
<i>Shahan Nercessian, Andy Sarroff, Kurt James Werner, iZotope, Inc., United States</i>	
AUD-32.3: ATTACKING AND DEFENDING BEHIND A PSYCHOACOUSTICS-BASED CAPTCHA	6
<i>Chih-Hsiang Huang, Po-Hao Wu, Yi-Wen Liu, Shan-Hung Wu, National Tsing Hua University, Taiwan</i>	
AUD-32.4: DOUBLE-DCCCAE: ESTIMATION OF BODY GESTURES FROM SPEECH WAVEFORM	11
<i>JinHong Lu, TianHang Liu, Shuzhuang Xu, Hiroshi Shimodaira, University of Edinburgh, United Kingdom</i>	
AUD-32.6: INVESTIGATING LOCAL AND GLOBAL INFORMATION FOR AUTOMATED AUDIO CAPTIONING WITH TRANSFER LEARNING	16
<i>Xuenan Xu, Heinrich Dinkel, Mengyue Wu, Zeyu Xie, Kai Yu, Shanghai Jiao Tong University, China</i>	
 AUD-33: TOPICS IN DEEP LEARNING FOR SPEECH AND AUDIO	
AUD-33.1: UNIDIRECTIONAL MEMORY-SELF-ATTENTION TRANSDUCER FOR ONLINE SPEECH RECOGNITION	820
<i>Jian Luo, Jianzong Wang, Ning Cheng, Jing Xiao, Ping An Technology (Shenzhen) Co., Ltd., China</i>	
AUD-33.2: ACCDOA: ACTIVITY-COUPLED CARTESIAN DIRECTION OF ARRIVAL REPRESENTATION FOR SOUND EVENT LOCALIZATION AND DETECTION	825
<i>Kazuki Shimada, Yuichiro Koyama, Naoya Takahashi, Shusuke Takahashi, Yuki Mitsufuji, Sony Corporation, Japan</i>	
AUD-33.3: SEEN AND UNSEEN EMOTIONAL STYLE TRANSFER FOR VOICE CONVERSION WITH A NEW EMOTIONAL SPEECH DATASET	830
<i>Kun Zhou, National University of Singapore, Singapore; Berrak Sisman, Rui Liu, Singapore University of Technology and Design, Singapore; Haizhou Li, National University of Singapore, Singapore</i>	
AUD-33.4: U-CONVOLUTION BASED RESIDUAL ECHO SUPPRESSION WITH MULTIPLE ENCODERS	835
<i>Eesung Kim, Jae-Jin Jeon, Hyeji Seo, Kakao Enterprise, South Korea</i>	
AUD-33.5: A MULTI-CHANNEL TEMPORAL ATTENTION CONVOLUTIONAL NEURAL NETWORK MODEL FOR ENVIRONMENTAL SOUND CLASSIFICATION	840
<i>You Wang, Chuyao Feng, David Anderson, Georgia Institute of Technology, United States</i>	
AUD-33.6: A GENERAL NETWORK ARCHITECTURE FOR SOUND EVENT LOCALIZATION AND DETECTION USING TRANSFER LEARNING AND RECURRENT NEURAL NETWORK	845
<i>Thi Ngoc Tho Nguyen, Nanyang Technological University, Singapore; Ngoc Khanh Nguyen, Motional, Singapore; Huy Phan, Queen Mary University of London, United Kingdom; Lam Pham, Austrian Institute of Technology, Austria; Kenneth Ooi, Nanyang Technological University, Singapore; Douglas L. Jones, University of Illinois at Urbana-Champaign, United States; Woon-Seng Gan, Nanyang Technological University, Singapore</i>	

AUD-34: ACOUSTIC SYSTEM IDENTIFICATION AND MODELING

AUD-34.1: ROBUST RECURSIVE LEAST M-ESTIMATE ADAPTIVE FILTER FOR THE IDENTIFICATION OF LOW-RANK ACOUSTIC SYSTEMS 301

Hongsen He, Southwest University of Science and Technology, China; Jingdong Chen, Northwestern Polytechnical University, China; Jacob Benesty, University of Quebec, Canada; Yi Yu, Southwest University of Science and Technology, China

AUD-34.2: NOISE-ROBUST ADAPTATION CONTROL FOR SUPERVISED ACOUSTIC SYSTEM IDENTIFICATION EXPLOITING A NOISE DICTIONARY 306

Thomas Haubner, Andreas Brendel, Mohamed Elminshawi, Walter Kellermann, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany

AUD-34.3: INTERPOLATION OF IRREGULARLY SAMPLED FREQUENCY RESPONSE FUNCTIONS USING CONVOLUTIONAL NEURAL NETWORKS 311

Matteo Acerbi, Raffaele Malvermi, Mirco Pezzoli, Fabio Antonacci, Augusto Sarti, Roberto Corradi, Politecnico di Milano, Italy

AUD-34.4: EFFECTIVE RANK-BASED ESTIMATION OF THE COHERENT-TO-DIFFUSE POWER RATIO 316

Heinrich Loellmann, Andreas Brendel, Walter Kellermann, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany

AUD-34.5: ROOM IMPULSE RESPONSE INTERPOLATION FROM A SPARSE SET OF MEASUREMENTS USING A MODAL ARCHITECTURE 321

Orchisama Das, Stanford University, United States; Paul Calamia, Sebastia Gari, Facebook Reality Labs Research, United States

AUD-34.6: PROCESSING PIPELINES FOR EFFICIENT, PHYSICALLY-ACCURATE SIMULATION OF MICROPHONE ARRAY SIGNALS IN DYNAMIC SOUND SCENES 326

Alastair H. Moore, Rebecca R. Vos, Patrick A. Naylor, Mike Brookes, Imperial College London, United Kingdom

BIO-1: BRAIN-COMPUTER INTERFACES

BIO-1.1: A CLASSIFIER FOR IMPROVING CAUSE AND EFFECT IN SSVEP-BASED BCIS FOR INDIVIDUALS WITH COMPLEX COMMUNICATION DISORDERS 1005

Hadi Habibzadeh, University at Albany, State University of New York, United States; Olivia Zhou, New York State Department of Health, United States; James J. S. Norton, Theresa M. Vaughan, Stratton VA Medical Center, United States; Daphney-Stavroula Zois, University at Albany, State University of New York, United States

BIO-1.2: SAGA: SPARSE ADVERSARIAL ATTACK ON EEG-BASED BRAIN COMPUTER INTERFACE 1010

Boyuan Feng, Yuke Wang, Yufei Ding, University of California, Santa Barbara, United States

BIO-1.3: RIEMANNIAN GEOMETRY ON CONNECTIVITY FOR CLINICAL BCI 1015

Marie-Constance Corsi, Aramis lab, Paris Brain Institute, France; Florian Yger, LAMSADE, Univ Paris-Dauphine, France; Sylvain Chevallier, LISV, Univ Paris-Saclay, France; Camille Noûs, Cogitamus, CNRS, France

BIO-1.4: DECODING MUSIC ATTENTION FROM “EEG HEADPHONES”: A USER-FRIENDLY AUDITORY BRAIN-COMPUTER INTERFACE 1020

Wenkang An, Barbara Shinn-Cunningham, Carnegie Mellon University, United States; Hannes Gamper, Dimitra Emmanouilidou, David Johnston, Mihai Jalobeanu, Edward Cutrell, Andrew Wilson, Microsoft Research, United States; Kuan-Jung Chiang, University of California, San Diego, United States; Ivan Tashev, Microsoft Research, United States

BIO-1.5: MITIGATING INTER-SUBJECT BRAIN SIGNAL VARIABILITY FOR EEG-BASED DRIVER FATIGUE STATE CLASSIFICATION 1025

Sunhee Hwang, Sungho Park, Dohyung Kim, Jewook Lee, Hyeran Byun, Yonsei University, South Korea

BIO-1.6: A DEEP SPATIO-TEMPORAL MODEL FOR EEG-BASED IMAGINED SPEECH RECOGNITION	1030
<i>Pradeep Kumar, Erik Scheme, University of New Brunswick, Canada</i>	
 BIO-2: BIOMEDICAL SIGNAL PROCESSING: DETECTION AND ESTIMATION	
BIO-2.1: INCORPORATING UNCERTAINTY IN DATA LABELING INTO DETECTION OF BRAIN INTERICTAL EPILEPTIFORM DISCHARGES FROM EEG USING WEIGHTED OPTIMIZATION	1305
<i>Bahman Abdi-Sargezeh, Nottingham Trent University, United Kingdom; Antonio Valentin, King's College London, United Kingdom; Gonzalo Alarcon, Hamad General Hospital, Qatar; Saeid Sanei, Nottingham Trent University, United Kingdom</i>	
BIO-2.2: MULTI-LEVEL REVERSIBLE ENCRYPTION FOR ECG SIGNALS USING COMPRESSIVE SENSING	1310
<i>Mikko Impiö, Mehmet Yamaç, Tampere University, Finland; Jenni Raitoharju, Finnish Environment Institute, Finland</i>	
BIO-2.3: VALIDATING THE INSPIRED SINEWAVE TECHNIQUE TO MEASURE LUNG HETEROGENEITY COMPARED TO ATELECTASIS & OVER-DISTENDED VOLUME IN COMPUTED TOMOGRAPHY IMAGES	1315
<i>Minh Tran, PhiAnh Phan, Douglas Crockett, University of Oxford, United Kingdom; Federico Formenti, John Cronin, King's College London, United Kingdom; Stephen Payne, Andrew Farmery, University of Oxford, United Kingdom</i>	
BIO-2.4: A PATIENT-INVARIANT MODEL FOR FREEZING OF GAIT DETECTION AIDED BY WAVELET DECOMPOSITION	1320
<i>Nasimuddin Ahmed, Shivam Singhal, Varsha Sharma, Sakyajit Bhattacharya, Aniruddha Sinha, Avik Ghose, TCS Research, India</i>	
BIO-2.5: IDENTIFICATION OF UTERINE CONTRACTIONS BY AN ENSEMBLE OF GAUSSIAN PROCESSES	1325
<i>Liu Yang, Stony Brook University, United States; Cassandra Heiselman, J. Gerald Quirk, Stony Brook University Hospital, United States; Petar M. Djurić, Stony Brook University, United States</i>	
BIO-2.6: ARRHYTHMIA CLASSIFICATION WITH HEARTBEAT-AWARE TRANSFORMER	1330
<i>Bin Wang, Chang Liu, Chuanyan Hu, Xudong Liu, Jun Cao, Lepu Medical Technology, China</i>	
 BIO-3: MACHINE LEARNING FOR COVID-19 DIAGNOSIS	
BIO-3.1: MULTI-LEVEL GROUP TESTING WITH APPLICATION TO ONE-SHOT POOLED COVID-19 TESTS	970
<i>Alejandro Cohen, Massachusetts Institute of Technology, United States; Nir Shlezinger, Ben-Gurion University of the Negev, Israel; Amit Solomon, Massachusetts Institute of Technology, United States; Yonina C. Eldar, Weizmann Institute of Science, Israel; Muriel Medard, Massachusetts Institute of Technology, United States</i>	
BIO-3.2: DETECTION OF COVID-19 THROUGH THE ANALYSIS OF VOCAL FOLD OSCILLATIONS	975
<i>Mahmoud Al Ismail, Soham Deshmukh, Rita Singh, Carnegie Mellon University, United States</i>	
BIO-3.3: CT-CAPS: FEATURE EXTRACTION-BASED AUTOMATED FRAMEWORK FOR COVID-19 DISEASE IDENTIFICATION FROM CHEST CT SCANS USING CAPSULE NETWORKS	980
<i>Shahin Heidarian, Parnian Afshar, Arash Mohammadi, Concordia University, Canada; Moezedin Javad Rafiee, McGill University, Canada; Anastasia Oikonomou, Konstantinos N. Plataniotis, University of Toronto, Canada; Farnoosh Naderkhani, Concordia University, Canada</i>	
BIO-3.4: FEW-SHOT LEARNING FOR CT SCAN BASED COVID-19 DIAGNOSIS	985
<i>Yifan Jiang, Han Chen, Korea University, South Korea; David K. Han, Drexel University, United States; Hanseok Ko, Korea University, South Korea</i>	

BIO-3.5: GRAPH-BASED PYRAMID GLOBAL CONTEXT REASONING WITH A SALIENCY-AWARE PROJECTION FOR COVID-19 LUNG INFECTIONS SEGMENTATION	990
<i>Huimin Huang, Ming Cai, Lanfen Lin, Zhejiang University, China; Jing Zheng, Xiongwei Mao, Xiaohan Qian, Zhiyi Peng, Jianying Zhou, The First Affiliated Hospital, China; Yutaro Iwamoto, Xian-Hua Han, Yen-Wei Chen, Ritsumeikan University, Japan; Ruofeng Tong, Zhejiang University, China</i>	
BIO-3.6: INTERPRETING GLOTTAL FLOW DYNAMICS FOR DETECTING COVID-19 FROM VOICE	995
<i>Soham Deshmukh, Mahmoud Al Ismail, Rita Singh, Carnegie Mellon University, United States</i>	
BIO-3.7: CYCLE GENERATIVE ADVERSARIAL NETWORK APPROACHES TO PRODUCE NOVEL PORTABLE CHEST X-RAYS IMAGES FOR COVID-19 DIAGNOSIS	1000
<i>Daniel I. Moris, Joaquim de Moura, Jorge Novo, Marcos Ortega, University of A Coruña, Spain</i>	
BIO-4: MACHINE LEARNING AND SIGNAL PROCESSING FOR NEURAL SIGNALS	
BIO-4.1: EEG-BASED EMOTION CLASSIFICATION USING GRAPH SIGNAL PROCESSING	1190
<i>Seyed Saman Saboksayr, Gonzalo Mateos, Mujdat Cetin, University of Rochester, United States</i>	
BIO-4.2: GRANGER CAUSALITY BASED DIRECTIONAL PHASE-AMPLITUDE COUPLING MEASURE	1195
<i>Tamanna Tabassum Khan Munia, Selin Aviyente, Michigan State University, United States</i>	
BIO-4.3: REPAC: RELIABLE ESTIMATION OF PHASE-AMPLITUDE COUPLING IN BRAIN NETWORKS	1200
<i>Giulia Cisotto, University of Padova, Italy</i>	
BIO-4.4: SUBSPACE ODDITY - OPTIMIZATION ON PRODUCT OF STIEFEL MANIFOLDS FOR EEG DATA	1205
<i>Maria Sayu Yamamoto, Tokyo University of Agriculture and Technology, Japan; Maria Sayu Yamamoto, Université Paris-Saclay, France; Florian Yger, Université Paris-Dauphine, France; Sylvain Chevallier, Université Paris-Saclay, France</i>	
BIO-4.5: DECENTRALIZED MOTION INFERENCE AND REGISTRATION OF NEUROPIXEL DATA	1210
<i>Erdem Varol, Julien Boussard, Nishchal Dethé, Columbia University, United States; Olivier Winter, Champalimaud Centre for the Unknown, Portugal; Anne Urai, Leiden University, Netherlands; Anne Churchland, University of California, Los Angeles, United States; Nick Steinmetz, University of Washington, United States; Liam Paninski, Columbia University, United States</i>	
BIO-4.6: DYNAMIC GRAPH LEARNING BASED ON GRAPH LAPLACIAN	1215
<i>Bo Jiang, North Carolina State University, United States; Yiyi Yu, University of California, Santa Barbara, United States; Hamid Krim, North Carolina State University, United States; Spencer Smith, University of California, Santa Barbara, United States</i>	
BIO-5: NEUROIMAGING AND NEURAL SIGNAL PROCESSING	
BIO-5.1: MUTUAL INFORMATION FLOWS IN A BIVARIATE POINT PROCESS	1250
<i>Syed Ahmed Pasha, Air University, Pakistan; Victor Solo, University of New South Wales, Australia</i>	
BIO-5.2: UNCERTAINTY-BASED BIOLOGICAL AGE ESTIMATION OF BRAIN MRI SCANS	1255
<i>Karim Armanious, Sherif Abdulatif, Wenbin Shi, University of Stuttgart, Germany; Tobias Hepp, Max Planck Institute for Intelligent Systems, Germany; Sergios Gatidis, University of Tübingen, Germany; Bin Yang, University of Stuttgart, Germany</i>	

BIO-5.3: SPARSE REPRESENTATION OF COMPLEX-VALUED FMRI DATA BASED ON HARD THRESHOLDING OF SPATIAL SOURCE PHASE	1260
<i>Jia-Yang Song, Miao-Ying Qi, Dun-Pei Lv, Chao-Ying Zhang, Qiu-Hua Lin, Dalian University of Technology, China; Vince Calhoun, Georgia State University, Georgia Institute of Technology, Emory University, United States</i>	
BIO-5.4: TUCKER DECOMPOSITION FOR EXTRACTING SHARED AND INDIVIDUAL SPATIAL MAPS FROM MULTI-SUBJECT RESTING-STATE FMRI DATA	1265
<i>Yue Han, Qiu-Hua Lin, Dalian University of Technology, China; Li-Dan Kuang, Changsha University of Science and Technology, China; Xiao-Feng Gong, Fengyu Cong, Dalian University of Technology, China; Vince Calhoun, Georgia State University, Georgia Institute of Technology, Emory University, United States</i>	
BIO-5.5: RIEMANNIAN GEOMETRY-BASED DECODING OF THE DIRECTIONAL FOCUS OF AUDITORY ATTENTION USING EEG	1270
<i>Simon Geirnaert, Tom Francart, Alexander Bertrand, KU Leuven, Belgium</i>	
BIO-6: MEDICAL IMAGE SEGMENTATION	
BIO-6.1: DFDM: A DEEP FEATURE DECOUPLING MODULE FOR LUNG NODULE SEGMENTATION	1035
<i>Wei Chen, Qiuli Wang, Sheng Huang, Xiaohong Zhang, Yucong Li, Chongqing University, China; Chen Liu, The First Affiliated Hospital of Army Medical University, China</i>	
BIO-6.2: PYRAMID U-NET FOR RETINAL VESSEL SEGMENTATION	1040
<i>Jiawei Zhang, Fudan University, China; Yanchun Zhang, Victoria University, Australia; Xiaowei Xu, Guangdong Provincial People's Hospital, China</i>	
BIO-6.3: A PROBABILISTIC MODEL FOR SEGMENTATION OF AMBIGUOUS 3D LUNG NODULE	1045
<i>Xiaojiang Long, Wei Chen, Qiuli Wang, Xiaohong Zhang, Chongqing University, China; Chen Liu, The First Affiliated Hospital of Army Medical University, China; Yucong Li, Jiuquan Zhang, Chongqing University Cancer Hospital, China</i>	
BIO-6.4: SEMI-SUPERVISED SKIN LESION SEGMENTATION WITH LEARNING MODEL CONFIDENCE	1050
<i>Zhiqiang Xie, Enmei Tu, Hao Zheng, Yun Gu, Jie Yang, Institute of Image Processing and Pattern Recognition, Shanghai Jiao Tong University, China</i>	
BIO-6.5: A HYBRID FEATURE ENHANCEMENT METHOD FOR GLAND SEGMENTATION IN HISTOPATHOLOGY IMAGES	1055
<i>Xiangjiang Wu, Xiangtan University, China; Xuanya Li, Baidu Inc., China; Kai Hu, Xiangtan University, China; Zhineng Chen, Fudan University, China; Xieping Gao, Xiangtan University, China</i>	
BIO-6.6: AUTOMATED MULTI-ORGAN SEGMENTATION IN PET IMAGES USING CASCADED TRAINING OF A 3D U-NET AND CONVOLUTIONAL AUTOENCODER	1060
<i>Annika Liebgott, Charlotte Lorenz, University of Stuttgart, Germany; Sergios Gatidis, Viet Chau Vu, Konstantin Nikolaou, University Hospital of Tuebingen, Germany; Bin Yang, University of Stuttgart, Germany</i>	
BIO-7: MEDICAL IMAGE FORMATION AND RECONSTRUCTION	
BIO-7.1: IMPROVED SUPERVISED TRAINING OF PHYSICS-GUIDED DEEP LEARNING IMAGE RECONSTRUCTION WITH MULTI-MASKING	1160
<i>Burhaneddin Yaman, Seyed Amir Hossein Hosseini, Steen Moeller, Mehmet Akcakaya, University of Minnesota, United States</i>	
BIO-7.2: FINE-GRAINED MRI RECONSTRUCTION USING ATTENTIVE SELECTION GENERATIVE ADVERSARIAL NETWORKS	1165
<i>Jingshuai Liu, Mehrdad Yaghoobi, University of Edinburgh, China</i>	

BIO-7.3: ENSURE: ENSEMBLE STEIN'S UNBIASED RISK ESTIMATOR FOR UNSUPERVISED LEARNING	1170
<i>Hemant Kumar Aggarwal, Aniket Pramanik, Mathews Jacob, University of Iowa, United States</i>	
BIO-7.4: ULTRASOUND ELASTICITY IMAGING USING PHYSICS-BASED MODELS AND LEARNING-BASED PLUG-AND-PLAY PRIORS	1175
<i>Narges Mohammadi, Marvin M. Doyley, Mujdat Cetin, University of Rochester, United States</i>	
BIO-7.5: A PERIODIC FRAME LEARNING APPROACH FOR ACCURATE LANDMARK LOCALIZATION IN M-MODE ECHOCARDIOGRAPHY	1180
<i>Yinbing Tian, Beijing University of Posts and Telecommunications, China; Shibiao Xu, Beijing University of Posts and Telecommunications and Institute of Automation, Chinese Academy of Sciences, China; Li Guo, Fuze Cong, Beijing University of Posts and Telecommunications, China</i>	
BIO-7.6: A BIAS-REDUCING LOSS FUNCTION FOR CT IMAGE DENOISING	1185
<i>Madhuri Nagare, Purdue University, United States; Roman Melnyk, GE Healthcare, United States; Obaidullah Rahman, Ken D. Sauer, University of Notre Dame, United States; Charles A. Bouman, Purdue University, United States</i>	
 BIO-8: BIOLOGICAL IMAGE ANALYSIS	
BIO-8.1: LEARNING BINARY SEMANTIC EMBEDDING FOR BREAST HISTOLOGY IMAGE CLASSIFICATION AND RETRIEVAL	1130
<i>Xiao Kang, Xingbo Liu, Shandong University, China; Xiushan Nie, Shandong Jianzhu University, China; Yilong Yin, Shandong University, China</i>	
BIO-8.2: CHANNEL ATTENTION RESIDUAL U-NET FOR RETINAL VESSEL SEGMENTATION	1135
<i>Changlu Guo, Márton Szemenyei, Budapest University of Technology and Economics, Hungary; Yangtao Hu, Hospital of the Peoples Liberation Army Joint Logistics Support Force, China; Wenle Wang, Jiangxi Normal University, China; Wei Zhou, Shenyang Institute of Computing Technology, Chinese Academy of Science, China; Yugen Yi, Jiangxi Normal University, China</i>	
BIO-8.3: CMIM: CROSS-MODAL INFORMATION MAXIMIZATION FOR MEDICAL IMAGING	1140
<i>Tristan Sylvain, Université de Montréal, Canada; Francis Dutil, Tess Berthier, Lisa Di Jorio, Imagia Cybernetics, Canada; Margaux Luck, Mila, Canada; Devon Hjelm, Microsoft Research, United States; Yoshua Bengio, Université de Montréal, Canada</i>	
BIO-8.4: STRUCTURE-ENHANCED ATTENTIVE LEARNING FOR SPINE SEGMENTATION FROM ULTRASOUND VOLUME PROJECTION IMAGES	1145
<i>Rui Zhao, Zixun Huang, Tianshan Liu, Frank H.F. Leung, The Hong Kong Polytechnic University, Hong Kong SAR China; Sai Ho Ling, University of Technology Sydney, Australia; De Yang, Timothy Tin-Yan Lee, Daniel P.K. Lun, Yong-Ping Zheng, Kin-Man Lam, The Hong Kong Polytechnic University, Hong Kong SAR China</i>	
BIO-8.5: FOVEAL AVASCULAR ZONE SEGMENTATION OF OCTA IMAGES USING DEEP LEARNING APPROACH WITH UNSUPERVISED VESSEL SEGMENTATION	1150
<i>Zhijin Liang, Junkang Zhang, Cheolhong An, University of California, San Diego, United States</i>	
BIO-8.6: ACUTE LYMPHOBLASTIC LEUKEMIA DETECTION BASED ON ADAPTIVE UNSHARPENING AND DEEP LEARNING	1155
<i>Angelo Genovese, Università degli Studi di Milano, Italy; Mahdi S. Hosseini, University of New Brunswick, Canada; Vincenzo Piuri, Università degli Studi di Milano, Italy; Konstantinos N. Plataniotis, University of Toronto, Canada; Fabio Scotti, Università degli Studi di Milano, Italy</i>	

BIO-9: MEDICAL IMAGE ANALYSIS

BIO-9.1: META ORDINAL WEIGHTING NET FOR IMPROVING LUNG NODULE CLASSIFICATION 1275

Yiming Lei, Hongming Shan, Junping Zhang, Fudan University, China

BIO-9.2: DEEPNODULE: MULTI-TASK LEARNING OF SEGMENTATION BOOTSTRAP FOR PULMONARY NODULE DETECTION 1280

Jingqin Li, Kun Wang, Dan Yang, Xiaohong Zhang, Chongqing University, China; Chen Liu, The First Affiliated Hospital of Army Medical University, China

BIO-9.3: DENSE ATTENTION MODULE FOR ACCURATE PULMONARY NODULE DETECTION 1285

Jiannan Liu, Jie Li, Fanyong Xue, Chentao Wu, Shanghai Jiao Tong University, China

BIO-9.4: UNSUPERVISED MULTIMODAL IMAGE REGISTRATION WITH ADAPTATIVE GRADIENT GUIDANCE 1290

Zhe Xu, Jiangpeng Yan, Tsinghua University, China; Jie Luo, Harvard Medical School, United States; Xiu Li, Tsinghua University, United States; Jagadeesan Jayender, Harvard Medical School, United States

BIO-9.5: IMPROVING INTRAOPERATIVE LIVER REGISTRATION IN IMAGE-GUIDED SURGERY WITH LEARNING-BASED RECONSTRUCTION 1295

Meng Jia, Matthew Kyan, York University, Canada

BIO-9.6: A NEW FRAMEWORK BASED ON TRANSFER LEARNING FOR CROSS-DATABASE PNEUMONIA DETECTION 1300

Xinxin Shan, Ying Wen, East China Normal University, China

BIO-10: DEEP LEARNING FOR EEG ANALYSIS

BIO-10.1: HIERARCHICAL ATTENTION-BASED TEMPORAL CONVOLUTIONAL NETWORKS FOR EEG-BASED EMOTION RECOGNITION 1065

Chao Li, Boyang Chen, Ziping Zhao, Tianjin Normal University, China; Nicholas Cummins, King's College London, United Kingdom; Björn Schuller, University of Augsburg, Germany

BIO-10.2: DEEP MULTIWAY CANONICAL CORRELATION ANALYSIS FOR MULTI-SUBJECT EEG NORMALIZATION 1070

Jaswanth Reddy Katthi, Sriram Ganapathy, Indian Institute of Science, India

BIO-10.3: DYNAMIC GRAPH MODELING OF SIMULTANEOUS EEG AND EYE-TRACKING DATA FOR READING TASK IDENTIFICATION 1075

Puneet Mathur, Trisha Mittal, Dinesh Manocha, University of Maryland, College Park, United States

BIO-10.4: LEARNING FROM HETEROGENEOUS EEG SIGNALS WITH DIFFERENTIABLE CHANNEL REORDERING 1080

Aaqib Saeed, Eindhoven University of Technology, Netherlands; David Grangier, Olivier Pietquin, Neil Zeghidour, Google Research, France

BIO-10.5: ENHANCING MULTI-CHANNEL EEG CLASSIFICATION WITH GRAMIAN TEMPORAL GENERATIVE ADVERSARIAL NETWORKS 1085

Chi Nok Enoch Kan, Richard Povinelli, Dong Hye Ye, Marquette University, United States

BIO-10.6: A NOVEL CONVOLUTIONAL NEURAL NETWORK MODEL TO REMOVE MUSCLE ARTIFACTS FROM EEG 1090

Haoming Zhang, Chen Wei, Mingqi Zhao, Southern University of Science and Technology, China; Haiyan Wu, University of Macau, China; Quanying Liu, Southern University of Science and Technology, China

BIO-11: DEEP LEARNING FOR PHYSIOLOGICAL SIGNALS

BIO-11.1: MULTILABEL 12-LEAD ELECTROCARDIOGRAM CLASSIFICATION USING BEAT TO SEQUENCE AUTOENCODERS 1095

Alexander William Wong, Amir Salimi, Abram Hindle, Sunil Vasu Kalmady, Padma Kaul, University of Alberta, Canada

BIO-11.2: CONTRASTIVE EMBEDDING LEARNING METHOD FOR RESPIRATORY SOUND CLASSIFICATION 1100

Wenjie Song, Jiqing Han, Hongwei Song, Harbin Institute of Technology, China

BIO-11.3: DECODING NEURAL REPRESENTATIONS OF RHYTHMIC SOUNDS FROM MAGNETOENCEPHALOGRAPHY 1105

Pei-Chun Chang, Jia-Ren Chang, Po-Yu Chen, Li-Kai Cheng, Jen-Chuen Hsieh, National Yang Ming Chiao Tung University, Taiwan; Hsin-Yen Yu, Taipei National University of the Arts, Taiwan; Li-Fen Chen, Yong-Sheng Chen, National Yang Ming Chiao Tung University, Taiwan

BIO-11.4: LOW-DIMENSIONAL DENOISING EMBEDDING TRANSFORMER FOR ECG CLASSIFICATION 1110

Jian Guan, Wenbo Wang, Harbin Engineering University, China; Pengming Feng, State Key Laboratory of Space-Ground Integrated Information Technology, China; Xinxin Wang, Alibaba Group, China; Wenwu Wang, University of Surrey, United Kingdom

BIO-11.5: SELF-SUPERVISED LEARNING FOR SLEEP STAGE CLASSIFICATION WITH PREDICTIVE AND DISCRIMINATIVE CONTRASTIVE CODING 1115

Qinfeng Xiao, Jing Wang, Jianan Ye, Hongjun Zhang, Yuyan Bu, Yiqiong Zhang, Hao Wu, Beijing Jiaotong University, China

BIO-11.6: LENGTH NO LONGER MATTERS: A REAL LENGTH ADAPTIVE ARRHYTHMIA CLASSIFICATION MODEL WITH MULTI-SCALE CONVOLUTION 1120

Chuanqi Han, Fang Yu, Peng Wang, Ruoran Huang, Xi Huang, Li Cui, Institute of Computing Technology, Chinese Academy of Sciences, China

BIO-11.7: FEW-SHOT LEARNING FOR DECODING SURFACE ELECTROMYOGRAPHY FOR HAND GESTURE RECOGNITION 1125

Elahe Rahimian, Soheil Zabihi, Concordia University, Canada; Amir Asif, York University, Canada; Seyed Farokh Atashzar, New York University, United States; Arash Mohammadi, Concordia University, Canada

BIO-12: FEATURE EXTRACTION AND FUSION FOR BIOMEDICAL APPLICATIONS

BIO-12.1: DEEP LUNG AUSCULTATION USING ACOUSTIC BIOMARKERS FOR ABNORMAL RESPIRATORY SOUND EVENT DETECTION 1220

Upasana Tiwari, Swapnil Bhosale, Rupayan Chakraborty, Sunil Kumar Kopparapu, TCS Research and Innovation, India

BIO-12.2: SPEAKER-INDEPENDENT BRAIN ENHANCED SPEECH DENOISING 1225

Maryam Hosseini, Luca Celotti, Éric Plourde, Université de Sherbrooke, Canada

BIO-12.3: SHAPELET BASED VISUAL ASSESSMENT OF CLUSTER TENDENCY IN ANALYZING COMPLEX UPPER LIMB MOTION 1230

Shreyasi Datta, University of Melbourne, Australia; Chandan Karmakar, Deakin University, Australia; Punit Rathore, Massachusetts Institute of Technology, United States; Marimuthu Palaniswami, University of Melbourne, Australia

BIO-12.4: HUMAN-CENTERED FAVORITE MUSIC CLASSIFICATION USING EEG-BASED INDIVIDUAL MUSIC PREFERENCE VIA DEEP TIME-SERIES CCA 1235

Ryosuke Sawata, Graduate School of Information Science and Technology, Hokkaido University, Japan; Takahiro Ogawa, Miki Haseyama, Faculty of Information Science and Technology, Hokkaido University, Japan

BIO-12.5: MULTI-SCALE AND MULTI-REGION FACIAL DISCRIMINATIVE REPRESENTATION FOR AUTOMATIC DEPRESSION LEVEL PREDICTION	1240
<i>Mingyue Niu, Jianhua Tao, Bin Liu, National Laboratory of Pattern Recognition, CASIA, China</i>	
BIO-12.6: ECG HEART-BEAT CLASSIFICATION USING MULTIMODAL IMAGE FUSION	1245
<i>Zeeshan Ahmad, Anika Tabassum, Ling Guan, Naimul Khan, Ryerson University, Canada</i>	
 BIO-13: DEEP LEARNING FOR BIOMEDICAL APPLICATIONS	
BIO-13.1: ESTIMATION OF VISUAL FEATURES OF VIEWED IMAGE FROM INDIVIDUAL AND SHARED BRAIN INFORMATION BASED ON FMRI DATA USING PROBABILISTIC GENERATIVE MODEL	1335
<i>Takaaki Higashi, Keisuke Maeda, Takahiro Ogawa, Miki Haseyama, Hokkaido University, Japan</i>	
BIO-13.2: HIERARCHICAL POSE CLASSIFICATION FOR INFANT ACTION ANALYSIS AND MENTAL DEVELOPMENT ASSESSMENT	1340
<i>Zhongyu Jiang, Jianxiong Zhou, University of Washington, United States; Jang-Hee Yoo, Electronics and Telecommunications Research Institute (ETRI), South Korea; Jenq-Neng Hwang, University of Washington, United States</i>	
BIO-13.3: ON THE RELATIONSHIP BETWEEN SPEECH-BASED BREATHING SIGNAL PREDICTION EVALUATION MEASURES AND BREATHING PARAMETERS ESTIMATION	1345
<i>Zohreh Mostaani, Idiap Research Institute, Switzerland; Venkata Srikanth Nallanthighal, Aki Harma, Philips Research, Netherlands; Helmer Strik, Radboud University Nijmegen, Netherlands; Mathew Magimai-Doss, Idiap Research Institute, Switzerland</i>	
BIO-13.4: PREDICTION OF EGFR MUTATION STATUS IN LUNG ADENOCARCINOMA USING MULTI-SOURCE FEATURE REPRESENTATIONS	1350
<i>Jianhong Cheng, Jin Liu, Meilin Jiang, Hailin Yue, Lin Wu, Jianxin Wang, Central South University, China</i>	
BIO-13.5: TRAINING NEURAL NETWORKS WITH DOMAIN PATTERN-AWARE AUXILIARY TASK FOR SLEEP STAGING	1355
<i>Taeheon Lee, Jeonghwan Hwang, Honggu Lee, Looxid Labs, South Korea</i>	
BIO-13.6: CLASSIFICATION OF EXPERT-NOVICE LEVEL USING EYE TRACKING AND MOTION DATA VIA CONDITIONAL MULTIMODAL VARIATIONAL AUTOENCODER	1360
<i>Yusuke Akamatsu, Keisuke Maeda, Takahiro Ogawa, Miki Haseyama, Hokkaido University, Japan</i>	
 CI-1: THEORY FOR COMPUTATIONAL IMAGING	
CI-1.1: GATE TRIMMING: ONE-SHOT CHANNEL PRUNING FOR EFFICIENT CONVOLUTIONAL NEURAL NETWORKS	1365
<i>Fang Yu, Chuanqi Han, Pengcheng Wang, Xi Huang, Li Cui, Institute of Computing Technology, Chinese Academy of Sciences, China</i>	
CI-1.2: DEEP S3PR: SIMULTANEOUS SOURCE SEPARATION AND PHASE RETRIEVAL USING DEEP GENERATIVE MODELS	1370
<i>Christopher Metzler, Gordon Wetzstein, Stanford University, United States</i>	
CI-1.3: ADVERSARIAL ATTACKS ON OBJECT DETECTORS WITH LIMITED PERTURBATIONS	1375
<i>Zhenbo Shi, Wei Yang, Zhenbo Xu, Zhi Chen, Yingjie Li, University of Science and Technology of China, China; Haoran Zhu, University of Queensland, Australia; Liusheng Huang, University of Science and Technology of China, China</i>	

CI-1.4: A CONSENSUS EQUILIBRIUM SOLUTION FOR DEEP IMAGE PRIOR POWERED BY RED	1380
<i>Rakib Hyder, University of California, Riverside, United States; Hassan Mansour, Yanting Ma, Petros Boufounos, Pu Wang, Mitsubishi Electric Research Laboratories (MERL), United States</i>	
CI-1.5: SUREMAP: PREDICTING UNCERTAINTY IN CNN-BASED IMAGE RECONSTRUCTIONS USING STEIN'S UNBIASED RISK ESTIMATE	1385
<i>Ruangrawee Kitichotkul, Christopher Metzler, Frank Ong, Gordon Wetzstein, Stanford University, United States</i>	
CI-1.6: MULTI-INITIALIZATION META-LEARNING WITH DOMAIN ADAPTATION	1390
<i>Zhengyu Chen, Donglin Wang, Westlake University, China</i>	
CI-2: COMPUTATIONAL IMAGING FOR INVERSE PROBLEMS	
CI-2.1: STOCHASTIC DEEP UNFOLDING FOR IMAGING INVERSE PROBLEMS	1395
<i>Jiaming Liu, Yu Sun, Weijie Gan, Xiaojian Xu, Washington University in St. Louis, United States; Brendt Wohlberg, Los Alamos National Laboratory, United States; Ulugbek Kamilov, Washington University in St. Louis, United States</i>	
CI-2.2: FUSION-BASED DIGITAL IMAGE CORRELATION FRAMEWORK FOR STRAIN MEASUREMENT	1400
<i>Laixi Shi, Carnegie Mellon University, United States; Dehong Liu, Mitsubishi Electric Research Laboratories (MERL), United States; Masaki Umeda, Norihiko Hana, Mitsubishi Electric, Japan</i>	
CI-2.3: LEARNING SPARSIFYING TRANSFORMS FOR IMAGE RECONSTRUCTION IN ELECTRICAL IMPEDANCE TOMOGRAPHY	1405
<i>Kaiyi Yang, Narong Borijindaragoon, Boon Poh Ng, Nanyang Technological University, Singapore; Saiprasad Ravishankar, Michigan State University, Singapore; Bihan Wen, Nanyang Technological University, Singapore</i>	
CI-2.4: D-VDAMP: DENOISING-BASED APPROXIMATE MESSAGE PASSING FOR COMPRESSIVE MRI	1410
<i>Christopher Metzler, Gordon Wetzstein, Stanford University, United States</i>	
CI-2.5: EMPIRICALLY ACCELERATING SCALED GRADIENT PROJECTION USING DEEP NEURAL NETWORK FOR INVERSE PROBLEMS IN IMAGE PROCESSING	1415
<i>Byung Hyun Lee, UNIST, South Korea; Se Young Chun, Seoul National University, South Korea</i>	
CI-2.6: SYNTHETIC APERTURE ACOUSTIC IMAGING WITH DEEP GENERATIVE MODEL BASED SOURCE DISTRIBUTION PRIOR	1420
<i>Boqiang Fan, Rice University, United States; Samarjit Das, Bosch Research Pittsburgh, United States</i>	
CI-3: COMPUTATIONAL PHOTOGRAPHY	
CI-3.1: NON-LOCAL SINGLE IMAGE DE-RAINING WITHOUT DECOMPOSITION	1425
<i>Chaobing Zheng, Wuhan University of Science and Technology, China; Zhengguo Li, Institute for Infocomm Research, A*STAR, China; Yuwen Li, Shiqian Wu, Wuhan University of Science and Technology, China</i>	
CI-3.2: FRAME-RATE-AWARE AGGREGATION FOR EFFICIENT VIDEO SUPER-RESOLUTION	1430
<i>Takashi Isobe, Tsinghua University, China; Fang Zhu, New York University, United States; Shengjin Wang, Tsinghua University, China</i>	
CI-3.3: MEASUREMENT CODING FRAMEWORK WITH ADJACENT PIXELS BASED MEASUREMENT MATRIX FOR COMPRESSIVELY SENSED IMAGES	1435
<i>Rentao Wan, Fudan University, China; Jinjia Zhou, Hosei University, Japan; Bowen Huang, Fudan University, China; Hui Zeng, Zhejiang Gongshang University, China; Yibo Fan, Fudan University, China</i>	

CI-3.4: MULTIVIEW SENSING WITH UNKNOWN PERMUTATIONS: AN OPTIMAL TRANSPORT APPROACH	1440
<i>Yanting Ma, Petros Boufounos, Hassan Mansour, Mitsubishi Electric Research Laboratories (MERL), United States; Shuchin Aeron, Tufts University, United States</i>	
CI-3.5: A HIGH-FRAME-RATE EYE-TRACKING FRAMEWORK FOR MOBILE DEVICES	1445
<i>Yuhu Chang, Changyang He, Yingying Zhao, Tun Lu, Ning Gu, Fudan University, China</i>	
CI-3.6: CATILOC: CAMERA IMAGE TRANSFORMER FOR INDOOR LOCALIZATION	1450
<i>Ali Ghofrani, Rahil Mahdian Toroghi, Iran Broadcasting University (IRIBU), Iran; Seyed Mojtaba Tabatabaie, Alpha Reality, Iran</i>	
 CI-4: REMOTE SENSING AND CODED APERTURE IMAGING	
CI-4.1: SAR IMAGE AUTOFOCUSING USING WIRTINGER CALCULUS AND CAUCHY REGULARIZATION	1455
<i>Zi-Yao Zhang, Odysseas Pappas, Alin Achim, University of Bristol, United Kingdom</i>	
CI-4.2: A HOMOGENEITY-BASED MULTISCALE HYPERSPECTRAL IMAGE REPRESENTATION FOR SPARSE SPECTRAL UNMIXING	1460
<i>Luciano Ayres, Sérgio de Almeida, Catholic University of Pelotas, Brazil; José Bermudez, Ricardo Borsoi, Federal University of Santa Catarina, Brazil</i>	
CI-4.3: LEARNING TO ESTIMATE KERNEL SCALE AND ORIENTATION OF DEFOCUS BLUR WITH ASYMMETRIC CODED APERTURE	1465
<i>Jisheng Li, Tsinghua University, China; Qi Dai, Boyan Technology DBA RayShaper China, China; Jiangtao Wen, Tsinghua University, China</i>	
CI-4.4: TRANSMITTANCE REGULARIZER FOR BINARY CODED APERTURE DESIGN IN A COMPUTATIONAL IMAGING END-TO-END APPROACH	1470
<i>Jorge Bacca, Tatiana Gelvez, Henry Arguello, Universidad Industrial de Santander, Colombia</i>	
CI-4.5: FOURIER TRANSFORMATION AUTOENCODERS FOR ANOMALY DETECTION	1475
<i>Demetris Lappas, Vasileios Argyriou, Dimitrios Makris, Kingston University, United Kingdom</i>	
CI-4.6: ZERO-GRADIENT CONSTRAINTS FOR DESTRIPIING OF REMOTE-SENSING DATA	1480
<i>Kazuki Naganuma, Saori Takeyama, Shunsuke Ono, Tokyo Institute of Technology, Japan</i>	
 IVMSP-1: OBJECT DETECTION 1	
IVMSP-1.1: MULTI-SCALE SAMPLE SELECTION BASED ON STATISTICAL CHARACTERISTICS FOR OBJECT DETECTION	1605
<i>Zhiguo Li, Yuan Yuan, Dandan Ma, Northwestern Polytechnical University, China</i>	
IVMSP-1.2: MS-CSPN: MULTI-SCALE CASCADE SPATIAL PYRAMID NETWORK FOR OBJECT DETECTION	1610
<i>Tianyuan Wang, University of Chinese Academy of Sciences, China; Can Ma, Institute of Information Engineering, Chinese Academy of Sciences, China; Haoshan Su, University of Chinese Academy of Sciences, China; Weiping Wang, Institute of Information Engineering, Chinese Academy of Sciences, China</i>	
IVMSP-1.3: DUAL-STREAM NETWORK BASED ON GLOBAL GUIDANCE FOR SALIENT OBJECT DETECTION	1615
<i>Shuyong Gao, Qianyu Guo, Wei Zhang, Wenqiang Zhang, Fudan University, China; Zhongwei Ji, ZTE Corporation, China</i>	

IVMSP-1.4: SSFENET: SPATIAL AND SEMANTIC FEATURE ENHANCEMENT NETWORK FOR OBJECT DETECTION	1620
<i>Tianyuan Wang, University of Chinese Academy of Sciences, China; Can Ma, Institute of Information Engineering, Chinese Academy of Sciences, China; Haoshan Su, University of Chinese Academy of Sciences, China; Weiping Wang, Institute of Information Engineering, Chinese Academy of Sciences, China</i>	
IVMSP-1.5: SALIENCY-DRIVEN VERSATILE VIDEO CODING FOR NEURAL OBJECT DETECTION	1625
<i>Kristian Fischer, Felix Fleckenstein, Christian Herglotz, André Kaup, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany</i>	
IVMSP-1.6: OBJECT-ORIENTED RELATIONAL DISTILLATION FOR OBJECT DETECTION	1630
<i>Shuyu Miao, Rui Feng, Fudan University, China</i>	
 IVMSP-2: OBJECT DETECTION 2	
IVMSP-2.1: ENSEMBLING OBJECT DETECTORS FOR IMAGE AND VIDEO DATA ANALYSIS	2375
<i>Kateryna Chumachenko, Jenni Raitoharju, Tampere University, Finland; Alexandros Iosifidis, Aarhus University, Denmark; Moncef Gabbouj, Tampere University, Finland</i>	
IVMSP-2.2: TRAINING REAL-TIME PANORAMIC OBJECT DETECTORS WITH VIRTUAL DATASET	2380
<i>Qing-Yang Shen, Tian-Guo Huang, Chengdu University of Information Technology, China; Peng-Xin Ding, Sichuan University, China; Jia He, Chengdu University of Information Technology, China</i>	
IVMSP-2.3: FAST: FEATURE AGGREGATION FOR DETECTING SALIENT OBJECT IN REAL-TIME	2385
<i>Lv Tang, Nanjing University, China; Bo Li, Youtu Lab, Tencent, China; Yanliang Wu, Bo Xiao, Southwest Jiaotong University, China; Shouhong Ding, Youtu Lab, Tencent, China</i>	
IVMSP-2.4: EXPLOITING THE DUAL-TREE COMPLEX WAVELET TRANSFORM FOR SHIP WAKE DETECTION IN SAR IMAGERY	2390
<i>Wanli Ma, Alin Achim, Oktay Karakuş, University of Bristol, United Kingdom</i>	
IVMSP-2.5: TASK-RELATED SELF-SUPERVISED LEARNING FOR REMOTE SENSING IMAGE CHANGE DETECTION	2395
<i>Zhinan Cai, Zhiyu Jiang, Yuan Yuan, Northwestern Polytechnical University, China</i>	
IVMSP-2.6: UNSUPERVISED COMMON PARTICULAR OBJECT DISCOVERY AND LOCALIZATION BY ANALYZING A MATCH GRAPH	2400
<i>Makoto Okuda, National Institute of Information and Communications Technology, Japan; Shin'ichi Satoh, National Institute of Informatics, Japan; Yoichi Sato, University of Tokyo, Japan; Yutaka Kidawara, National Institute of Information and Communications Technology, Japan</i>	
 IVMSP-3: IMAGE & VIDEO CODING 1	
IVMSP-3.1: PREDICTIVE CODING FOR LOSSLESS DATASET COMPRESSION	1515
<i>Madeleine Barowsky, Alexander Mariona, Flavio P. Calmon, Harvard University, United States</i>	
IVMSP-3.2: ADAPTIVE DUAL TREE STRUCTURE FOR SCREEN CONTENT CODING	1520
<i>Weijia Zhu, Jizheng Xu, Li Zhang, Bytedance Inc, United States; Yue Wang, Beijing Bytedance Network Technology, China</i>	

IVMSP-3.3: SNR-ADAPTIVE DEEP JOINT SOURCE-CHANNEL CODING FOR WIRELESS IMAGE TRANSMISSION	1525
<i>Mingze Ding, Harbin Institute of Technology, China; Jiahui Li, Mengyao Ma, Huawei, China; Xiaopeng Fan, Harbin Institute of Technology, China</i>	
IVMSP-3.4: RELYING ON A RATE CONSTRAINT TO REDUCE MOTION ESTIMATION COMPLEXITY	1530
<i>Gabriel B. Sant’Anna, Luiz Henrique Cancellier, Ismael Seidel, Mateus Grellert, José Luís Güntzel, Federal University of Santa Catarina, Brazil</i>	
IVMSP-3.5: A NOVEL VIEWPORT-ADAPTIVE MOTION COMPENSATION TECHNIQUE FOR FISHEYE VIDEO	1535
<i>Andy Regensky, Christian Herglotz, André Kaup, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany</i>	
IVMSP-3.6: RATE-DISTORTION OPTIMIZED MOTION ESTIMATION FOR ON-THE-SPHERE COMPRESSION OF 360 VIDEOS	1540
<i>Alban Marie, Navid Mahmoudian Bidgoli, Thomas Maugey, Aline Roumy, Inria, France</i>	
 IVMSP-4: IMAGE & VIDEO CODING 2	
IVMSP-4.1: ADAPTIVE GOP SIZE DECISION FOR MULTI-PASS VIDEO CODING BASED ON HIDDEN MARKOV MODEL	1865
<i>Bohan Li, Jingning Han, Yaowu Xu, Google LLC, United States</i>	
IVMSP-4.2: IMPROVED INTRA MODE CODING BEYOND AV1	1870
<i>Yize Jin, University of Texas at Austin, Tencent America, United States; Liang Zhao, Xin Zhao, Shan Liu, Tencent America, United States; Alan Bovik, University of Texas at Austin, Tencent America, United States</i>	
IVMSP-4.3: DECISION TREE BASED INTER PARTITION TERMINATION FOR AV1 ENCODING	1875
<i>Xinyao Chen, Yiwei Zhang, Yanghao Li, Jiangtao Wen, Tsinghua University, China</i>	
IVMSP-4.4: IMAGE CODING FOR MACHINES: AN END-TO-END LEARNED APPROACH	1880
<i>Nam Le, Tampere University, Finland; Honglei Zhang, Francesco Cricri, Ramin Ghaznavi Youvalari, Nokia Technologies, Finland; Esa Rahtu, Tampere University, Finland</i>	
IVMSP-4.5: SPARSE FLOW ADVERSARIAL MODEL FOR ROBUST IMAGE COMPRESSION	1885
<i>Shihui Zhao, Shuyuan Yang, Zhi Liu, Zhixi Feng, Xu Liu, Xidian University, China</i>	
IVMSP-4.6: HVS-BASED PERCEPTUAL COLOR COMPRESSION OF IMAGE DATA	1890
<i>Lee Prangnell, Victor Sanchez, University of Warwick, United Kingdom</i>	
 IVMSP-5: SUPER-RESOLUTION 1	
IVMSP-5.1: HOCA: HIGHER-ORDER CHANNEL ATTENTION FOR SINGLE IMAGE SUPER-RESOLUTION	2045
<i>Yalei Lv, Tao Dai, Bin Chen, Tsinghua University, China; Jian Lu, Shenzhen University, China; Shu-Tao Xia, Tsinghua University, China; Jingchao Cao, City University of Hong Kong, China</i>	
IVMSP-5.2: IMAGE SUPER-RESOLUTION USING MULTI-RESOLUTION ATTENTION NETWORK	2050
<i>Anqi Liu, Sumei Li, Yongli Chang, Tianjin University, China</i>	
IVMSP-5.3: REAL IMAGE SUPER-RESOLUTION USING TOKEN BASED CONTEXTUAL ATTENTION	2055
<i>Zhihong Pan, Baopu Li, Baidu USA, United States</i>	

IVMSP-5.4: FEATURE REDUNDANCY MINING: DEEP LIGHT-WEIGHT IMAGE SUPER-RESOLUTION MODEL	2060
<i>Jun Xiao, Wenqi Jia, Kin-Man Lam, The Hong Kong Polytechnic University, Hong Kong SAR China</i>	
IVMSP-5.5: LIGHTWEIGHT NON-LOCAL NETWORK FOR IMAGE SUPER-RESOLUTION	2065
<i>Risheng Wang, Tao Lei, Wenzheng Zhou, Shaanxi University of Science and Technology, China; Qi Wang, Northwestern Polytechnical University, China; Hongying Meng, Asoke K. Nandi, Brunel University London, United Kingdom</i>	
IVMSP-5.6: LIGHTWEIGHT AND ACCURATE SINGLE IMAGE SUPER-RESOLUTION WITH CHANNEL SEGREGATION NETWORK	2070
<i>Zhong-Han Niu, Xi-Peng Lin, An-Ni Yu, Yang-Hao Zhou, Yu-Bin Yang, Nanjing University, China</i>	
IVMSP-6: SUPER-RESOLUTION 2 & MULTI-SCALE PROCESSING	
IVMSP-6.1: DEEP LEARNING ARCHITECTURAL DESIGNS FOR SUPER-RESOLUTION OF NOISY IMAGES	2075
<i>Angel Villar-Corrales, Franziska Schirrmacher, Christian Riess, University of Erlangen-Nuremberg, Germany</i>	
IVMSP-6.2: JOINT COUPLED TRANSFORM LEARNING FRAMEWORK FOR MULTIMODAL IMAGE SUPER-RESOLUTION	2080
<i>Andrew Gigie, Achanna Anil Kumar, TCS Research and Innovation, India; Angshul Majumdar, IIIT Delhi, India; Kriti Kumar, M Girish Chandra, TCS Research and Innovation, India</i>	
IVMSP-6.3: HYPERSPECTRAL IMAGE SUPER-RESOLUTION VIA ADJACENT SPECTRAL FUSION STRATEGY	2085
<i>Qiang Li, Qi Wang, Xuelong Li, Northwestern Polytechnical University, China</i>	
IVMSP-6.4: RAW DATA PROCESSING FOR PRACTICAL TIME-OF-FLIGHT SUPER-RESOLUTION	2090
<i>Miguel Heredia Conde, University of Siegen, Germany</i>	
IVMSP-6.5: EDGE-AWARE MULTI-SCALE PROGRESSIVE COLORIZATION	2095
<i>Jun Xia, Guanghua Tan, Yi Xiao, Fangqiang Xu, Hunan University, China; Chi-Sing Leung, City University of Hong Kong, China</i>	
IVMSP-6.6: LEARNING REPRESENTATION OF MULTI-SCALE OBJECT FOR FINE-GRAINED IMAGE RETRIEVAL	2100
<i>Kangbo Sun, Jie Zhu, Shanghai Jiao Tong University, China</i>	
IVMSP-7: MACHINE LEARNING FOR IMAGE PROCESSING	
IVMSP-7.1: SUPER-RESOLUTION AND INFECTION EDGE DETECTION CO-GUIDED LEARNING FOR COVID-19 CT SEGMENTATION	1725
<i>Yu Sang, Jinguang Sun, Simiao Wang, Liaoning Technical University, China; Heng Qi, Dalian University of Technology, China; Keqiu Li, Tianjin University, China</i>	
IVMSP-7.2: GATING FEATURE DENSE NETWORK FOR SINGLE ANISOTROPIC MR IMAGE SUPER-RESOLUTION	1730
<i>Weidong He, Chongqing University, China; Yangjinan Hu, Columbia University, China; Lulu Wang, Zhongshi He, Chongqing University, China; Jinglong Du, Chongqing Medical University, China</i>	
IVMSP-7.3: ADAPTABLE ENSEMBLE DISTILLATION	1735
<i>Yankai Wang, Dawei Yang, Wei Zhang, Fudan University, China; Zhe Jiang, ARM Ltd., United Kingdom; Wenqiang Zhang, Fudan University, China</i>	

IVMSP-7.4: A SCALE INVARIANT MEASURE OF FLATNESS FOR DEEP NETWORK MINIMA	1740
<i>Akshay Rangamani, Massachusetts Institute of Technology, United States; Nam Nguyen, IBM Research, United States; Abhishek Kumar, Google Brain, United States; Dzung Phan, IBM Research, United States; Sang Chin, Boston University, United States; Trac D. Tran, Johns Hopkins University, United States</i>	
IVMSP-7.5: MULTI-ORDER ADVERSARIAL REPRESENTATION LEARNING FOR COMPOSED QUERY IMAGE RETRIEVAL	1745
<i>Zhixiao Fu, Zhejiang University, China; Xinyuan Chen, East China Normal University, China; Jianfeng Dong, Zhejiang Gongshang University, China; Shouling Ji, Zhejiang University, China</i>	
IVMSP-7.6: DEEP NEURAL NETWORKS WITH FLEXIBLE COMPLEXITY WHILE TRAINING BASED ON NEURAL ORDINARY DIFFERENTIAL EQUATIONS	1750
<i>Zhengbo Luo, Sei-ichiro Kamata, Zitang Sun, Weilian Zhou, Waseda University, Japan</i>	
IVMSP-8: MACHINE LEARNING FOR IMAGE PROCESSING	
IVMSP-8.1: IMPROVING MEMORY BANKS FOR UNSUPERVISED LEARNING WITH LARGE MINI-BATCH, CONSISTENCY AND HARD NEGATIVE MINING	2465
<i>Adrian Bulat, Enrique Sanchez-Lozano, Georgios Tzimiropoulos, Samsung AI Cambridge, United Kingdom</i>	
IVMSP-8.2: ROBUST BINARY LOSS FOR MULTI-CATEGORY CLASSIFICATION WITH LABEL NOISE	2470
<i>Defu Liu, Guowu Yang, University of Electronic Science and Technology of China, China; Jinzhao Wu, Guangxi University, China; Jiayi Zhao, Fengmao Lv, Southwestern University of Finance and Economics, China</i>	
IVMSP-8.3: A PLUG AND PLAY FAST INTERSECTION OVER UNION LOSS FOR BOUNDARY BOX REGRESSION	2475
<i>Zengsheng Kuang, Xian Fang, Nankai University, China; Ruixun Zhang, Massachusetts Institute of Technology, China; Xiuli Shao, Hongpeng Wang, Nankai University, China</i>	
IVMSP-8.4: ATTRIBUTE DECOMPOSITION FOR FLOW-BASED DOMAIN MAPPING	2480
<i>Sheng-Jhe Huang, Jen-Tzung Chien, National Chia Tung University, Taiwan</i>	
IVMSP-8.5: ADA-SISE: ADAPTIVE SEMANTIC INPUT SAMPLING FOR EFFICIENT EXPLANATION OF CONVOLUTIONAL NEURAL NETWORKS	2485
<i>Mahesh Sudhakar, Sam Sattarzadeh, Konstantinos N. Plataniotis, University of Toronto, Canada; Jongseong Jang, Yeonjeong Jeong, Hyunwoo Kim, LG AI Research, South Korea</i>	
IVMSP-8.6: NETWORK PRUNING USING LINEAR DEPENDENCY ANALYSIS ON FEATURE MAPS	2490
<i>Hao Pan, Zhongdi Chao, Jiang Qian, Bojin Zhuang, Shaojun Wang, Ping An Technology (Shenzhen) Co., Ltd., China; Jing Xiao, Ping An Insurance (Group) Company of China, China</i>	
IVMSP-9: ZERO AND FEW SHOT LEARNING	
IVMSP-9.1: MULTIPLE-INPUT MULTIPLE-OUTPUT FUSION NETWORK FOR GENERALIZED ZERO-SHOT LEARNING	2315
<i>Fangming Zhong, Guangze Wang, Zhikui Chen, Xu Yuan, Feng Xia, Dalian University of Technology, China</i>	
IVMSP-9.2: REPRESENTATIVE LOCAL FEATURE MINING FOR FEW-SHOT LEARNING	2320
<i>Kun Yan, Peking University, China; Lingbo Liu, Sun Yat-Sen University, China; Jun Hou, SenseTime, China; Ping Wang, Peking University, China</i>	
IVMSP-9.3: KAN: KNOWLEDGE-AUGMENTED NETWORKS FOR FEW-SHOT LEARNING	2325
<i>Zeyang Zhu, Xin Lin, East China Normal University, China</i>	

IVMSP-9.4: FEW-SHOT IMAGE CLASSIFICATION WITH MULTI-FACET PROTOTYPES	2330
<i>Kun Yan, Peking University, China; Zied Bouraoui, Artois University, France; Ping Wang, Peking University, China; Shoaib Jameel, University of Essex, United Kingdom; Steven Schockaert, Cardiff University, United Kingdom</i>	
IVMSP-9.5: SELF-SUPERVISED LEARNING FOR FEW-SHOT IMAGE CLASSIFICATION	2335
<i>Da Chen, Yuefeng Chen, Yuhong Li, Feng Mao, Yuan He, Hui Xue, Alibaba Group, China</i>	
IVMSP-9.6: DOMAIN ADAPTATION FOR LEARNING GENERATOR FROM PAIRED FEW-SHOT DATA	2340
<i>Chun-Chih Teng, National Chiao Tung University, Taiwan; Pin-Yu Chen, IBM Research, United States; Wei-Chen Chiu, National Chiao Tung University, Taiwan</i>	
 IVMSP-10: METRIC LEARNING AND INTERPRETABILITY	
IVMSP-10.1: DEEP SEMI-SUPERVISED METRIC LEARNING VIA IDENTIFICATION OF MANIFOLD MEMBERSHIPS	2405
<i>Furen Zhuang, Pierre Moulin, University of Illinois at Urbana-Champaign, United States</i>	
IVMSP-10.2: A RANKED SIMILARITY LOSS FUNCTION WITH PAIR WEIGHTING FOR DEEP METRIC LEARNING	2410
<i>Jian Wang, Zhichao Zhang, Shanghai Ocean University, China; Dongmei Huang, Shanghai University of Electric Power, China; Wei Song, Shanghai Ocean University, China; Quanmiao Wei, Donghai Bureau of the Ministry of Natural Resources, China; Xinyue Li, Shanghai Ocean University, China</i>	
IVMSP-10.3: STATISTICAL DISTANCE METRIC LEARNING FOR IMAGE SET RETRIEVAL	2415
<i>Ting-Yao Hu, Alexander G Hauptmann, Carnegie Mellon University, United States</i>	
IVMSP-10.4: DISTRIBUTION-AWARE HIERARCHICAL WEIGHTING METHOD FOR DEEP METRIC LEARNING	2420
<i>Yinong Zhu, Yong Feng, Chongqing University, China; Mingliang Zhou, University of Macau, China; Baohua Qiang, Guilin University of Electronic Technology, China; Leong Hou U, University of Macau, China; Jiajie Zhu, Chongqing University, China</i>	
IVMSP-10.5: INTEGRATED GRAD-CAM: SENSITIVITY-AWARE VISUAL EXPLANATION OF DEEP CONVOLUTIONAL NETWORKS VIA INTEGRATED GRADIENT-BASED SCORING	2425
<i>Sam Sattarzadeh, Mahesh Sudhakar, Konstantinos N. Plataniotis, University of Toronto, Canada; Jongseong Jang, Yeonjeong Jeong, Hyunwoo Kim, LG AI Research, South Korea</i>	
IVMSP-10.6: VISUALIZING ASSOCIATION IN EXEMPLAR-BASED CLASSIFICATION	2430
<i>Taiga Kashima, Ryuichiro Hataya, Hideki Nakayama, University of Tokyo, Japan</i>	
 IVMSP-11: IMAGE & VIDEO SEGMENTATION	
IVMSP-11.1: HFGCNET: HIGH-FREQUENCY GRAPH REASONING FOR FINER SEMANTIC IMAGE SEGMENTATION	1665
<i>Zitang Sun, Xidian University, China; Ruoqing Wang, Zhengbo Luo, Weili Chen, Waseda University, Japan</i>	
IVMSP-11.2: UNSUPERVISED IMAGE SEGMENTATION WITH SPATIAL TRIPLET MARKOV TREES	1670
<i>Hugo Gangloff, SAMOVAR, France; Jean-Baptiste Courbot, Université de Haute-Alsace, France; Emmanuel Monfrini, SAMOVAR, France; Christophe Collet, Université de Strasbourg, France</i>	

IVMSP-11.3: CROSS SCENE VIDEO FOREGROUND SEGMENTATION VIA CO-OCCURRENCE PROBABILITY ORIENTED SUPERVISED AND UNSUPERVISED MODEL INTERACTION	1675
<i>Dong Liang, Nanjing University of Aeronautics and Astronautics, China; Bin Kang, Nanjing University of Posts and Telecommunications, China; Xinyu Liu, Han Sun, Liyan Zhang, Ningzhong Liu, Nanjing University of Aeronautics and Astronautics, China</i>	
IVMSP-11.4: INSTANCE SEGMENTATION WITH THE NUMBER OF CLUSTERS INCORPORATED IN EMBEDDING LEARNING	1680
<i>Jianfeng Cao, Hong Yan, City University of Hong Kong, Hong Kong SAR China</i>	
IVMSP-11.5: DECOUPLE THE HIGH-FREQUENCY AND LOW-FREQUENCY INFORMATION OF IMAGES FOR SEMANTIC SEGMENTATION	1685
<i>Lianlei Shan, Xiaobin Li, Weiqiang Wang, University of Chinese Academy of Sciences, China</i>	
IVMSP-11.6: MPDNET: A 3D MISSING PART DETECTION NETWORK BASED ON POINT CLOUD SEGMENTATION	1690
<i>Zhaoxin Fan, Renmin University of China, China; Hongyan Liu, Tsinghua University, China; Jun He, Min Zhang, Xiaoyong Du, Renmin University of China, China</i>	
 IVMSP-12: IMAGE & VIDEO INTERPRETATION AND UNDERSTANDING	
IVMSP-12.1: SM + : REFINED SCALE MATCH FOR TINY PERSON DETECTION	1815
<i>Nan Jiang, Xuehui Yu, Xiaoke Peng, Yuqi Gong, Zhenjun Han, University of Chinese Academy of Sciences, China</i>	
IVMSP-12.2: SUB-BAND GROUPING SPECTRAL FEATURE-ATTENTION BLOCK FOR HYPERSPECTRAL IMAGE CLASSIFICATION	1820
<i>Weilian Zhou, Sei-ichiro Kamata, Zhengbo Luo, Graduate School of Information, Production and Systems, Waseda University, Japan</i>	
IVMSP-12.3: UNSUPERVISED STACKED CAPSULE AUTOENCODER FOR HYPERSPECTRAL IMAGE CLASSIFICATION	1825
<i>Erting Pan, Yong Ma, Xiaoguang Mei, Fan Fan, Jiayi Ma, Wuhan University, China</i>	
IVMSP-12.4: ROBUST GRAPH AUTOENCODER FOR HYPERSPECTRAL ANOMALY DETECTION	1830
<i>Ganghui Fan, Yong Ma, Jun Huang, Xiaoguang Mei, Jiayi Ma, Wuhan University, China</i>	
 IVMSP-13: IMAGE ENHANCEMENT AND RESTORATION	
IVMSP-13.1: REFLECTANCE-ORIENTED PROBABILISTIC EQUALIZATION FOR IMAGE ENHANCEMENT	2015
<i>Xiaomeng Wu, Yongqing Sun, Akisato Kimura, Kunio Kashino, NTT Corporation, Japan</i>	
IVMSP-13.2: PD-GAN: PERCEPTUAL-DETAILS GAN FOR EXTREMELY NOISY LOW LIGHT IMAGE ENHANCEMENT	2020
<i>Yijun Liu, Zhengning Wang, Yi Zeng, Hao Zeng, Deming Zhao, University of Electronic Science and Technology of China, China</i>	
IVMSP-13.3: HETEROGENEOUS TWO-STREAM NETWORK WITH HIERARCHICAL FEATURE PREFUSION FOR MULTISPECTRAL PAN-SHARPENING	2025
<i>Dong Wang, Yunpeng Bai, Northwestern Polytechnical University, China; Bendu Bai, Xi'an University of Posts and Telecommunications, China; Chanyue Wu, Ying Li, Northwestern Polytechnical University, China</i>	
IVMSP-13.4: SYNERGIC FEATURE ATTENTION FOR IMAGE RESTORATION	2030
<i>Chong Mou, Jian Zhang, School of Electronic and Computer Engineering, Shenzhen Graduate School, Peking University, China</i>	

IVMSP-13.5: EFFICIENT MULTI-OBJECTIVE GANS FOR IMAGE RESTORATION.....	2035
<i>Jingwen Su, Hujun Yin, University of Manchester, United Kingdom</i>	
IVMSP-13.6: SELF-CONVOLUTION: A HIGHLY-EFFICIENT OPERATOR FOR NON-LOCAL IMAGE RESTORATION	2040
<i>Lanqing Guo, Zhiyuan Zha, Nanyang Technological University, Singapore; Saiprasad Ravishankar, Michigan State University, United States; Bihan Wen, Nanyang Technological University, Singapore</i>	
IVMSP-14: HYPERSPECTRAL IMAGING	
IVMSP-14.1: NMF-SAE: AN INTERPRETABLE SPARSE AUTOENCODER FOR HYPERSPECTRAL UNMIXING	1785
<i>Fengchao Xiong, Nanjing University of Science and Technology, China; Jun Zhou, Griffith University, Australia; Minchao Ye, China Jiliang University, China; Jianfeng Lu, Nanjing University of Science and Technology, China; Yuntao Qian, College of Computer Science, China</i>	
IVMSP-14.2: AN ADMM BASED NETWORK FOR HYPERSPECTRAL UNMIXING TASKS	1790
<i>Chao Zhou, Miguel R.D. Rodrigues, University College London, United Kingdom</i>	
IVMSP-14.3: VARIATIONAL AUTOENCODERS FOR HYPERSPECTRAL UNMIXING WITH ENDMEMBER VARIABILITY	1795
<i>Shuaikai Shi, Min Zhao, Lijun Zhang, Jie Chen, Northwestern Polytechnical University, China</i>	
IVMSP-14.4: AUGMENTED GAUSSIAN LINEAR MIXTURE MODEL FOR SPECTRAL VARIABILITY IN HYPERSPECTRAL UNMIXING	1800
<i>Yaser Esmaeili Salehani, Queen's University, Canada; Ehsan Arabnejad, ets, Canada; Saeed Gazor, Queen's University, Canada</i>	
IVMSP-14.5: UTDN: AN UNSUPERVISED TWO-STREAM DIRICHLET-NET FOR HYPERSPECTRAL UNMIXING	1805
<i>Qiwen Jin, Yong Ma, Xiaoguang Mei, Wuhan University, China; Hao Li, Wuhan Polytechnic University, China; Jiayi Ma, Wuhan University, China</i>	
IVMSP-14.6: LAPLACIAN REGULARIZED TENSOR LOW-RANK MINIMIZATION FOR HYPERSPECTRAL SNAPSHOT COMPRESSIVE IMAGING	1810
<i>Yi Yang, Fei Jiang, Hongtao Lu, Shanghai Jiao Tong University, China</i>	
IVMSP-15: LOCAL DESCRIPTORS AND TEXTURE	
IVMSP-15.1: COMPRESSING LOCAL DESCRIPTOR MODELS FOR MOBILE APPLICATIONS	2345
<i>Roy Miles, Krystian Mikolajczyk, Imperial College London, United Kingdom</i>	
IVMSP-15.2: VK-NET: CATEGORY-LEVEL POINT CLOUD REGISTRATION WITH UNSUPERVISED ROTATION INVARIANT KEYPOINTS	2350
<i>Zhi Chen, Wei Yang, Zhenbo Xu, Zhenbo Shi, Liusheng Huang, University of Science and Technology of China, China</i>	
IVMSP-15.3: MATCHING AS COLOR IMAGES: THERMAL IMAGE LOCAL FEATURE DETECTION AND DESCRIPTION	2355
<i>Bhavesh Deshpande, Sourabh Hanamsheth, Yawen Lu, Guoyu Lu, Rochester Institute of Technology, United States</i>	
IVMSP-15.4: FRAME RATE UP-CONVERSION USING KEY POINT AGNOSTIC FREQUENCY-SELECTIVE MESH-TO-GRID RESAMPLING	2360
<i>Viktoria Heimann, Andreas Spruck, André Kaup, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany</i>	

IVMSP-15.5: EFFICIENT REAL-TIME VIDEO STABILIZATION WITH A NOVEL LEAST SQUARES FORMULATION	2365
<i>Jianwei Ke, Alex Watras, Jae-Jun Kim, Hwei Liu, Hongrui Jiang, Yu Hen Hu, University of Wisconsin-Madison, United States</i>	
IVMSP-15.6: DECOMPOSING TEXTURES USING EXPONENTIAL ANALYSIS	2370
<i>Yuan Hou, Annie Cuyt, University of Antwerp, Belgium; Wen-shin Lee, Deepayan Bhowmik, University of Stirling, United Kingdom</i>	
IVMSP-16: POINT CLOUDS AND DEPTH	
IVMSP-16.1: G-ARRAYS: GEOMETRIC ARRAYS FOR EFFICIENT POINT CLOUD PROCESSING	1755
<i>Hoda Roodaki, Masoud Dehyadegari, K. N. Toosi University of technology, Iran; Mahdi Nazm Bojnordi, School of Computing, University of Utah, United States</i>	
IVMSP-16.2: QOE-DRIVEN AND TILE-BASED ADAPTIVE STREAMING FOR POINT CLOUDS	1760
<i>Lisha Wang, Chenglin Li, Wenrui Dai, Junni Zou, Hongkai Xiong, Shanghai Jiao Tong University, China</i>	
IVMSP-16.3: DYNAMIC POINT CLOUD COMPRESSION USING A CUBOID ORIENTED DISCRETE COSINE BASED MOTION MODEL	1765
<i>Ashek Ahmmed, Manoranjan Paul, Charles Sturt University, Australia; Manzur Murshed, FAU, Australia; David Taubman, University of New South Wales, Australia</i>	
IVMSP-16.4: AN ADAPTIVE PYRAMID SINGLE-VIEW DEPTH LOOKUP TABLE CODING METHOD	1770
<i>Yangang Cai, Ronggang Wang, Song Gu, Jian Zhang, Wen Gao, Peking University, China</i>	
IVMSP-16.5: PATCH DECODER-SIDE DEPTH ESTIMATION IN MPEG IMMERSIVE VIDEO	1775
<i>Marta Milovanovic, Felix Henry, Orange Labs, France; Marco Cagnazzo, Telecom Paris, France; Joel Jung, Tencent Media Lab, United States</i>	
IVMSP-16.6: GEOMETRY CONSISTENCY OF AUGMENTED REALITY BASED ON SEMANTICS	1780
<i>Hongyan Quan, Mingwei Yao, XiaoXiao Qian, East China Normal University, China</i>	
IVMSP-17: LOOKING AT PEOPLE	
IVMSP-17.1: WHAT AND WHERE TO FOCUS IN PERSON SEARCH	1485
<i>Tong Zhou, Kun Tian, University of Chinese Academy of Sciences, China</i>	
IVMSP-17.2: STABLE AND EFFECTIVE ONE-STEP METHOD FOR PERSON SEARCH	1490
<i>Ning Lv, Xuezhi Xiang, Xinyao Wang, Jie Yang, Rokia Abdeen, Harbin Engineering University, China; Abdulmotaleb El Saddik, University of Ottawa, Canada</i>	
IVMSP-17.3: AN ADAPTIVE PART-BASED MODEL FOR PERSON RE-IDENTIFICATION	1495
<i>Xipeng Lin, Yubin Yang, Nanjing University, China</i>	
IVMSP-17.4: CROWD COUNTING VIA MULTI-LEVEL REGRESSION WITH LATENT GAUSSIAN MAPS	1500
<i>Yukang Gao, Hua Yang, Shanghai Jiao Tong University, China</i>	
IVMSP-17.5: LIGHTWEIGHT DUAL-TASK NETWORKS FOR CROWD COUNTING IN AERIAL IMAGES	1505
<i>Ye Tian, Chengzhen Duan, Ruilin Zhang, Zhiwei Wei, Harbin Institute of Technology, Shenzhen, China; Hongpeng Wang, Harbin Institute of Technology, Shenzhen; Peng Cheng Laboratory, China</i>	

IVMSP-17.6: SANET++: ENHANCED SCALE AGGREGATION WITH DENSELY CONNECTED FEATURE FUSION FOR CROWD COUNTING 1510
Siyang Pan, Yanyun Zhao, Fei Su, Zhicheng Zhao, Beijing University of Posts and Telecommunications, China

IVMSP-18: FACES IN IMAGES & VIDEOS

IVMSP-18.1: ATTENTIVE SEMANTIC EXPLORING FOR MANIPULATED FACE DETECTION 1575
Zehao Chen, Hua Yang, Shanghai Jiao Tong University, China

IVMSP-18.2: EFFICIENT FACE MANIPULATION VIA DEEP FEATURE DISENTANGLEMENT AND REINTEGRATION NET 1580
Bin Cheng, Tao Dai, Bin Chen, Shutao Xia, Tsinghua University, Peng Cheng Laboratory, China; Xiu Li, Tsinghua University, China

IVMSP-18.3: CONTINUOUS FACE AGING GENERATIVE ADVERSARIAL NETWORKS..... 1585
Seogkyu Jeon, Pilhyeon Lee, Kibeom Hong, Hyeran Byun, Yonsei University, South Korea

IVMSP-18.4: FAST INVERSE MAPPING OF FACE GANS..... 1590
Nicky Bayat, Vahid Reza Khazaie, Yalda Mohsenzadeh, Western University, Canada

IVMSP-18.5: MULTI-LEVEL ADAPTIVE REGION OF INTEREST AND GRAPH LEARNING FOR FACIAL ACTION UNIT RECOGNITION 1595
Jingwei Yan, Hikvision Research Institute, China; Boyuan Jiang, Zhejiang University, China; Jingjing Wang, Qiang Li, Chunmao Wang, Shiliang Pu, Hikvision Research Institute, China

IVMSP-18.6: BRIDGING UNPAIRED FACIAL PHOTOS AND SKETCHES BY LINE-DRAWINGS 1600
Meimei Shang, Fei Gao, Xiang Li, Hangzhou Dianzi University, China; Jingjie Zhu, AiSketcher Technology Co. Ltd., China; Lingna Dai, Hangzhou Dianzi University, China

IVMSP-19: DERAISING AND DEHAZING

IVMSP-19.1: TEMPORAL RAIN DECOMPOSITION WITH SPATIAL STRUCTURE GUIDANCE FOR VIDEO DERAISING 2135
Xinwei Xue, Ying Ding, Long Ma, Yi Wang, Risheng Liu, Xin Fan, Dalian University of Technology, China

IVMSP-19.2: GTA-NET: GRADUAL TEMPORAL AGGREGATION NETWORK FOR FAST VIDEO DERAISING 2140
Xinwei Xue, Xiangyu Meng, Long Ma, Risheng Liu, Xin Fan, Dalian University of Technology, China

IVMSP-19.3: DENSE FEATURE PYRAMID GRIDS NETWORK FOR SINGLE IMAGE DERAISING 2145
Zhen Wang, Dalian University of Technology, China; Cong Wang, The Hong Kong Polytechnic University, China; Zhixun Su, Dalian University of Technology, China; Junyang Chen, Shenzhen University, China

IVMSP-19.4: A FAST AND EFFICIENT NETWORK FOR SINGLE IMAGE DERAISING 2150
Youzhao Yang, Hong Lu, Fudan University, China

IVMSP-19.5: DNANET: DENSE NESTED ATTENTION NETWORK FOR SINGLE IMAGE DEHAZING 2155
Dongdong Ren, Artificial Intelligence Institute, Qilu University of Technology and School of Computer Science and Technology, Heilongjiang University, China; Jinbao Li, Qilu University of Technology (Shandong Academy of Sciences), Shandong Artificial Intelligence Institute, China; Meng Han, Data-driven Intelligence Research (DIR) Lab, Kennesaw State University, United States; Minglei Shu, Qilu University of Technology (Shandong Academy of Sciences), Shandong Artificial Intelligence Institute, China

IVMSP-19.6: FWB-NET: FRONT WHITE BALANCE NETWORK FOR COLOR SHIFT 2160
CORRECTION IN SINGLE IMAGE DEHAZING VIA ATMOSPHERIC LIGHT ESTIMATION
Cong Wang, Yan Huang, Yuexian Zou, Peking University, China; Yong Xu, South China University of Technology, China

IVMSP-20: DENOISING AND DEBLURRING

IVMSP-20.1: LEARNING INTEGRODIFFERENTIAL MODELS FOR IMAGE 2255
DENOISING
Tobias Alt, Joachim Weickert, Saarland University, Germany

IVMSP-20.2: UNROLLING OF DEEP GRAPH TOTAL VARIATION FOR IMAGE 2260
DENOISING
Huy Vu, Gene Cheung, York University, Canada; Yonina C. Eldar, Weizmann Institute of Science, Israel

IVMSP-20.3: LEARNING MODEL-BLIND TEMPORAL DENOISERS WITHOUT 2265
GROUND TRUTHS
Yanghao Li, Bichuan Guo, Jiangtao Wen, Tsinghua University, China; Zhen Xia, Shan Liu, Tencent Media Lab, China; Yuxing Han, Research Institute of Tsinghua University in Shenzhen, China

IVMSP-20.4: IMAGE DENOISING BASED ON CORRELATION ADAPTIVE SPARSE 2270
MODELING
Hangfan Liu, University of Pennsylvania, United States; Jian Zhang, Chong Mou, Peking University, China

IVMSP-20.5: NASA: A NOISE-ADAPTIVE AND STRUCTURE-AWARE LEARNING 2275
FRAMEWORK FOR IMAGE DEBLURRING
Xiaokun Liu, Long Ma, Risheng Liu, Wei Zhong, Xin Fan, Zhongxuan Luo, Dalian University of Technology, China

IVMSP-20.6: MULTIPLE AUXILIARY NETWORKS FOR SINGLE BLIND IMAGE 2280
DEBLURRING
Chen Li, Qi Wang, Shaoteng Liu, Xuelong Li, Northwestern Polytechnical University, China

IVMSP-21: IMAGE & VIDEO QUALITY

IVMSP-21.1: JOINT LEARNING OF IMAGE AESTHETIC QUALITY ASSESSMENT AND 1895
SEMANTIC RECOGNITION BASED ON FEATURE ENHANCEMENT
Xiangfei Liu, Shandong University, China; Xiushan Nie, Shandong Jianzhu University, China; Zhen Shen, Yilong Yin, Shandong University, China

IVMSP-21.2: NESTED ERROR MAP GENERATION NETWORK FOR NO-REFERENCE 1900
IMAGE QUALITY ASSESSMENT
Junming Chen, Peking University, China; Haiqiang Wang, Pengcheng lab, China; Ge Li, Peking University, China; Shan Liu, Tencent, China

IVMSP-21.3: REGRESSION OR CLASSIFICATION? NEW METHODS TO EVALUATE 1905
NO-REFERENCE PICTURE AND VIDEO QUALITY MODELS
Zhengzhong Tu, Chia-Ju Chen, Li-Heng Chen, University of Texas at Austin, United States; Yilin Wang, Neil Birkbeck, Balu Adsumilli, Google Inc., United States; Alan Bovik, University of Texas at Austin, United States

IVMSP-21.4: BLIND IMAGE QUALITY EVALUATOR WITH SCALE ROBUSTNESS 1910
Ci Wang, Mei Li, East China Normal University, China

IVMSP-21.5: MULTI-SCALE FEATURE-GUIDED STEREOSCOPIC VIDEO QUALITY 1915
ASSESSMENT BASED ON 3D CONVOLUTIONAL NEURAL NETWORK
Yingjie Feng, Sumei Li, Yongli Chang, Tianjin University, China

IVMSP-21.6: NO-REFERENCE STEREOSCOPIC IMAGE QUALITY ASSESSMENT BASED ON THE HUMAN VISUAL SYSTEM	1920
<i>Fan Meng, Sumei Li, Yongli Chang, Tianjin University, China</i>	
 IVMSP-22: IMAGE & VIDEO SENSING, MODELING AND REPRESENTATION	
IVMSP-22.1: STEREO RECTIFICATION BASED ON EPIPOLAR CONSTRAINED NEURAL NETWORK	1925
<i>Yuxing Wang, Yawen Lu, Guoyu Lu, Rochester Institute of Technology, United States</i>	
IVMSP-22.2: MULTI-SCALE CASCADE DISPARITY REFINEMENT STEREO NETWORK	1930
<i>Xiaogang Jia, Wei Chen, Zhengfa Liang, Xin Luo, Mingfei Wu, Yusong Tan, Libo Huang, National University of Defense Technology, China</i>	
IVMSP-22.3: HIERARCHICAL CONTEXT GUIDED AGGREGATION NETWORK FOR STEREO MATCHING	1935
<i>Jun Peng, Wangduo Xie, Zijing Huang, Wei Chen, Yong Zhao, Shenzhen Graduate School of Peking University, China</i>	
IVMSP-22.4: COST AFFINITY LEARNING NETWORK FOR STEREO MATCHING	1940
<i>Shenglun Chen, Dalian University of Technology, China; Baopu Li, Baidu Research, China; Wei Wang, Hong Zhang, Haojie Li, Zhihui Wang, Dalian University of Technology, China</i>	
IVMSP-22.5: VIDEO QUALITY PREDICTION USING VOXEL-WISE FMRI MODELS OF THE VISUAL CORTEX	1945
<i>Naga Sailaja Mahankali, Sumohana S Channappayya, Indian Institute of Technology, Hyderabad, India</i>	
IVMSP-22.6: TENSOR DECOMPOSITION VIA CORE TENSOR NETWORKS	1950
<i>Jianfu Zhang, Shanghai Jiao Tong University, China; Zerui Tao, Tokyo University of Agriculture and Technology, Japan; Liqing Zhang, Shanghai Jiao Tong University, China; Qibin Zhao, RIKEN AIP, Japan</i>	
 IVMSP-23: APPLICATIONS 1	
IVMSP-23.1: SIGN LANGUAGE SEGMENTATION WITH TEMPORAL CONVOLUTIONAL NETWORKS	1695
<i>Katrin Renz, Nicolaj Stache, University of Heilbronn, Germany; Samuel Albanie, University of Oxford, United Kingdom; Gül Varol, Ecole des Ponts, France</i>	
IVMSP-23.2: AN ADAPTIVE DISCRIMINANT AND SPARSITY FEATURE DESCRIPTOR FOR FINGER VEIN RECOGNITION	1700
<i>Shuyi Li, Bob Zhang, University of Macau, China</i>	
IVMSP-23.3: ROUTINGGAN: ROUTING AGE PROGRESSION AND REGRESSION WITH DISENTANGLED LEARNING	1705
<i>Zhizhong Huang, Junping Zhang, Hongming Shan, Fudan University, China</i>	
IVMSP-23.4: SEMANTIC-AWARE UNPAIRED IMAGE-TO-IMAGE TRANSLATION FOR URBAN SCENE IMAGES	1710
<i>Zongyao Li, Ren Togo, Takahiro Ogawa, Miki Haseyama, Hokkaido University, Japan</i>	
IVMSP-23.5: FONTNET: ON-DEVICE FONT UNDERSTANDING AND PREDICTION PIPELINE	1715
<i>Rakshith S, Rishabh Khurana, Vibhav Agarwal, Jayesh Rajkumar Vachhani, Guggilla Bhanodai, Samsung Research and Development Institute Bangalore, India</i>	

IVMSP-23.6: AGENT-ENVIRONMENT NETWORK FOR TEMPORAL ACTION PROPOSAL GENERATION	1720
<i>Viet-Khoa Vo-Ho, Hoang-Ngan Le, Kashu Kamazaki, University of Arkansas, United States; Akihiro Sugimoto, National Institute of Informatics, United States; Minh-Triet Tran, University of Science, Vietnam National University - Ho Chi Minh City, United States</i>	
 IVMSP-24: APPLICATIONS 2	
IVMSP-24.1: ADAPTIVE MULTI-DOMAIN LEARNING FOR OUTDOOR 3D HUMAN POSE AND SHAPE ESTIMATION	1985
<i>Zhaoyang Gui, Shanshan Zhang, Kangkan Wang, Jian Yang, Nanjing University of Science and Technology, China; Pong Chi Yuen, Hong Kong Baptist University, China</i>	
IVMSP-24.2: LIGHTWEIGHT HUMAN POSE ESTIMATION UNDER RESOURCE-LIMITED SCENES	1990
<i>Zhe Zhang, Jie Tang, Gangshan Wu, Nanjing University, China</i>	
IVMSP-24.3: ABSOLUTE 3D POSE ESTIMATION AND LENGTH MEASUREMENT OF SEVERELY DEFORMED FISH FROM MONOCULAR VIDEOS IN LONGLINE FISHING	1995
<i>Jie Mei, Jenq-Neng Hwang, University of Washington, United States; Suzanne Romain, Craig Rose, Braden Moore, Kelsey Magrane, Pacific States Marine Fisheries Commission, National Oceanic and Atmospheric Administration, United States</i>	
IVMSP-24.4: CAMERA CALIBRATION WITH POSE GUIDANCE	2000
<i>Yuzhuo Ren, Feng Hu, NVIDIA, United States</i>	
IVMSP-24.5: REAL VERSUS FAKE 4K - AUTHENTIC RESOLUTION ASSESSMENT	2005
<i>Rishi Rajesh Shah, Vyas Anirudh Akundy, Zhou Wang, University of Waterloo, Canada</i>	
IVMSP-24.6: PERCEPTUAL QUALITY ASSESSMENT FOR RECOGNIZING TRUE AND PSEUDO 4K CONTENT	2010
<i>Wenhan Zhu, Guangtao Zhai, Xiongkuo Min, Xiaokang Yang, Shanghai Jiao Tong University, China; Xiao-Ping Zhang, Ryerson University, Canada</i>	
 IVMSP-25: TRACKING	
IVMSP-25.1: A NEW TUBULAR STRUCTURE TRACKING ALGORITHM BASED ON CURVATURE-PENALIZED PERCEPTUAL GROUPING	1955
<i>Li Liu, Donghua University, China; Da Chen, Minglei Shu, Qilu University of Technology (Shandong Academy of Sciences), China; Huazhong Shu, Southeast University, China; Laurent Cohen, Paris Dauphine University, France</i>	
IVMSP-25.2: MULTIPLE HUMAN TRACKING IN NON-SPECIFIC COVERAGE WITH WEARABLE CAMERAS	1960
<i>Sibo Wang, Ruize Han, Wei Feng, Tianjin University, China; Song Wang, University of South Carolina, United States</i>	
IVMSP-25.3: FINE-GRAINED POSE TEMPORAL MEMORY MODULE FOR VIDEO POSE ESTIMATION AND TRACKING	1965
<i>Chaoyi Wang, Shanghai Jiao Tong University, China; Yang Hua, Queen's University Belfast, United Kingdom; Tao Song, Zhengui Xue, Ruhui Ma, Shanghai Jiao Tong University, China; Neil Robertson, Queen's University Belfast, United Kingdom; Haibing Guan, Shanghai Jiao Tong University, China</i>	
IVMSP-25.4: DRAWING ORDER RECOVERY FROM TRAJECTORY COMPONENTS	1970
<i>Minghao Yang, Xukang Zhou, Institute of Automation, Chinese Academy of Sciences, China; Yangchang Sun, University of Chinese Academy of Sciences, China; Jinglong Chen, Baohua Qiang, School of computer science and technology, Guilin University of Electronic Science and technology, China</i>	
IVMSP-25.5: DEEP HASHING FOR MOTION CAPTURE DATA RETRIEVAL	1975
<i>Na Lv, Ying Wang, Zhiquan Feng, Jingliang Peng, University of Jinan, China</i>	

IVMSP-25.6: HIERARCHICAL ATTENTION FUSION FOR GEO-LOCALIZATION..... 1980
Liqi Yan, Westlake University, China; Yiming Cui, University of Florida, United States; Yingjie Chen, Dongfang Liu, Purdue University, United States

IVMSP-26: ATTENTION FOR VISION

IVMSP-26.1: ATTENTIONLITE: TOWARDS EFFICIENT SELF-ATTENTION MODELS 2195 FOR VISION
Souvik Kundu, University of Southern California, United States; Sairam Sundaresan, Intel Labs, United States

IVMSP-26.2: ATTENTION-GUIDED SECOND-ORDER POOLING CONVOLUTIONAL 2200 NETWORKS
Shannan Chen, Dalian University, China; Qiule Sun, Dalian University of Technology, China; Cunhua Li, Jiangsu Ocean University, China; Jianxin Zhang, Dalian Minzu University, China; Qiang Zhang, Dalian University of Technology, China

IVMSP-26.3: SA-NET: SHUFFLE ATTENTION FOR DEEP CONVOLUTIONAL NEURAL 2205 NETWORKS
Qing-Long Zhang, Yu-Bin Yang, State Key Laboratory for Novel Software Technology at Nanjing University, China

IVMSP-26.4: AN ATTENTION BASED WAVELET CONVOLUTIONAL MODEL FOR 2210 VISUAL SALIENCY DETECTION
Reshmi Bhooshan, College of Engineering, Trivandrum, India; Suresh K., Govt. Engineering College, Barton Hill, India

IVMSP-26.5: CASCADE ATTENTION FUSION FOR FINE-GRAINED IMAGE 2215 CAPTIONING BASED ON MULTI-LAYER LSTM
Shuang Wang, Yun Meng, Yu Gu, Lei Zhang, Xiutiao Ye, Jingxian Tian, Licheng Jiao, Xidian University, China

IVMSP-26.6: WEBLY SUPERVISED DEEP ATTENTIVE QUANTIZATION 2220
Jinpeng Wang, Bin Chen, Tao Dai, Shutao Xia, Tsinghua University, China

IVMSP-27: MULTI-MODAL SIGNAL PROCESSING

IVMSP-27.1: UNSUPERVISED AUDIO-VISUAL SUBSPACE ALIGNMENT FOR 1545 HIGH-STAKES DECEPTION DETECTION
Leena Mathur, Maja Matarić, University of Southern California, United States

IVMSP-27.2: VIOLENCE DETECTION IN VIDEOS BASED ON FUSING VISUAL AND 1550 AUDIO INFORMATION
Wenfeng Pang, Qianhua He, Yongjian Hu, Yanxiong Li, South China University of Technology, China

IVMSP-27.3: QUERYD: A VIDEO DATASET WITH HIGH-QUALITY TEXT AND AUDIO 1555 NARRATIONS
Andreea-Maria Oncescu, João F. Henriques, Yang Liu, Andrew Zisserman, Samuel Albanie, University of Oxford, United Kingdom

IVMSP-27.4: GENERATING NATURAL QUESTIONS FROM IMAGES FOR 1560 MULTIMODAL ASSISTANTS
Alkesh Patel, Akanksha Bindal, Hadas Kotek, Christopher Klein, Jason Williams, Apple, United States

IVMSP-27.5: AN ADAPTIVE MULTI-SCALE AND MULTI-LEVEL FEATURES FUSION 1565 NETWORK WITH PERCEPTUAL LOSS FOR CHANGE DETECTION
Jialang Xu, Yang Luo, University of Electronic Science and Technology of China, China; Xinyue Chen, Sichuan University, China; Chunbo Luo, University of Electronic Science and Technology of China, China

IVMSP-27.6: SEEHEAR: SIGNER DIARISATION AND A NEW DATASET 1570
Samuel Albanie, University of Oxford, United Kingdom; Gül Varol, Ecole des Ponts, Univ Gustave Eiffel, France; Liliane Momeni, Triantafyllos Afouras, Andrew Brown, Chuhan Zhang, Ernesto Coto, University of Oxford, France; Necati Cihan Camgöz, Ben Saunders, University of Surrey, United Kingdom; Abhishek Dutta, University of Oxford, United Kingdom; Neil Fox, University College London, United Kingdom; Richard Bowden, University of Surrey, United Kingdom; Bencie Woll, University College London, United Kingdom; Andrew Zisserman, University of Oxford, United Kingdom

IVMSP-28: IMAGE SYNTHESIS

IVMSP-28.1: SEMANTIC IMAGE SYNTHESIS FROM INACCURATE AND COARSE MASKS 2225

Kai Katsumata, Hideki Nakayama, University of Tokyo, Japan

IVMSP-28.2: RANGE GUIDED DEPTH REFINEMENT AND UNCERTAINTY-AWARE AGGREGATION FOR VIEW SYNTHESIS 2230

Yuan Chang, Yisong Chen, Guoping Wang, Peking University, China

IVMSP-28.3: DP-VTON: TOWARD DETAIL-PRESERVING IMAGE-BASED VIRTUAL TRY-ON NETWORK 2235

Yuan Chang, Tao Peng, Ruhan He, Xinrong Hu, Junping Liu, Zili Zhang, Minghua Jiang, Wuhan Textile University, China

IVMSP-28.4: LIGHT FIELD STYLE TRANSFER WITH LOCAL ANGULAR CONSISTENCY 2240

Donal Egan, Martin Alain, Aljosa Smolic, Trinity College Dublin, Ireland

IVMSP-28.5: SKIP ATTENTION GAN FOR REMOTE SENSING IMAGE SYNTHESIS 2245

Kai Deng, Kun Zhang, Ping Yao, Siyuan Cheng, Peng He, Institute of Computing Technology, Chinese Academy of Sciences, China

IVMSP-28.6: IMAGE GENERATION BASED ON TEXTURE GUIDED VAE-AGAN FOR REGIONS OF INTEREST DETECTION IN REMOTE SENSING IMAGES 2250

Libao Zhang, Yanan Liu, Beijing Normal University, China

IVMSP-29: SEMANTIC SEGMENTATION

IVMSP-29.1: EADNET: EFFICIENT ASYMMETRIC DILATED NETWORK FOR SEMANTIC SEGMENTATION 1635

Qihang Yang, Tao Chen, Jiayuan Fan, Ye Lu, Fudan University, China; Chongyan Zuo, Qinghua Chi, Shanghai Huawei Technologies Co., Ltd., China

IVMSP-29.2: LTAF-NET: LEARNING TASK-AWARE ADAPTIVE FEATURES AND REFINING MASK FOR FEW-SHOT SEMANTIC SEGMENTATION 1640

Binjie Mao, Lingfeng Wang, Shiming Xiang, Chunhong Pan, Institute of Automation, Chinese Academy of Sciences, China

IVMSP-29.3: CGAN-NET: CLASS-GUIDED ASYMMETRIC NON-LOCAL NETWORK FOR REAL-TIME SEMANTIC SEGMENTATION 1645

Hanlin Chen, National University of Defense Technology, China; Qingyong Hu, University of Oxford, United Kingdom; Jungang Yang, Jing Wu, National University of Defense Technology, China; Yulan Guo, National University of Defense Technology, Sun Yat-sen University, China

IVMSP-29.4: AGGREGATION ARCHITECTURE AND ALL-TO-ONE NETWORK FOR REAL-TIME SEMANTIC SEGMENTATION 1650

Kuntao Cao, Xi Huang, Jie Shao, University of Electronic Science and Technology of China, China

IVMSP-29.5: NLKD: USING COARSE ANNOTATIONS FOR SEMANTIC SEGMENTATION BASED ON KNOWLEDGE DISTILLATION	1655
<i>Dong Liang, Yun Du, College of Computer Science and Technology, Nanjing University of Aeronautics and Astronautics, China; Han Sun, Liyan Zhang, Ningzhong Liu, Mingqiang Wei, Nanjing University of Aeronautics and Astronautics, China</i>	
IVMSP-29.6: KNOWLEDGE REASONING FOR SEMANTIC SEGMENTATION	1660
<i>Shengjia Chen, Zhixin Li, Xiwei Yang, Guangxi Normal University, China</i>	
 IVMSP-30: INVERSE PROBLEMS IN IMAGE & VIDEO PROCESSING	
IVMSP-30.1: NON-CONVEX SPARSE DEVIATION MODELING VIA GENERATIVE MODELS	2105
<i>Yaxi Yang, Hailin Wang, Southwest University, China; Haiquan Qiu, Xi'an Jiaotong University, China; Jianjun Wang, Southwest University, China; Yao Wang, Xi'an Jiaotong University, China</i>	
IVMSP-30.2: IMRNET: AN ITERATIVE MOTION COMPENSATION AND RESIDUAL RECONSTRUCTION NETWORK FOR VIDEO COMPRESSED SENSING	2110
<i>Xin Yang, Chunling Yang, South China University of Technology, China</i>	
IVMSP-30.3: DEEP COLOR CONSTANCY USING TEMPORAL GRADIENT UNDER AC LIGHT SOURCES	2115
<i>Jeong-Won Ha, Jun-Sang Yoo, Jong-Ok Kim, Korea University, South Korea</i>	
IVMSP-30.4: END-TO-END LEARNING OF VARIATIONAL MODELS AND SOLVERS FOR THE RESOLUTION OF INTERPOLATION PROBLEMS	2120
<i>Ronan Fablet, Lucas Drumetz, IMT Atlantique, UMR CNRS Lab-STICC, France; Francois Rousseau, IMT Atlantique, UMR INSERM Latim, France</i>	
IVMSP-30.5: MULTI-MODELS FUSION FOR LIGHT FIELD ANGULAR SUPER-RESOLUTION	2125
<i>FengYin Cao, Ping An, Xinpeng Huang, Chao Yang, Shanghai University, China; Qiang Wu, University of Technology Sydney, Australia</i>	
IVMSP-30.6: HIDE CHOPIN IN THE MUSIC: EFFICIENT INFORMATION STEGANOGRAPHY VIA RANDOM SHUFFLING	2130
<i>Zhun Sun, BIGO Technology Pte. Ltd., Singapore; Chao Li, Qibin Zhao, RIKEN, Japan</i>	
 IVMSP-31: APPLICATIONS 3	
IVMSP-31.1: POINTER NETWORKS FOR ARBITRARY-SHAPED TEXT SPOTTING	2165
<i>Yi Zhang, Wei Yang, Zhenbo Xu, Yingjie Li, Zhi Chen, Liusheng Huang, University of Science and Technology of China, China</i>	
IVMSP-31.2: ROTATION INVARIANCE ANALYSIS OF LOCAL CONVOLUTIONAL FEATURES IN IMAGE RETRIEVAL	2170
<i>Longjiao Zhao, NAGOYA UNIVERSITY, Japan; Yu Wang, Jien Kato, Ritsumeikan University, Japan</i>	
IVMSP-31.3: SIGNATURE FEATURE MARKING ENHANCED IRM FRAMEWORK FOR DRONE IMAGE ANALYSIS IN PRECISION AGRICULTURE	2175
<i>Atharva Kadethankar, Neelam Sinha, International Institute of Information Technology, India; Vinayaka Hegde, Central Plantation Crops Research Institute, India; Abhishek Burman, General Aeronautics Private Limited, India</i>	
IVMSP-31.4: VEHICLE 3D LOCALIZATION IN ROAD SCENES VIA A MONOCULAR MOVING CAMERA	2180
<i>Yanting Zhang, Donghua University, China; Aotian Zheng, University of Washington, United States; Ke Han, Fudan University, China; Yizhou Wang, University of Washington, United States; Jenq-Neng Hwang, University of Washinton, United States</i>	

IVMSP-31.5: GPS-DENIED NAVIGATION USING SAR IMAGES AND NEURAL NETWORKS 2185

Teresa White, Utah State University, United States; Jesse Wheeler, University of Michigan, United States; Colton Lindstrom, Randall Christensen, Kevin Moon, Utah State University, United States

IVMSP-31.6: ATTENTION-EMBEDDED DECOMPOSED NETWORK WITH UNPAIRED CT IMAGES PRIOR FOR METAL ARTIFACT REDUCTION 2190

Binyu Zhao, Qianqian Ren, Heilongjiang University, China; Jinbao Li, Qilu University of Technology(Shandong Academy of Science), China; Yafeng Zhao, Heilongjiang University, China

IVMSP-32: APPLICATIONS 4

IVMSP-32.1: PARTIAL FEATURE AGGREGATION NETWORK FOR REAL-TIME OBJECT COUNTING 2435

Houshun Yu, Li Zhang, Soochow university, China

IVMSP-32.2: A BAYESIAN INFERENCE APPROACH FOR LOCATION-BASED MICRO MOTIONS USING RADIO FREQUENCY SENSING 2440

David A. Maluf, Cisco Systems, United States; Amr Elnakeeb, University of Southern California, United States; Matt Silverman, Cisco Systems, United States

IVMSP-32.3: ROBUST SPATIAL-TEMPORAL CORRELATION MODEL FOR BACKGROUND INITIALIZATION IN SEVERE SCENE 2445

Yuheng Deng, Wenjun Zhou, Bo Peng, Southwest Petroleum University, China; Dong Liang, Nanjing University of Aeronautics and Astronautics, China; Shun'ichi Kaneko, Hokkaido University, Japan

IVMSP-32.4: 2D-FRFT BASED FREQUENCY SHIFT-INVARIANT DIGITAL IMAGE ENCRYPTION 2450

Lei Gao, Ryerson University, Canada; Lin Qi, Zhengzhou University, China; Ling Guan, Ryerson University, Canada

IVMSP-32.5: CAPTURING BANDING IN IMAGES: DATABASE CONSTRUCTION AND OBJECTIVE ASSESSMENT 2455

Akshay Kapoor, Jatin Sapra, Zhou Wang, University of Waterloo, Canada

IVMSP-32.6: ON THE CAMERA POSITION DITHERING IN VISUAL 3D RECONSTRUCTION 2460

Qier An, Yuan Shen, Tsinghua University, China

IVMSP-33: ACTION RECOGNITION

IVMSP-33.1: LONG-SHORT TEMPORAL MODELING FOR EFFICIENT ACTION RECOGNITION 1835

Liyu Wu, Yuexian Zou, Can Zhang, Peking University, Taiwan

IVMSP-33.2: MULTI-DIRECTIONAL CONVOLUTION NETWORKS WITH SPATIAL-TEMPORAL FEATURE PYRAMID MODULE FOR ACTION RECOGNITION 1840

Bohong Yang, Zijian Wang, Wu Ran, Hong Lu, Fudan University, China; Yi-Ping Phoebe Chen, La Trobe University, China

IVMSP-33.3: UNSUPERVISED MOTION REPRESENTATION ENHANCED NETWORK FOR ACTION RECOGNITION 1845

Xiaohang Yang, Lingtong Kong, Jie Yang, Shanghai Jiao Tong University, China

IVMSP-33.4: AN IMPROVED DEEP RELATION NETWORK FOR ACTION RECOGNITION IN STILL IMAGES 1850

Wei Wu, Jiale Yu, Inner Mongolia University, China

IVMSP-33.5: HUMAN-AWARE COARSE-TO-FINE ONLINE ACTION DETECTION	1855
<i>Zichen Yang, Di Huang, Beihang University, China; Jie Qin, Inception Institute of Artificial Intelligence, United Arab Emirates; Yunhong Wang, Beihang University, China</i>	
IVMSP-33.6: SRF-NET: SELECTIVE RECEPTIVE FIELD NETWORK FOR ANCHOR-FREE TEMPORAL ACTION DETECTION	1860
<i>Ranyu Ning, Can Zhang, Yuexian Zou, Peking University, China</i>	
IVMSP-34: INPAINTING AND OCCLUSIONS HANDLING	
IVMSP-34.1: SEMANTIC-AWARE CONTEXT AGGREGATION FOR IMAGE INPAINTING	2285
<i>Zhilin Huang, Chujun Qin, Ruixian Liu, Zhenyu Weng, Yuesheng Zhu, Peking University, China</i>	
IVMSP-34.2: BISHIFT-NET FOR IMAGE INPAINTING	2290
<i>Xue Zhou, Tao Dai, Yong Jiang, Shutao Xia, Tsinghua University, China</i>	
IVMSP-34.3: OAS-NET: OCCLUSION AWARE SAMPLING NETWORK FOR ACCURATE OPTICAL FLOW	2295
<i>Lingtong Kong, Xiaohang Yang, Jie Yang, Shanghai Jiao Tong University, China</i>	
IVMSP-34.4: MASK4D: 4D CONVOLUTION NETWORK FOR LIGHT FIELD OCCLUSION REMOVAL	2300
<i>Yingjie Li, Wei Yang, Zhenbo Xu, Zhi Cheng, Zhenbo Shi, Yi Zhang, Liusheng Huang, University of Science and Technology of China, China</i>	
IVMSP-34.5: SELF-SUPERVISED DEPTH ESTIMATION VIA IMPLICIT CUES FROM VIDEOS	2305
<i>Jianrong Wang, Ge Zhang, Zhenyu Wu, Xuwei Li, College of Intelligence and Computing, Tianjin University, China; Li Liu, Shenzhen Research Institute of Big Data, the Chinese University of Hong Kong, Shenzhen, China</i>	
IVMSP-34.6: SCENE COMPLETENESS-AWARE LIDAR DEPTH COMPLETION FOR DRIVING SCENARIO	2310
<i>Cho-Ying Wu, Ulrich Neumann, University of Southern California, United States</i>	
IFS-1: MULTIMEDIA FORENSICS 1	
IFS-1.1: SEMI-SUPERVISED FEATURE EMBEDDING FOR DATA SANITIZATION IN REAL-WORLD EVENTS	2495
<i>Bahram Lavi, Jose Nascimento, Anderson Rocha, University of Campinas, Brazil</i>	
IFS-1.2: EXPOSING GAN-GENERATED FACES USING INCONSISTENT CORNEAL SPECULAR HIGHLIGHTS	2500
<i>Shu Hu, University at Buffalo, State University of New York, United States; Yuezun Li, Ocean University of China, China; Siwei Lyu, University at Buffalo, State University of New York, United States</i>	
IFS-1.3: A FEATURES DECOUPLING METHOD FOR MULTIPLE MANIPULATIONS IDENTIFICATION IN IMAGE OPERATION CHAINS	2505
<i>Jiixin Chen, Xin Liao, Hunan University, China; Wei Wang, Institute of Automation, Chinese Academy of Sciences, China; Zheng Qin, Hunan University, China</i>	
IFS-1.4: SUBJECTIVE AND OBJECTIVE EVALUATION OF DEEPFAKE VIDEOS	2510
<i>Pavel Korshunov, Sébastien Marcel, Idiap Research Institute, Switzerland</i>	
IFS-1.5: FORENSICABILITY OF DEEP NEURAL NETWORK INFERENCE PIPELINES	2515
<i>Alexander Schlögl, Tobias Kupek, Rainer Böhme, University of Innsbruck, Austria</i>	

IFS-2: MULTIMEDIA FORENSICS 2

IFS-2.1: SERN: STANCE EXTRACTION AND REASONING NETWORK FOR FAKE NEWS DETECTION 2520

Jianhui Xie, Song Liu, Ruixin Liu, Yinghong Zhang, Yuesheng Zhu, Peking University, China

IFS-2.2: AN EFFICIENT PAPER ANTI-COUNTERFEITING METHOD BASED ON MICROSTRUCTURE ORIENTATION ESTIMATION 2525

Yuhao Sun, Xin Liao, Hunan University, China; Jianfeng Liu, China Jiliang University, China

IFS-2.3: LEARNING DOUBLE-COMPRESSION VIDEO FINGERPRINTS LEFT FROM SOCIAL MEDIA PLATFORMS 2530

Irene Amerini, Aris Anagnostopoulos, Luca Maiano, Sapienza University of Rome, Italy; Lorenzo Ricciardi Celsi, ELIS Consulting & Labs, Italy

IFS-2.4: CHECKING PRNU USABILITY ON MODERN DEVICES..... 2535

Chiara Albisani, Massimo Iuliani, Alessandro Piva, University of Florence, Italy

IFS-2.5: HANDWRITTEN DIGITS RECONSTRUCTION FROM UNLABELLED EMBEDDINGS 2540

Thomas Thebaud, Gaël Le Lan, Orange Labs, France; Anthony Larcher, Laboratoire d'Informatique de l'Université du Mans, France

IFS-2.6: EFFECT OF VIDEO PIXEL-BINNING ON SOURCE ATTRIBUTION OF MIXED MEDIA 2545

Samet Taspinar, Overjet AI, United States; Manoranjan Mohanty, University of Technology Sydney, Australia; Nasir Memon, New York University Abu Dhabi, United Arab Emirates

IFS-3: FORENSICS AND BIOMETRICS

IFS-3.1: COMBINING DYNAMIC IMAGE AND PREDICTION ENSEMBLE FOR CROSS-DOMAIN FACE ANTI-SPOOFING 2550

Lingling Lv, Youjun Xiang, Xianfeng Li, Hanye Huang, Rongju Ruan, Xiaoyan Xu, Yuli Fu, South China University of Technology, China

IFS-3.2: LABEL-GUIDED DICTIONARY PAIR LEARNING FOR ECG BIOMETRIC RECOGNITION 2555

Mingzhu Ma, Shandong University, China; Gongping Yang, Shandong University and Heze University, China; Kuikui Wang, Shandong University, China; Yuwen Huang, Shandong University and Heze University, China; Yilong Yin, Shandong University, China

IFS-3.3: BACKDOOR ATTACK AGAINST SPEAKER VERIFICATION 2560

Tongqing Zhai, Yiming Li, Ziqi Zhang, Tsinghua University, China; Baoyuan Wu, The Chinese University of Hong Kong, China; Yong Jiang, Shu-Tao Xia, Tsinghua University, China

IFS-3.4: CLASS-CONDITIONAL DEFENSE GAN AGAINST END-TO-END SPEECH ATTACKS 2565

Mohammad Esmailpour, Patrick Cardinal, Alessandro Lameiras Koerich, École de Technologie Supérieure, Canada

IFS-3.5: SELFGAIT: A SPATIOTEMPORAL REPRESENTATION LEARNING METHOD FOR SELF-SUPERVISED GAIT RECOGNITION 2570

Yiqun Liu, Yi Zeng, Jian Pu, Hongming Shan, Peiyang He, Junping Zhang, Fudan University, China

IFS-3.6: ATTACK ON PRACTICAL SPEAKER VERIFICATION SYSTEM USING UNIVERSAL ADVERSARIAL PERTURBATIONS 2575

Weiyi Zhang, Shuning Zhao, Tsinghua University, China; Le Liu, d-Ear Technologies, China; Jianmin Li, Xingliang Cheng, Thomas Fang Zheng, Xiaolin Hu, Tsinghua University, China

IFS-4: SURVEILLANCE, BIOMETRICS AND SECURITY

IFS-4.1: HIGHLY EFFICIENT PROTECTION OF BIOMETRIC FACE SAMPLES WITH SELECTIVE JPEG2000 ENCRYPTION 2610

Heinz Hofbauer, Paris Lodron University of Salzburg, Austria; Yoanna Martínez-Díaz, Advanced Technologies Application Center (CENATAV), Cuba; Simon Kirchgasser, Paris Lodron University of Salzburg, Austria; Heydi Méndez-Vázquez, Advanced Technologies Application Center (CENATAV), Cuba; Andreas Uhl, Paris Lodron University of Salzburg, Cuba

IFS-4.2: DEEP AUTO-ENCODING AND BIOHASHING FOR SECURE FINGER VEIN RECOGNITION 2615

Hatef Otroshi Shahreza, Sébastien Marcel, Idiap Research Institute, Switzerland

IFS-4.3: TOPIC SEQUENCE EMBEDDING FOR USER IDENTITY LINKAGE FROM HETEROGENEOUS BEHAVIOR DATA 2620

Jinzhu Yang, Wei Zhou, Wanhui Qian, University of Chinese Academy of Sciences, China; Jizhong Han, Songlin Hu, Chinese Academy of Sciences, China

IFS-4.4: LOOKING THROUGH WALLS: INFERRING SCENES FROM VIDEO-SURVEILLANCE ENCRYPTED TRAFFIC 2625

Daniele Mari, University of Padova, Italy; Samuele Giuliano Piazzetta, ETH Zurich, Switzerland; Sara Bordin, Luca Pajola, Sebastiano Verde, Simone Milani, Mauro Conti, University of Padova, Italy

IFS-4.5: OPTIMAL ATTACKING STRATEGY AGAINST ONLINE REPUTATION SYSTEMS WITH CONSIDERATION OF THE MESSAGE-BASED PERSUASION PHENOMENON 2630

Zhanjiang Chen, H. Vicky Zhao, Tsinghua University, China

IFS-5: PRIVACY AND INFORMATION SECURITY

IFS-5.1: STEP-GAN: A ONE-CLASS ANOMALY DETECTION MODEL WITH APPLICATIONS TO POWER SYSTEM SECURITY 2580

Mohammad Adiban, Norwegian University of Science and Technology, Norway; Arash Safari, University of Tehran, Iran; Giampiero Salvi, Norwegian University of Science and Technology, Norway

IFS-5.2: APPLICATION-LAYER DDOS ATTACKS WITH MULTIPLE EMULATION DICTIONARIES 2585

Michele Cirillo, Mario Di Mauro, Vincenzo Matta, Marco Tambasco, University of Salerno, Italy

IFS-5.3: SECRET KEY GENERATION OVER WIRELESS CHANNELS USING SHORT BLOCKLENGTH MULTILEVEL SOURCE POLAR CODING 2590

Henri Hentilä, Aalto University, Finland; Yanina Shkel, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Visa Koivunen, Aalto University, Switzerland

IFS-5.4: EFFICIENT NETWORK PROTECTION GAMES AGAINST MULTIPLE TYPES OF STRATEGIC ATTACKERS 2595

Zhifan Xu, Melike Baykal-Gursoy, Rutgers University, United States

IFS-5.5: DETECTION OF MALICIOUS DNS AND WEB SERVERS USING GRAPH-BASED APPROACHES 2600

Jinyuan Jia, Duke University, United States; Zheng Dong, Jie Li, Microsoft Corporation, United States; Jack W. Stokes, Microsoft Research, United States

IFS-5.6: LOW COMPLEXITY SECURE P-TENSOR PRODUCT COMPRESSED SENSING RECONSTRUCTION OUTSOURCING AND IDENTITY AUTHENTICATION IN CLOUD 2605

Mengdi Wang, Di Xiao, Jia Liang, Chongqing University, China

IFS-6: ANONYMIZATION, SECURITY AND PRIVACY

IFS-6.1: PRIVACY-PRESERVING NEAR NEIGHBOR SEARCH VIA SPARSE CODING WITH AMBIGUATION 2635

Behrooz Razeghi, University of Geneva, Switzerland; Sohrab Ferdowsi, HES-SO Geneva, Switzerland; Dimche Kostadinov, University of Zurich, Switzerland; Flavio P. Clamon, Harvard University, United States; Slava Voloshynovskiy, University of Geneva, United States

IFS-6.2: PRIVACY-PRESERVING OPTIMAL INSULIN DOSING DECISION 2640

Zuobin Ying, City University of Macau, China; Shuanglong Cao, Anhui University, China; Shengmin Xu, Singapore Management University, Singapore; Ximeng Liu, Fuzhou University, China; Lingjuan Lyu, Cen Chen, Li Wang, Ant Group, China

IFS-6.3: PRIVACY-ACCURACY TRADE-OFF OF INFERENCE AS SERVICE 2645

Yulu Jin, Lifeng Lai, University of California, Davis, United States

IFS-6.4: FEDERATED LEARNING WITH LOCAL DIFFERENTIAL PRIVACY: TRADE-OFFS BETWEEN PRIVACY, UTILITY, AND COMMUNICATION 2650

Muah Kim, Onur Günlü, Technische Universität Berlin, Germany; Rafael F. Schaefer, Universität Siegen, Germany

IFS-6.5: SCALABLE PRIVACY-PRESERVING DISTRIBUTED EXTREMELY RANDOMIZED TREES FOR STRUCTURED DATA WITH MULTIPLE COLLUDING PARTIES 2655

Amin Aminifar, Western Norway University of Applied Sciences, Norway; Fazle Rabbi, University of Bergen, Western Norway University of Applied Sciences, Norway; Yngve Lamo, Western Norway University of Applied Sciences, Norway

IFS-6.6: ACTIVE PRIVACY-UTILITY TRADE-OFF AGAINST A HYPOTHESIS TESTING ADVERSARY 2660

Ecenaz Erdemir, Pier Luigi Dragotti, Deniz Gündüz, Imperial College London, United Kingdom

IFS-7: INFORMATION HIDING, CRYPTOGRAPHY AND CYBERSECURITY

IFS-7.1: BAITRADAR: A MULTI-MODEL CLICKBAIT DETECTION ALGORITHM USING DEEP LEARNING 2665

Bhanuka Gamage, Adnan Labib, Aisha Joomun, Chern Hong Lim, KokSheik Wong, Monash University Malaysia, Malaysia

IFS-7.2: ENABLING EFFICIENT AND EXPRESSIVE SPATIAL KEYWORD QUERIES ON ENCRYPTED DATA 2670

Xiangyu Wang, Jianfeng Ma, Xidian University, China; Ximeng Liu, Fuzhou University, China

IFS-7.3: PRIVACY-PRESERVING CLOUD-BASED DNN INFERENCE 2675

Shangyu Xie, Bingyu Liu, Yuan Hong, Illinois Institute of Technology, United States

IFS-7.4: CRYPTO-ORIENTED NEURAL ARCHITECTURE DESIGN 2680

Avital Shafran, Gil Segev, Shmuel Peleg, Yedid Hoshen, The Hebrew University of Jerusalem, Israel

IFS-7.5: INTEGRATING DEEP LEARNING WITH FIRST-ORDER LOGIC PROGRAMMED CONSTRAINTS FOR ZERO-DAY PHISHING ATTACK DETECTION 2685

Seok-Jun Bu, Sung-Bae Cho, Yonsei University, South Korea

IFS-7.6: IMPROVED PROBABILISTIC CONTEXT-FREE GRAMMARS FOR PASSWORDS USING WORD EXTRACTION 2690

Haibo Cheng, Wenting Li, Ping Wang, Peking University, China; Kaitai Liang, Delft University of Technology, China

IFS-8: WATERMARKING AND DATA HIDING

IFS-8.1: ENHANCING IMAGE STEGANOGRAPHY VIA STEGO GENERATION AND SELECTION 2695

Tingting Song, Minglin Liu, Weiqi Luo, Peijia Zheng, Sun Yat-Sen University, China

IFS-8.2: SYNCHRONOUS MULTI-BIT AUDIO WATERMARKING BASED ON PHASE SHIFTING 2700

Shengbei Wang, Weitao Yuan, Zhen Zhang, Jianming Wang, Tiangong University, China; Masashi Unoki, Japan Advanced Institute of Science and Technology, Japan

IFS-8.3: IMAGE STEGANOGRAPHY BASED ON ITERATIVE ADVERSARIAL PERTURBATIONS ONTO A SYNCHRONIZED-DIRECTIONS SUB-IMAGE 2705

Xinghong Qin, Shunquan Tan, Shenzhen University, China; Weixuan Tang, Guangzhou University, China; Bin Li, Jiwu Huang, Shenzhen University, China

IFS-8.4: EXTENDING THE REVERSE JPEG COMPATIBILITY ATTACK TO DOUBLE COMPRESSED IMAGES 2710

Jan Butora, Jessica Fridrich, Binghamton University, United States

IFS-8.5: REVERSIBLE DATA HIDING IN JPEG IMAGES FOR PRIVACY PROTECTION..... 2715

Yuxuan Huang, Xin Cao, Hao-Tian Wu, South China University of Technology, China; Yiu-ming Cheung, Hong Kong Baptist University, Hong Kong SAR China

IFS-8.6: A LAYERED EMBEDDING-BASED SCHEME TO COPE WITH INTRA-FRAME DISTORTION DRIFT IN IPM-BASED HEVC STEGANOGRAPHY 2720

Xiaoqing Jia, Jie Wang, Sun Yat-sen University, China; Yongliang Liu, Alibaba Group, China; Xiangui Kang, Sun Yat-sen University, China; Yunqing Shi, New Jersey Institute of Technology, United States

MLSP-1: DEEP LEARNING TRAINING METHODS 1

MLSP-1.1: META-LEARNING WITH ATTENTION FOR IMPROVED FEW-SHOT LEARNING 2755

Zejiang Hou, Princeton University, United States; Anwar Walid, Nokia Bell Labs, United States; Sun-Yuan Kung, Princeton University, United States

MLSP-1.2: B-SMALL: A BAYESIAN NEURAL NETWORK APPROACH TO SPARSE MODEL-AGNOSTIC META-LEARNING 2760

Anish Madan, Ranjitha Prasad, IIT Delhi, India

MLSP-1.3: DEEP TRANSFORM AND METRIC LEARNING NETWORKS 2765

Wen Tang, North Carolina State University, United States; Emilie Chouzenoux, Jean-Christophe Pesquet, CentraleSupélec, France; Hamid Krim, North Carolina State University, United States

MLSP-1.4: ROBUSTNESS AND DIVERSITY SEEKING DATA-FREE KNOWLEDGE DISTILLATION 2770

Pengchao Han, Northeastern University, China; Jihong Park, Deakin University, Australia; Shiqiang Wang, IBM T. J. Watson Research Center, United States; Yejun Liu, Chongqing University of Posts and Telecommunications, China

MLSP-1.5: ENSEMBLE DISTILLATION APPROACHES FOR GRAMMATICAL ERROR CORRECTION 2775

Yassir Fathullah, Mark J. F. Gales, Cambridge University, United Kingdom; Andrey Malinin, Yandex, Russia

MLSP-1.6: TRAIN YOUR CLASSIFIER FIRST: CASCADE NEURAL NETWORKS TRAINING FROM UPPER LAYERS TO LOWER LAYERS 2780

Shucong Zhang, University of Edinburgh, United Kingdom; Cong-Thanh Do, Rama Doddipatla, Toshiba Research Europe Ltd., United Kingdom; Erfan Loweimi, Peter Bell, Steve Renals, University of Edinburgh, United Kingdom

MLSP-2: DEEP LEARNING TRAINING METHODS 2

MLSP-2.1: HOW CONVOLUTIONAL NEURAL NETWORKS DEAL WITH ALIASING 2815
Antonio H. Ribeiro, Thomas B. Schön, Uppsala University, Sweden

MLSP-2.2: CANET: CONTEXT-AWARE LOSS FOR DESCRIPTOR LEARNING 2820
Tianyou Chen, Xiaoguang Hu, Jin Xiao, Guofeng Zhang, Hui Ruan, Beihang University, China

MLSP-2.3: PROGRESSIVE MULTI-STAGE FEATURE MIX FOR PERSON RE-IDENTIFICATION 2825
Yan Zhang, Binyu He, Li Sun, Qingli Li, East China Normal University, China

MLSP-2.4: USING DEEP IMAGE PRIORS TO GENERATE COUNTERFACTUAL EXPLANATIONS 2830
Vivek Narayanaswamy, Arizona State University, United States; Jayaraman Thiagarajan, Lawrence Livermore National Labs, United States; Andreas Spanias, Arizona State University, United States

MLSP-2.5: ELLIPTICAL SHAPE RECOVERY FROM BLURRED PIXELS USING DEEP LEARNING 2835
Hojatollah Zamani, Peyman Rostami, Arash Amini, Farokh Marvasti, Sharif University of Technology, Iran

MLSP-2.6: FACTORIZED CRF WITH BATCH NORMALIZATION BASED ON THE ENTIRE TRAINING DATA 2840
Eran Goldman, Jacob Goldberger, Bar-Ilan University, Israel

MLSP-3: DEEP LEARNING TRAINING METHODS 3

MLSP-3.1: EVOLUTIONARY QUANTIZATION OF NEURAL NETWORKS WITH MIXED-PRECISION 2845
Zhenhua Liu, Peking University, China; Xinfeng Zhang, University of Chinese Academy of Sciences, China; Shanshe Wang, Siwei Ma, Wen Gao, Peking University, China

MLSP-3.2: EVOLVING QUANTIZED NEURAL NETWORKS FOR IMAGE CLASSIFICATION USING A MULTI-OBJECTIVE GENETIC ALGORITHM 2850
Yong Wang, Xiaojing Wang, Xiaoyu He, Central South University, China

MLSP-3.3: SPECTRAL DOMAIN CONVOLUTIONAL NEURAL NETWORK..... 2855
Bochen Guan, OPPO US Research Center, United States; Jinnian Zhang, William A. Sethares, University of Wisconsin-Madison, United States; Richard Kijowski, New York University, United States; Fang Liu, Harvard University, United States

MLSP-3.4: PARAMETRIC SPECTRAL FILTERS FOR FAST CONVERGING, SCALABLE CONVOLUTIONAL NEURAL NETWORKS 2860
Luke Wood, Google, United States; Eric Larson, Southern Methodist University, United States

MLSP-3.5: FEATURE REUSE FOR A RANDOMIZATION BASED NEURAL NETWORK..... 2865
Xinyue Liang, Mikael Skoglund, Saikat Chatterjee, KTH Royal Institute of Technology, Sweden

MLSP-3.6: A RELU DENSE LAYER TO IMPROVE THE PERFORMANCE OF NEURAL NETWORKS 2870
Alireza M. Javid, Sandipan Das, Mikael Skoglund, Saikat Chatterjee, KTH Royal Institute of Technology, Sweden

MLSP-4: MACHINE LEARNING FOR CLASSIFICATION APPLICATIONS 1

MLSP-4.1: NESTED LEARNING FOR MULTI-LEVEL CLASSIFICATION 3715
Raphaël Achddou, LTCI, Télécom Paris, Institut Polytechnique de Paris, France; J.Matias di Martino, Guillermo Sapiro, Duke University, United States

MLSP-4.2: CROSS-MODAL REPRESENTATION RECONSTRUCTION FOR ZERO-SHOT CLASSIFICATION	3720
<i>Yu Wang, Tongji University, China; Shenjie Zhao, Mojie Technology(Ningbo), China</i>	
MLSP-4.3: HIGCNN: HIERARCHICAL INTERLEAVED GROUP CONVOLUTIONAL NEURAL NETWORKS FOR POINT CLOUDS ANALYSIS	3725
<i>Jisheng Dang, Jun Yang, Lanzhou Jiaotong University, China</i>	
MLSP-4.4: AUTOKWS: KEYWORD SPOTTING WITH DIFFERENTIABLE ARCHITECTURE SEARCH	3730
<i>Bo Zhang, Wenfeng Li, Qingyuan Li, Weiji Zhuang, Xiangxiang Chu, Yujun Wang, Xiaomi, China</i>	
MLSP-4.5: EMBEDDING SEMANTIC HIERARCHY IN DISCRETE OPTIMAL TRANSPORT FOR RISK MINIMIZATION	3735
<i>Yubin Ge, University of Illinois Urbana-Champaign, United States; Site Li, Carnegie Mellon University, United States; Xuyang Li, Northeastern University, United States; Fangfang Fan, Wanqing Xie, Harvard University, United States; Jane You, Hong Kong Polytechnic University, China; Xiaofeng Liu, Harvard University, United States</i>	
MLSP-4.6: IDENTIFYING SPAMMERS TO BOOST CROWDSOURCED CLASSIFICATION	3740
<i>Panagiotis Traganitis, Georgios B. Giannakis, University of Minnesota, United States</i>	
 MLSP-5: MACHINE LEARNING FOR CLASSIFICATION APPLICATIONS 2	
MLSP-5.1: A RANK-CONSTRAINED CLUSTERING ALGORITHM WITH ADAPTIVE EMBEDDING	3745
<i>Shenfei Pei, Feiping Nie, Rong Wang, Xuelong Li, Northwestern Polytechnical University, China</i>	
MLSP-5.2: TOWARDS EFFICIENT AGE ESTIMATION BY EMBEDDING POTENTIAL GENDER FEATURES	3750
<i>Yulan Deng, Lunke Fei, Shaohua Teng, Wei Zhang, Dongning Liu, Yan Hou, Guangdong University of Technology, China</i>	
MLSP-5.3: ADVERSARIAL ATTACKS ON COARSE-TO-FINE CLASSIFIERS	3755
<i>Ismail Alkhouri, George Atia, University of Central Florida, United States</i>	
MLSP-5.4: GDTW: A NOVEL DIFFERENTIABLE DTW LOSS FOR TIME SERIES TASKS	3760
<i>Xiang Liu, Naiqi Li, Shu-Tao Xia, Tsinghua University, China</i>	
MLSP-5.5: HIERARCHICAL RECURRENT NEURAL NETWORK FOR HANDWRITTEN STROKES CLASSIFICATION	3765
<i>Illya Degtyarenko, Ivan Deriuga, Andrii Grygoriev, Serhii Polotskyi, Volodymyr Melnyk, Dmytro Zakharchuk, Olga Radyvonenko, Samsung Research, Kyiv, Ukraine</i>	
MLSP-5.6: ROBUST DOMAIN-FREE DOMAIN GENERALIZATION WITH CLASS-AWARE ALIGNMENT	3770
<i>Wenyu Zhang, Institute for Infocomm Research, A*STAR, Singapore; Mohamed Ragab, Nanyang Technological University, Singapore; Ramon Sagarna, Institute for Infocomm Research, A*STAR, Singapore</i>	
 MLSP-6: COMPRESSED SENSING AND LEARNING	
MLSP-6.1: ONE-BIT COMPRESSED SENSING USING UNTRAINED NETWORK PRIOR	3145
<i>Swatantra Kafle, Geethu Joseph, Pramod K. Varshney, Syracuse University, United States</i>	

MLSP-6.2: DEEP UNFOLDING NETWORK FOR BLOCK-SPARSE SIGNAL RECOVERY	3150
<i>Rong Fu, Tsinghua University, China; Vincent Monardo, Carnegie Mellon University, United States; Tianyao Huang, Yimin Liu, Tsinghua University, China</i>	
MLSP-6.3: REST: ROBUST LEARNED SHRINKAGE-THRESHOLDING NETWORK TAMING INVERSE PROBLEMS WITH MODEL MISMATCH	3155
<i>Wei Pu, Chao Zhou, University College London, United Kingdom; Yonina C. Eldar, Weizmann Institute of Science, Israel; Miguel R.D. Rodrigues, University College London, United Kingdom</i>	
MLSP-6.4: UNFOLDING NEURAL NETWORKS FOR COMPRESSIVE MULTICHANNEL BLIND DECONVOLUTION	3160
<i>Bahareh Tolooshams, Harvard University, United States; Satish Mulleti, Weizmann Institute of Science, Israel; Demba Ba, Harvard University, United States; Yonina C. Eldar, Weizmann Institute of Science, Israel</i>	
MLSP-6.5: SPARSITY DRIVEN LATENT SPACE SAMPLING FOR GENERATIVE PRIOR BASED COMPRESSIVE SENSING	3165
<i>Vinayak Killedar, Praveen Kumar Pokala, Chandra Sekhar Seelamantula, Indian Institute of Science, India</i>	
MLSP-6.6: A SPARSE CODING APPROACH TO AUTOMATIC DIET MONITORING WITH CONTINUOUS GLUCOSE MONITORS	3170
<i>Anurag Das, Seyedhooman Sajjadi, Bobak Mortazavi, Theodora Chaspari, Projna Paromita, Laura Ruebush, Nicolaas Deutz, Ricardo Gutierrez-Osuna, Texas A&M University, United States</i>	
MLSP-7: TENSOR SIGNAL PROCESSING	
MLSP-7.1: SPEEDING UP OF KERNEL-BASED LEARNING FOR HIGH-ORDER TENSORS	3275
<i>Ouafae Karmouda, Jeremie Boulanger, Remy Boyer, University of Lille, France</i>	
MLSP-7.2: A FAST RANDOMIZED ADAPTIVE CP DECOMPOSITION FOR STREAMING TENSORS	3280
<i>Trung Thanh Le, Karim Abed-Meraim, University of Orleans, France; Linh Trung Nguyen, VNU University of Engineering and Technology, Vietnam; Adel Hafiane, INSA Centre Val de Loire, France</i>	
MLSP-7.3: RANK-REVEALING BLOCK-TERM DECOMPOSITION FOR TENSOR COMPLETION	3285
<i>Athanasios Rontogiannis, National Observatory of Athens, Greece; Paris Giampouras, Johns Hopkins University, United States; Eleftherios Kofidis, University of Piraeus, Greece</i>	
MLSP-7.4: KERNEL LEARNING WITH TENSOR NETWORKS	3290
<i>Kriton Konstantinidis, Shengxi Li, Danilo P. Mandic, Imperial College London, United Kingdom</i>	
MLSP-7.5: FIBER-SAMPLED STOCHASTIC MIRROR DESCENT FOR TENSOR DECOMPOSITION WITH BETA-DIVERGENCE	3295
<i>Wenqiang Pu, The Chinese University of Hong Kong, Shenzhen, China; Shahana Ibrahim, Xiao Fu, Oregon State University, United States; Mingyi Hong, University of Minnesota, United States</i>	
MLSP-7.6: REGULARIZED RECOVERY BY MULTI-ORDER PARTIAL HYPERGRAPH TOTAL VARIATION	3300
<i>Ruyuan Qu, Jiaqi He, Hui Feng, Chongbin Xu, Bo Hu, Fudan University, China</i>	
MLSP-8: LEARNING	
MLSP-8.1: LEARNING DISCRIMINATIVE FEATURES FOR SEMI-SUPERVISED ANOMALY DETECTION	3395
<i>Zhe Feng, Jie Tang, Yishun Dou, Gangshan Wu, Nanjing University, China</i>	

MLSP-8.2: RGLN: ROBUST RESIDUAL GRAPH LEARNING NETWORKS VIA SIMILARITY-PRESERVING MAPPING ON GRAPHS	3400
<i>Jiayang Tang, Xiang Gao, Wei Hu, Peking University, China</i>	
MLSP-8.3: SEQUENCE-LEVEL SELF-TEACHING REGULARIZATION	3405
<i>Eric Sun, Liang Lu, Zhong Meng, Yifan Gong, Microsoft Corporation, United States</i>	
MLSP-8.4: WEARING A MASK: COMPRESSED REPRESENTATIONS OF VARIABLE-LENGTH SEQUENCES USING RECURRENT NEURAL TANGENT KERNELS	3410
<i>Sina Alemohammad, Hossein Babaei, Randall Balestriero, Matt Y. Cheung, Ahmed Imtiaz Humayun, Daniel LeJeune, Naiming Liu, Lorenzo Luzi, Jasper Tan, Zichao Wang, Richard Baraniuk, Rice University, United States</i>	
MLSP-8.5: H-GPR: A HYBRID STRATEGY FOR LARGE-SCALE GAUSSIAN PROCESS REGRESSION	3415
<i>Naiqi Li, Tsinghua-Berkeley Shenzhen Institute, Tsinghua University, China; Yinghua Gao, Wenjie Li, Shenzhen International Graduate School, Tsinghua University, China; Yong Jiang, Tsinghua-Berkeley Shenzhen Institute, Tsinghua University, China; Shu-Tao Xia, Shenzhen International Graduate School, Tsinghua University, China</i>	
MLSP-8.6: LEARNING OPTIMAL LATTICE CODES FOR MIMO COMMUNICATIONS	3420
<i>Lai Amorós, Mikko Pitkänen, Aalto University, Finland</i>	
 MLSP-9: LEARNING THEORY FOR NEURAL NETWORKS	
MLSP-9.1: A BAYESIAN INTERPRETATION OF THE LIGHT GATED RECURRENT UNIT	3625
<i>Alexandre Bittar, Philip Garner, Idiap Research Institute, Switzerland</i>	
MLSP-9.2: A LARGE-DIMENSIONAL ANALYSIS OF SYMMETRIC SNE	3630
<i>Charles Séjourné, Romain Couillet, Pierre Comon, GIPSA-Lab, University Grenoble Alpes, France</i>	
MLSP-9.3: A DYNAMICAL SYSTEMS PERSPECTIVE ON ONLINE BAYESIAN NONPARAMETRIC ESTIMATORS WITH ADAPTIVE HYPERPARAMETERS	3635
<i>Alec Koppel, Amrit Singh Bedi, US Army Research Laboratory, United States; Vikram Krishnamurthy, Cornell University, United States</i>	
MLSP-9.4: ONLINE MULTI-HOP INFORMATION BASED KERNEL LEARNING OVER GRAPHS	3640
<i>Zixiao Zong, Yanning Shen, University of California, Irvine, United States</i>	
MLSP-9.5: SPARSITY IN MAX-PLUS ALGEBRA AND APPLICATIONS IN MULTIVARIATE CONVEX REGRESSION	3645
<i>Nikos Tsilivis, National Technical University of Athens, Greece; Anastasios Tsiamis, University of Pennsylvania, United States; Petros Maragos, National Technical University of Athens, Greece</i>	
MLSP-9.6: COMPLEX-VALUED VS. REAL-VALUED NEURAL NETWORKS FOR CLASSIFICATION PERSPECTIVES: AN EXAMPLE ON NON-CIRCULAR DATA	3650
<i>Jose Agustin Barrachina, Chengfang Ren, ONERA/CentraleSupélec, France; Christele Morisseau, Gilles Vieillard, ONERA, France; Jean-Philippe Ovarlez, ONERA/CentraleSupélec, France</i>	
 MLSP-10: DEEP LEARNING FOR SPEECH AND AUDIO	
MLSP-10.1: HIGH-FREQUENCY ADVERSARIAL DEFENSE FOR SPEECH AND AUDIO	2995
<i>Raphael Olivier, Bhiksha Raj, Muhammad Shah, Carnegie Mellon University, United States</i>	
MLSP-10.2: LEARNING SEPARABLE TIME-FREQUENCY FILTERBANKS FOR AUDIO CLASSIFICATION	3000
<i>Jie Pu, Imperial College London, United Kingdom; Yannis Panagakis, University of Athens, Greece; Maja Pantic, Imperial College London, United Kingdom</i>	

MLSP-10.3: UPSAMPLING ARTIFACTS IN NEURAL AUDIO SYNTHESIS.....	3005
<i>Jordi Pons, Santiago Pascual, Giulio Cengarle, Joan Serrà, Dolby Laboratories, Spain</i>	
MLSP-10.4: DEEP CONVOLUTIONAL AND RECURRENT NETWORKS FOR POLYPHONIC INSTRUMENT CLASSIFICATION FROM MONOPHONIC RAW AUDIO WAVEFORMS	3010
<i>Kleanthis Avramidis, Agelos Kratimenos, Christos Garoufis, Athanasia Zlatintsi, Petros Maragos, National Technical University of Athens, Greece</i>	
MLSP-10.5: LEARNING AUDIO EMBEDDINGS WITH USER LISTENING DATA FOR CONTENT-BASED MUSIC RECOMMENDATION	3015
<i>Ke Chen, University of California, San Diego, United States; Beici Liang, Xiaoshuan Ma, Minwei Gu, Tencent Music Entertainment, China</i>	
MLSP-10.6: EFFICIENT SPEECH EMOTION RECOGNITION USING MULTI-SCALE CNN AND ATTENTION	3020
<i>Zixuan Peng, Yu Lu, Shengfeng Pan, Yunfeng Liu, Zhuiyi Technology, China</i>	
MLSP-11: SELF-SUPERVISED LEARNING FOR SPEECH PROCESSING	
MLSP-11.1: NEURAL AUDIO FINGERPRINT FOR HIGH-SPECIFIC AUDIO RETRIEVAL BASED ON CONTRASTIVE LEARNING	3115
<i>Sungkyun Chang, Cochlear.ai, South Korea; Donmoon Lee, Cochlear.ai, Seoul National University, South Korea; Jeongsoo Park, Hyungui Lim, Cochlear.ai, South Korea; Kyogu Lee, Seoul National University, South Korea; Karam Ko, SK Telecom, South Korea; Yoonchang Han, Cochlear.ai, South Korea</i>	
MLSP-11.2: SELF-TRAINING AND PRE-TRAINING ARE COMPLEMENTARY FOR SPEECH RECOGNITION	3120
<i>Qiantong Xu, Alexei Baevski, Tatiana Likhomanenko, Paden Tomasello, Alexis Conneau, Ronan Collobert, Gabriel Synnaeve, Michael Auli, Facebook AI Research, United States</i>	
MLSP-11.3: UNSUPERVISED DISCRIMINATIVE LEARNING OF SOUNDS FOR AUDIO EVENT CLASSIFICATION	3125
<i>Sascha Hornauer, Ke Li, Stella Yu, University of California, Berkeley, United States; Shabnam Ghaffarzadegan, Liu Ren, Robert Bosch LLC, United States</i>	
MLSP-11.4: SIMILARITY ANALYSIS OF SELF-SUPERVISED SPEECH REPRESENTATIONS	3130
<i>Yu-An Chung, Massachusetts Institute of Technology, United States; Yonatan Belinkov, Technion Henry and Marilyn Taub Faculty of Computer Science, Israel; James Glass, Massachusetts Institute of Technology, United States</i>	
MLSP-11.5: JOINT MASKED CPC AND CTC TRAINING FOR ASR.....	3135
<i>Chaitanya Talnikar, Tatiana Likhomanenko, Ronan Collobert, Gabriel Synnaeve, Facebook, United States</i>	
MLSP-11.6: A COMPARISON OF DISCRETE LATENT VARIABLE MODELS FOR SPEECH REPRESENTATION LEARNING	3140
<i>Henry Zhou, University of Toronto, Canada; Alexei Baevski, Michael Auli, Facebook AI Research, United States</i>	
MLSP-12: FEDERATED LEARNING 1	
MLSP-12.1: FEDERATED LEARNING FROM BIG DATA OVER NETWORKS.....	3305
<i>Yasmin SarcheshmehPour, Miika Leinonen, Alexander Jung, Aalto University, Finland</i>	
MLSP-12.2: EFFICIENT CLIENT CONTRIBUTION EVALUATION FOR HORIZONTAL FEDERATED LEARNING	3310
<i>Jie Zhao, Hainan University, China; Xinghua Zhu, Jianzong Wang, Jing Xiao, Ping An Technology (Shenzhen) Co., Ltd., China</i>	

MLSP-12.3: A QUANTITATIVE METRIC FOR PRIVACY LEAKAGE IN FEDERATED LEARNING	3315
<i>Yong Liu, National University of Singapore, China; Xinghua Zhu, Jianzong Wang, Jing Xiao, Ping An Technology (Shenzhen) Co., Ltd., China</i>	
MLSP-12.4: DP-SIGNSGD: WHEN EFFICIENCY MEETS PRIVACY AND ROBUSTNESS	3320
<i>Lingjuan Lyu, Ant Group, Singapore</i>	
MLSP-12.5: FEDERATED ALGORITHM WITH BAYESIAN APPROACH: OMNI-FEDGE	3325
<i>Sai Anuroop Kesnapalli, B. N. Bharath, Indian Institute of Technology, Dharwad, India</i>	
MLSP-12.6: TRAINING SPEECH RECOGNITION MODELS WITH FEDERATED LEARNING: A QUALITY/COST FRAMEWORK	3330
<i>Dhruv Guliani, Françoise Beaufays, Giovanni Motta, Google Inc, United States</i>	
 MLSP-13: FEDERATED LEARNING 2	
MLSP-13.1: CROSS-SILO FEDERATED TRAINING IN THE CLOUD WITH DIVERSITY SCALING AND SEMI-SUPERVISED LEARNING	3335
<i>Kishore Nandury, Anand Mohan, Frederick Weber, Amazon, India</i>	
MLSP-13.2: GRADUAL FEDERATED LEARNING USING SIMULATED ANNEALING	3340
<i>Luong Trung Nguyen, Byonghyo Shim, Seoul National University, South Korea</i>	
MLSP-13.3: OPTIMAL IMPORTANCE SAMPLING FOR FEDERATED LEARNING	3345
<i>Elsa Rizk, Stefan Vlaski, Ali H. Sayed, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
MLSP-13.4: MULTI-TIER FEDERATED LEARNING FOR VERTICALLY PARTITIONED DATA	3350
<i>Anirban Das, Stacy Patterson, Rensselaer Polytechnic Institute, United States</i>	
MLSP-13.5: ENERGY MINIMIZATION FOR FEDERATED LEARNING WITH IRS-ASSISTED OVER-THE-AIR COMPUTATION	3355
<i>Yuntao Hu, Ming Chen, Southeast University, China; Mingzhe Chen, Princeton University, United States; Zhaohui Yang, Mohammad Shikh-Bahaei, King's College London, United Kingdom; H. Vincent Poor, Princeton University, United States; Shuguang Cui, the Chinese University of Hong Kong, Hong Kong SAR China</i>	
MLSP-13.6: ADAPTIVE QUANTIZATION OF MODEL UPDATES FOR COMMUNICATION-EFFICIENT FEDERATED LEARNING	3360
<i>Divyansh Jhunjhunwala, Advait Gadhikar, Gauri Joshi, Carnegie Mellon University, United States; Yonina C. Eldar, Weizmann Institute of Science, Israel</i>	
 MLSP-14: LEARNING ALGORITHMS 1	
MLSP-14.1: HEBBNET: A SIMPLIFIED HEBBIAN LEARNING FRAMEWORK TO DO BIOLOGICALLY PLAUSIBLE LEARNING	3565
<i>Manas Gupta, Arulmurugan Ambikapathi, Savitha Ramasamy, Institute for Infocomm Research, A*STAR, Singapore</i>	
MLSP-14.2: T-K-MEANS: A ROBUST AND STABLE K-MEANS VARIANT	3570
<i>Yiming Li, Yang Zhang, Qingtao Tang, Tsinghua University, China; Weipeng Huang, University College Dublin, China; Yong Jiang, Shu-Tao Xia, Tsinghua University, China</i>	
MLSP-14.3: ADAPTIVE FEATURE WEIGHT LEARNING FOR ROBUST CLUSTERING PROBLEM WITH SPARSE CONSTRAINT	3575
<i>Feiping Nie, Wei Chang, Xuelong Li, Northwestern Polytechnical University, China; Jin Xu, Gongfu Li, Tencent Inc, China</i>	

MLSP-14.4: ASSISTED LEARNING: COOPERATIVE AI WITH AUTONOMY	3580
<i>Jiaying Zhou, Xun Xian, University of Minnesota, United States; Na Li, Harvard University, United States; Jie Ding, University of Minnesota, United States</i>	
MLSP-14.5: GEOM-SPIDER-EM: FASTER VARIANCE REDUCED STOCHASTIC	3585
EXPECTATION MAXIMIZATION FOR NONCONVEX FINITE-SUM OPTIMIZATION	
<i>Gersende Fort, Institut de Mathématiques de Toulouse, CNRS, France; Eric Moulines, CMAP, Ecole Polytechnique, France; Hoi-To Wai, The Chinese University of Hong-Kong, Hong Kong SAR China</i>	
MLSP-14.6: LEARNING A TREE OF NEURAL NETS.....	3590
<i>Arman Zharmagambetov, Miguel Á. Carreira-Perpiñán, University of California, Merced, United States</i>	

MLSP-15: LEARNING ALGORITHMS 2

MLSP-15.1: CORRUPTED CONTEXTUAL BANDITS: ONLINE LEARNING WITH	3655
CORRUPTED CONTEXT	
<i>Djallel Bouneffouf, IBM Research, United States</i>	
MLSP-15.2: TRAINING A BANK OF WIENER MODELS WITH A NOVEL QUADRATIC	3660
MUTUAL INFORMATION COST FUNCTION	
<i>Bo Hu, Jose C. Principe, University of Florida, United States</i>	
MLSP-15.3: INFORMATION AND REGULARIZATION IN RESTRICTED BOLTZMANN	3665
MACHINES	
<i>Matias Vera, CONICET, Argentina; Leonardo Rey Vega, Universidad de Buenos Aires and CONICET, Argentina; Pablo Piantanida, Université Paris-Saclay, France</i>	
MLSP-15.4: DEEP DETERMINISTIC INFORMATION BOTTLENECK WITH	3670
MATRIX-BASED ENTROPY FUNCTIONAL	
<i>Xi Yu, University of Florida, United States; Shujian Yu, NEC Laboratories Europe, Germany; Jose C. Principe, University of Florida, United States</i>	
MLSP-15.5: TRANSITIVE TRANSFER SPARSE CODING FOR DISTANT DOMAIN.....	3675
<i>Lingtian Feng, Feng Qian, Xin He, Yuqi Fan, Hanpeng Cai, Guangmin Hu, University of Electronic Science and Technology of China, China</i>	
MLSP-15.6: FAST LOCAL REPRESENTATION LEARNING WITH ADAPTIVE ANCHOR	3680
GRAPH	
<i>Canyu Zhang, Feiping Nie, Zheng Wang, School of Computer Science and Center for OPTical IMagery Analysis and Learning (OPTIMAL), Northwestern Polytechnical University, China; Rong Wang, School of Computer Science, Center for OPTical IMagery Analysis and Learning (OPTIMAL) and School of Cybersecurity, Northwestern Polytechnical University, China; Xuelong Li, School of Computer Science and Center for OPTical IMagery Analysis and Learning (OPTIMAL), Northwestern Polytechnical University, China</i>	

MLSP-16: ML AND GRAPHS

MLSP-16.1: LEARNING ON HETEROGENEOUS GRAPHS USING HIGH-ORDER	3985
RELATIONS	
<i>See Hian Lee, Feng Ji, Wee Peng Tay, Nanyang Technological University, Singapore</i>	
MLSP-16.2: INCOMPLETE MULTI-VIEW SUBSPACE CLUSTERING WITH	3990
LOW-RANK TENSOR	
<i>Jianlun Liu, Shaohua Teng, Wei Zhang, Xiaozhao Fang, Lunke Fei, Zhuxiu Zhang, Guangdong University of Technology, China</i>	

MLSP-16.3: CHANNEL-WISE MIX-FUSION DEEP NEURAL NETWORKS FOR ZERO-SHOT LEARNING	3995
<i>Guowei Wang, Tianjin University, China; Naiyang Guan, National Innovation Institute of Defense Technology, China; Hanjia Ye, Nanjing University, China; Xiaodong Yi, Hang Cheng, Junjie Zhu, National Innovation Institute of Defense Technology, China</i>	
MLSP-16.4: ONLINE UNSUPERVISED LEARNING USING ENSEMBLE GAUSSIAN PROCESSES WITH RANDOM FEATURES	4000
<i>Georgios V. Karanikolas, Qin Lu, Georgios B. Giannakis, University of Minnesota, United States</i>	
MLSP-16.5: DIMENSION SELECTED SUBSPACE CLUSTERING	4005
<i>Shuoyang Li, University of Surrey, United Kingdom; Yuhui Luo, National Physical Laboratory, United Kingdom; Jonathon Chambers, University of Leicester, United Kingdom; Wenwu Wang, University of Surrey, United Kingdom</i>	
MLSP-16.6: DEEP ENSEMBLE SIAMESE NETWORK FOR INCREMENTAL SIGNAL CLASSIFICATION	4010
<i>Chen Yang, Shuyuan Yang, Xidian University, China</i>	
 MLSP-17: GRAPH NEURAL NETWORKS	
MLSP-17.1: NON-RECURSIVE GRAPH CONVOLUTIONAL NETWORKS	2965
<i>Hao Chen, Beihang University, China; Zengde Deng, Cainiao Network, China; Yue Xu, Alibaba Group, China; Zhoujun Li, Beihang University, China</i>	
MLSP-17.2: EGO-BASED ENTROPY MEASURES FOR STRUCTURAL REPRESENTATIONS ON GRAPHS	2970
<i>George Dasoulas, Giannis Nikolentzos, École Polytechnique, France; Kevin Scaman, Aladin Virmaux, Noah's Ark Lab, Huawei, France; Michalis Vazirgiannis, École Polytechnique, France</i>	
MLSP-17.3: SYMMETRIC SUB-GRAPH SPATIO-TEMPORAL GRAPH CONVOLUTION AND ITS APPLICATION IN COMPLEX ACTIVITY RECOGNITION	2975
<i>Pratyusha Das, Antonio Ortega, University of Southern California, United States</i>	
MLSP-17.4: PROGRESSIVE SPATIO-TEMPORAL GRAPH CONVOLUTIONAL NETWORK FOR SKELETON-BASED HUMAN ACTION RECOGNITION	2980
<i>Negar Heidari, Alexandros Iosifidis, Aarhus University, Denmark</i>	
MLSP-17.5: SPARSE-CODED DYNAMIC MODE DECOMPOSITION ON GRAPH FOR PREDICTION OF RIVER WATER LEVEL DISTRIBUTION	2985
<i>Yusuke Arai, Shogo Muramatsu, Hiroyasu Yasuda, Kiyoshi Hayasaka, Niigata University, Japan; Yu Otake, Tohoku University, Japan</i>	
MLSP-17.6: GRAPH FREQUENCY ANALYSIS OF COVID-19 INCIDENCE TO IDENTIFY COUNTY-LEVEL CONTAGION PATTERNS IN THE UNITED STATES	2990
<i>Yang Li, Gonzalo Mateos, University of Rochester, United States</i>	
 MLSP-18: MATRIX FACTORIZATION AND APPLICATIONS	
MLSP-18.1: GENERALIZED POLYTOPIC MATRIX FACTORIZATION	3225
<i>Gokcan Tatli, Alper T. Erdogan, Koc University, Turkey</i>	
MLSP-18.2: EXACT LINEAR CONVERGENCE RATE ANALYSIS FOR LOW-RANK SYMMETRIC MATRIX COMPLETION VIA GRADIENT DESCENT	3230
<i>Trung Vu, Raviv Raich, Oregon State University, United States</i>	
MLSP-18.3: STRUCTURED SUPPORT EXPLORATION FOR MULTILAYER SPARSE MATRIX FACTORIZATION	3235
<i>Quoc-Tung Le, Rémi Gribonval, Ecole Normale Supérieure de Lyon, France</i>	

MLSP-18.4: OPTIMAL SELECTION OF MATRIX SHAPE AND DECOMPOSITION	3240
SCHEME FOR NEURAL NETWORK COMPRESSION	
<i>Yerlan Idelbayev, Miguel Á. Carreira-Perpiñán, University of California, Merced, United States</i>	
MLSP-18.5: SPARSE GRAPH BASED SKETCHING FOR FAST NUMERICAL LINEAR	3245
ALGEBRA	
<i>Dong Hu, Rensselaer Polytechnic Institute, United States; Shashanka Ubaru, IBM, United States; Alex Gittens, Rensselaer Polytechnic Institute, United States; Kenneth Clarkson, Lior Horesh, Vassilis Kalantzis, IBM, United States</i>	
MLSP-18.6: COLD START REVISITED: A DEEP HYBRID RECOMMENDER WITH	3250
COLD-WARM ITEM HARMONIZATION	
<i>Oren Barkan, Roy Hirsch, Ori Katz, Avi Caciularu, Yoni Weill, Noam Koenigstein, Microsoft, Israel</i>	
MLSP-19: NON-NEGATIVE MATRIX FACTORIZATION	
MLSP-19.1: ON A GUIDED NONNEGATIVE MATRIX FACTORIZATION	3200
<i>Joshua Vendrow, Jamie Haddock, Elizaveta Rebrova, Deanna Needell, University of California, Los Angeles, United States</i>	
MLSP-19.2: NONNEGATIVE UNIMODAL MATRIX FACTORIZATION	3205
<i>Andersen Man Shun Ang, University of Waterloo, Canada; Nicolas Gillis, Arnaud Vandaele, Universite de Mons, Belgium; Hans De Sterck, University of Waterloo, Canada</i>	
MLSP-19.3: KERNEL ORTHOGONAL NONNEGATIVE MATRIX FACTORIZATION:	3210
APPLICATION TO MULTISPECTRAL DOCUMENT IMAGE DECOMPOSITION	
<i>Abderrahmane Rahiche, Mohamed Cheriet, Synchromedia Lab, Ecole de Technologie Supérieure (ETS), Canada</i>	
MLSP-19.5: RANDOM PROJECTION STREAMS FOR (WEIGHTED) NONNEGATIVE	3215
MATRIX FACTORIZATION	
<i>Farouk Yahaya, Matthieu Puigt, Gilles Delmaire, Gilles Roussel, Univ. Littoral Côte d'Opale, France</i>	
MLSP-19.6: MULTIVARIATE NON-NEGATIVE MATRIX FACTORIZATION WITH	3220
APPLICATION TO ENERGY DISAGGREGATION	
<i>Pascal Alexander Schirmer, Iosif Mporas, University of Hertfordshire, United Kingdom</i>	
MLSP-20: ATTENTION AND AUTOENCODER NETWORKS	
MLSP-20.1: CONTINUOUS-TIME SELF-ATTENTION IN NEURAL DIFFERENTIAL	4045
EQUATION	
<i>Jen-Tzung Chien, Yi-Hsiang Chen, National Chiao Tung University, Taiwan</i>	
MLSP-20.2: BLIND DEINTERLEAVING OF SIGNALS IN TIME SERIES WITH	4050
SELF-ATTENTION BASED SOFT MIN-COST FLOW LEARNING	
<i>Oğul Can, Yeti Z. Gürbüç, Middle East Technical University, Turkey; Berkin Yıldırım, ASELSAN A. Ş., Turkey; A. Aydın Alatan, Middle East Technical University, Turkey</i>	
MLSP-20.3: ATTENTION ON ATTENTION SPARSE DENSE CONVOLUTIONAL	4055
NETWORK FOR FINANCIAL SIGNAL PROCESSING	
<i>Tianlei Zhu, Jiawei Li, Tsinghua University, China; Xinji Liu, Shenzhen Wukong Investment Management Co.Ltd, China; Yong Jiang, Shu-Tao Xia, Tsinghua University, China</i>	
MLSP-20.4: STOCK MOVEMENT PREDICTION AND PORTFOLIO MANAGEMENT VIA	4060
MULTIMODAL LEARNING WITH TRANSFORMER	
<i>Divyanshu Daiya, The LNM Institute of Information Technology, India; Che Lin, National Taiwan University, Taiwan</i>	
MLSP-20.5: A QUATERNION-VALUED VARIATIONAL AUTOENCODER	4065
<i>Eleonora Grassucci, Danilo Comminiello, Aurelio Uncini, Sapienza University of Rome, Italy</i>	

MLSP-20.6: LEARNING A SPARSE GENERATIVE NON-PARAMETRIC SUPERVISED AUTOENCODER	4070
<i>Michel Barlaud, University Cote d'azur, France; Frederic Guyard, Orange Labs, France</i>	
 MLSP-21: GENERATIVE NEURAL NETWORKS	
MLSP-21.1: DAG-GAN: CAUSAL STRUCTURE LEARNING WITH GENERATIVE ADVERSARIAL NETS	2935
<i>Yinghua Gao, Tsinghua University, China; Li Shen, Tencent AI Lab, China; Shu-Tao Xia, Tsinghua University, China</i>	
MLSP-21.2: RELAXED WASSERSTEIN WITH APPLICATIONS TO GANS	2940
<i>Xin Guo, Johnny Hong, Tianyi Lin, Nan Yang, University of California, Berkeley, United States</i>	
MLSP-21.3: ENVIRONMENT-INDEPENDENT WI-FI HUMAN ACTIVITY RECOGNITION WITH ADVERSARIAL NETWORK	2945
<i>Zhengyang Wang, Sheng Chen, Wei Yang, Yang Xu, University of Science and Technology of China, China</i>	
MLSP-21.4: A ROBUST TO NOISE ADVERSARIAL RECURRENT MODEL FOR NON-INTRUSIVE LOAD MONITORING	2950
<i>Maria Kaselimi, National Technical University of Athens, Greece; Athanasios Voulodimos, University of West Attica, Greece; Nikolaos Doulamis, Anastasios Doulamis, Eftychios Protopapadakis, National Technical University of Athens, Greece</i>	
MLSP-21.5: ENHANCING DATA-FREE ADVERSARIAL DISTILLATION WITH ACTIVATION REGULARIZATION AND VIRTUAL INTERPOLATION	2955
<i>Xiaoyang Qu, Jianzong Wang, Jing Xiao, Ping An Technology (Shenzhen) Co., Ltd., China</i>	
MLSP-21.6: SEQUENTIAL ADVERSARIAL ANOMALY DETECTION WITH DEEP FOURIER KERNEL	2960
<i>Shixiang Zhu, Henry Yuchi, Minghe Zhang, Yao Xie, Georgia Institute of Technology, United States</i>	
 MLSP-22: SEQUENTIAL LEARNING	
MLSP-22.1: INCORPORATE MAXIMUM MEAN DISCREPANCY IN RECURRENT LATENT SPACE FOR SEQUENTIAL GENERATIVE MODEL	3835
<i>Yuchi Zhang, Yongliang Wang, Yang Dong, Ant Group, China</i>	
MLSP-22.2: FMA-ETA: ESTIMATING TRAVEL TIME ENTIRELY BASED ON FFN WITH ATTENTION	3840
<i>Yiwen Sun, Yulu Wang, Tsinghua University, China; Kun Fu, Zheng Wang, DiDi AI Labs, China; Ziang Yan, Changshui Zhang, Tsinghua University, China; Jieping Ye, DiDi AI Labs; University of Michigan, Ann Arbor, China</i>	
MLSP-22.3: A UNIFIED APPROACH TO TRANSLATE CLASSICAL BANDIT ALGORITHMS TO STRUCTURED BANDITS	3845
<i>Samarth Gupta, Shreyas Chaudhari, Carnegie Mellon University, United States; Subhojyoti Mukherjee, University of Wisconsin-Madison, United States; Gauri Joshi, Osman Yagan, Carnegie Mellon University, United States</i>	
MLSP-22.4: NEAR-OPTIMAL ALGORITHMS FOR PIECEWISE-STATIONARY CASCADING BANDITS	3850
<i>Lingda Wang, Huozhi Zhou, University of Illinois at Urbana-Champaign, United States; Bingcong Li, University of Minnesota - Twin Cities, United States; Lav R. Varshney, Zhizhen Zhao, University of Illinois at Urbana-Champaign, United States</i>	
MLSP-22.5: OPTIMUM FEATURE ORDERING FOR DYNAMIC INSTANCE-WISE JOINT FEATURE SELECTION AND CLASSIFICATION	3855
<i>Yasitha Warahena Liyanage, Daphney-Stavroula Zois, University at Albany, State University of New York, United States</i>	

MLSP-22.6: POLA: ONLINE TIME SERIES PREDICTION BY ADAPTIVE LEARNING 3860 RATES

*Wenyu Zhang, Institute for Infocomm Research, A*STAR, Singapore*

MLSP-23: APPLICATIONS IN MUSIC AND AUDIO PROCESSING

MLSP-23.1: SINGER IDENTIFICATION USING DEEP TIMBRE FEATURE LEARNING 3060 WITH KNN-NET

Xulong Zhang, Jiale Qian, Fudan University, China; Yi Yu, National Institute of Informatics, Japan; Yifu Sun, Wei Li, Fudan University, China

MLSP-23.2: IMPLICIT HRTF MODELING USING TEMPORAL CONVOLUTIONAL 3065 NETWORKS

Israel D Gebru, Dejan Markovic, Alexander Richard, Steven Krenn, Gladstone Butler, Fernando De la Torre, Yaser Sheikh, Facebook Reality Labs Research, United States

MLSP-23.4: IMPROVING THE CLASSIFICATION OF RARE CHORDS WITH 3070 UNLABELED DATA

Marcelo Bortolozzo, Rodrigo Schramm, Claudio R. Jung, UFRGS, Brazil

MLSP-23.5: LOOPNET: MUSICAL LOOP SYNTHESIS CONDITIONED ON 3075 INTUITIVE MUSICAL PARAMETERS

Pritish Chandna, Antonio Ramires, Xavier Serra, Emilia Gómez, Universitat Pompeu Fabra, Spain

MLSP-23.6: MICAUGMENT: ONE-SHOT MICROPHONE STYLE TRANSFER 3080

Zalán Borsos, ETH Zurich, Switzerland; Yunpeng Li, Beat Gfeller, Marco Tagliasacchi, Google, Switzerland

MLSP-24: APPLICATIONS IN AUDIO AND SPEECH PROCESSING

MLSP-24.1: WASSERSTEIN BARYCENTER TRANSPORT FOR ACOUSTIC ADAPTATION 3895

Eduardo Fernandes Montesuma, Universidade Federal do Ceará, Brazil; Fred-Maurice Ngolè Mboula, Université Paris-Saclay, France

MLSP-24.2: EFFICIENT ADVERSARIAL AUDIO SYNTHESIS VIA PROGRESSIVE 3900 UPSAMPLING

Youngwoo Cho, Korea Advanced Institute of Science and Technology (KAIST), South Korea; Minwook Chang, NCSOFT, South Korea; Sanghyeon Lee, Korea Advanced Institute of Science and Technology (KAIST), South Korea; Hyoungwoo Lee, Gerard Jounghyun Kim, Korea University, South Korea; Jaegul Choo, Korea Advanced Institute of Science and Technology (KAIST), South Korea

MLSP-24.3: MULTI-CHANNEL SPEECH ENHANCEMENT USING GRAPH NEURAL 3905 NETWORKS

Panagiotis Tzirakis, Anurag Kumar, Jacob Donley, Facebook, United States

MLSP-24.4: MULTI-DECODER DPRNN: SOURCE SEPARATION FOR VARIABLE 3910 NUMBER OF SPEAKERS

Junzhe Zhu, Raymond Yeh, Mark Hasegawa-Johnson, University of Illinois at Urbana-Champaign, United States

MLSP-24.5: DATA-EFFICIENT FRAMEWORK FOR REAL-WORLD MULTIPLE SOUND 3915 SOURCE 2D LOCALIZATION

Guillaume Le Moing, Inria, Ecole normale supérieure, CNRS, PSL Research University, France; Phongtharin Vinayavekhin, Don Joven Agravante, Tadanobu Inoue, Jayakorn Vongkulbhisal, Asim Munawar, Ryuki Tachibana, IBM Research, Japan

MLSP-24.6: FUSING INFORMATION STREAMS IN END-TO-END AUDIO-VISUAL 3920 SPEECH RECOGNITION

Wentao Yu, Steffen Zeiler, Dorothea Kolossa, Ruhr University Bochum, Germany

MLSP-25: REINFORCEMENT LEARNING 1

MLSP-25.1: COOPERATIVE SCENARIOS FOR MULTI-AGENT REINFORCEMENT LEARNING IN WIRELESS EDGE CACHING 3425

Navneet Garg, Tharmalingam Ratnarajah, University of Edinburgh, United Kingdom

MLSP-25.2: ROBUST DEEP REINFORCEMENT LEARNING FOR UNDERWATER NAVIGATION WITH UNKNOWN DISTURBANCES 3430

Juan Parras, Santiago Zazo, Universidad Politécnica de Madrid, Spain

MLSP-25.3: ONLINE HYPER-PARAMETER TUNING FOR THE CONTEXTUAL BANDIT 3435

Djallel Bouneffouf, IBM Research, United States; Emmanuelle Claeys, Strasbourg University, United States

MLSP-25.4: DOUBLE-LINEAR THOMPSON SAMPLING FOR CONTEXT-ATTENTIVE BANDITS 3440

Djallel Bouneffouf, IBM Research, United States; Raphael Feraud, Orange, France; Sohini Upadhyay, IBM Research, United States; Yasaman Khazaeni, Irina Rish, Universite de montreal, United States

MLSP-25.5: ON THE MARGINAL BENEFIT OF ACTIVE LEARNING: DOES SELF-SUPERVISION EAT ITS CAKE? 3445

Yao-Chun Chan, Mingchen Li, Samet Oymak, University of California, Riverside, United States

MLSP-25.6: ROBUST MAML: PRIORITIZATION TASK BUFFER WITH ADAPTIVE LEARNING PROCESS FOR MODEL-AGNOSTIC META-LEARNING 3450

Thanh Nguyen, Tung Luu, Trung Pham, Sanzhar Rakhimkul, Chang Dong Yoo, Korea Advanced Institute of Science and Technology (KAIST), South Korea

MLSP-26: REINFORCEMENT LEARNING 2

MLSP-26.1: INTRODUCING DEEP REINFORCEMENT LEARNING TO NLU RANKING TASKS 3455

Ge Yu, Emre Barut, Chengwei Su, Amazon Inc, United States

MLSP-26.2: TEMPORAL LINK PREDICTION VIA REINFORCEMENT LEARNING 3460

Ye Tao, Ying Li, Zhonghai Wu, Peking University, China

MLSP-26.4: A DEEP REINFORCEMENT LEARNING APPROACH TO AUDIO-BASED NAVIGATION IN A MULTI-SPEAKER ENVIRONMENT 3465

Petros Giannakopoulos, National and Kapodistrian University of Athens, Greece; Aggelos Pikrakis, University of Pireaus, Greece; Yannis Cotronis, National and Kapodistrian University of Athens, Greece

MLSP-26.5: GLOBAL-LOCALIZED AGENT GRAPH CONVOLUTION FOR MULTI-AGENT REINFORCEMENT LEARNING 3470

Yuntao Liu, Yong Dou, Siqi Shen, Peng Qiao, National University of Defence Technology, China

MLSP-27: REINFORCEMENT LEARNING 3

MLSP-27.1: GAUSSIAN PROCESS TEMPORAL-DIFFERENCE LEARNING WITH SCALABILITY AND WORST-CASE PERFORMANCE GUARANTEES 3955

Qin Lu, Georgios B. Giannakis, University of Minnesota, United States

MLSP-27.2: SELF-INFERENCE OF OTHERS' POLICIES FOR HOMOGENEOUS AGENTS IN COOPERATIVE MULTI-AGENT REINFORCEMENT LEARNING 3960

Qifeng Lin, Qing Ling, Sun Yat-sen University, China

MLSP-27.3: SEMI-SUPERVISED BATCH ACTIVE LEARNING VIA BILEVEL OPTIMIZATION	3965
<i>Zalán Borsos, ETH Zurich, Switzerland; Marco Tagliasacchi, Google, Switzerland; Andreas Krause, ETH Zurich, Switzerland</i>	
MLSP-27.4: KERNEL-BASED LIFELONG POLICY GRADIENT REINFORCEMENT LEARNING	3970
<i>Rami Mowakeaa, Seung-Jun Kim, University of Maryland, Baltimore County, United States; Darren Emge, Combat Capabilities Development Command, United States</i>	
MLSP-27.5: POLICY AUGMENTATION: AN EXPLORATION STRATEGY FOR FASTER CONVERGENCE OF DEEP REINFORCEMENT LEARNING ALGORITHMS	3975
<i>Arash Mahyari, Florida Institute For Human and Machine Cognition (IHMC), United States</i>	
MLSP-27.6: GRAPHCOMM: A GRAPH NEURAL NETWORK BASED METHOD FOR MULTI-AGENT REINFORCEMENT LEARNING	3980
<i>Siqi Shen, Xiamen University, China; Yongquan Fu, Huayou Su, Hengyue Pan, Qiao Peng, Yong Dou, National University of Defense Technology, China; Cheng Wang, Xiamen University, China</i>	
 MLSP-28: ML AND TIME SERIES	
MLSP-28.1: IN SITU CALIBRATION OF CROSS-SENSITIVE SENSORS IN MOBILE SENSOR ARRAYS USING FAST INFORMED NON-NEGATIVE MATRIX FACTORIZATION	4075
<i>Olivier Vu thanh, University of Mons, Belgium; Matthieu Puigt, Farouk Yahaya, Gilles Delmaire, Gilles Roussel, Univ. Littoral Côte d'Opale, France</i>	
MLSP-28.2: MULTIPHISH: MULTI-MODAL FEATURES FUSION NETWORKS FOR PHISHING DETECTION	4080
<i>Lei Zhang, Peng Zhang, Luchen Liu, Jianlong Tan, Institute of Information Engineering, Chinese Academy of Sciences, China</i>	
MLSP-28.3: FAILURE PREDICTION BY CONFIDENCE ESTIMATION OF UNCERTAINTY-AWARE DIRICHLET NETWORKS	4085
<i>Theodoros Tsiligkaridis, MIT Lincoln Laboratory, United States</i>	
MLSP-28.4: TWO-STAGE FRAMEWORK FOR SEASONAL TIME SERIES FORECASTING	4090
<i>Qingyang Xu, Massachusetts Institute of Technology, United States; Qingsong Wen, Liang Sun, Alibaba Group, United States</i>	
MLSP-28.5: RECURSIVE INPUT AND STATE ESTIMATION: A GENERAL FRAMEWORK FOR LEARNING FROM TIME SERIES WITH MISSING DATA	4095
<i>Alberto Garcia-Duran, Robert West, Ecole Polytechnique Fédérale de Lausanne (EPFL), Spain</i>	
MLSP-28.6: ON THE PERFORMANCE-COMPLEXITY TRADEOFF IN STOCHASTIC GREEDY WEAK SUBMODULAR OPTIMIZATION	4100
<i>Abolfazl Hashemi, Haris Vikalo, Gustavo de Veciana, University of Texas at Austin, United States</i>	
 MLSP-29: DEEP LEARNING FOR TIME SERIES	
MLSP-29.1: SEMI-SUPERVISED TIME SERIES CLASSIFICATION BY TEMPORAL RELATION PREDICTION	2785
<i>Haoyi Fan, Fengbin Zhang, Ruidong Wang, Xunhua Huang, Harbin University of Science and Technology, China; Zuoyong Li, Minjiang University, China</i>	

MLSP-29.2: CONTINUOUS CNN FOR NONUNIFORM TIME SERIES 2790
Hui Shi, University of California, San Diego, United States; Yang Zhang, MIT-IBM Watson AI Lab, United States; Hao Wu, University of Illinois at Urbana-Champaign, United States; Shiyu Chang, MIT-IBM Watson AI Lab, United States; Kaizhi Qian, Mark Hasegawa-Johnson, University of Illinois at Urbana-Champaign, United States; Jishen Zhao, University of California, San Diego, United States

MLSP-29.3: BLEND-RES²NET: BLENDED REPRESENTATION SPACE BY 2795
TRANSFORMATION OF RESIDUAL MAPPING WITH RESTRAINED LEARNING FOR TIME SERIES CLASSIFICATION
Arijit Ukil, Tata Consultancy Services, India; Antonio J. Jara, HOP Ubiquitous (HOPU), Spain; Leandro Marin, University of Murcia, Spain

MLSP-29.4: SPATIOTEMPORAL ATTENTION FOR MULTIVARIATE TIME SERIES 2800
PREDICTION AND INTERPRETATION
Tryambak Gangopadhyay, Sin Yong Tan, Iowa State University, United States; Zhanhong Jiang, Johnson Controls, United States; Rui Meng, Lawrence Berkeley National Lab, UC Berkeley, United States; Soumik Sarkar, Iowa State University, United States

MLSP-29.5: TABULAR TRANSFORMERS FOR MODELING MULTIVARIATE TIME 2805
SERIES
Inkit Padhi, IBM Research, United States; Yair Schiff, IBM Cloud and Cognitive Software, United States; Igor Melnyk, Mattia Rigotti, Youssef Mroueh, Pierre Dognin, Jerret Ross, Ravi Nair, Erik Altman, IBM Research, United States

MLSP-29.6: REAL-TIME SYNCHRONIZATION IN NEURAL NETWORKS FOR 2810
MULTIVARIATE TIME SERIES ANOMALY DETECTION
Ahmed Abdulaal, Tomer Lancewicki, eBay, United States

MLSP-30: GRAPH SIGNAL PROCESSING

MLSP-30.1: FAST GRAPH KERNEL WITH OPTICAL RANDOM FEATURES..... 3255
Hashem Ghanem, Nicolas Keriven, Nicolas Tremblay, GIPSA-lab, CNRS, UGA, Grenoble INP, France

MLSP-30.2: FAST HIERARCHY PRESERVING GRAPH EMBEDDING VIA SUBSPACE 3260
CONSTRAINTS
Xu Chen, Peking University, China; Lun Du, Microsoft Research, China; Mengyuan Chen, Beijing Normal University, China; Yun Wang, QingQing Long, Kunqing Xie, Peking University, China

MLSP-30.5: GRAPH EMBEDDING USING MULTI-LAYER ADJACENT POINT 3265
MERGING MODEL
Jianming Huang, Hiroyuki Kasai, Waseda University, Japan

MLSP-30.6: NODE ATTRIBUTE COMPLETION IN KNOWLEDGE GRAPHS WITH 3270
MULTI-RELATIONAL PROPAGATION
Eda Bayram, Alberto Garcia-Duran, Robert West, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland

MLSP-31: RECOMMENDATION SYSTEMS

MLSP-31.1: USERREG: A SIMPLE BUT STRONG MODEL FOR RATING 4015
PREDICTION
Haiyang Zhang, University Of Sheffield, United Kingdom; Ivan Ganchev, University of Plovdiv “Paisii Hilendarski”, Bulgaria; Nikola S. Nikolov, University Of Limerick, Ireland; Mark Stevenson, University Of Sheffield, United Kingdom

MLSP-31.2: TOWARD SKILLS DIALOG ORCHESTRATION WITH ONLINE LEARNING 4020
Djallel Bouneffouf, IBM Research, United States; Raphael Feraud, Orange, France; Sohini Upadhyay, Mayank Agarwal, Yasaman Khazaeni, IBM Research, United States; Irina Rish, Université de montreal, Canada

MLSP-31.3: ADAPTIVE RE-BALANCING NETWORK WITH GATE MECHANISM FOR LONG-TAILED VISUAL QUESTION ANSWERING	4025
<i>Hongyu Chen, Ruifang Liu, Han Fang, Ximing Zhang, Beijing University of Posts and Telecommunications, China</i>	
MLSP-31.4: CO-CAPSULE NETWORKS BASED KNOWLEDGE TRANSFER FOR CROSS-DOMAIN RECOMMENDATION	4030
<i>Huiyuan Li, Li Yu, Youfang Leng, Qihan Du, Renmin University of China, China</i>	
MLSP-31.5: MODUREC: RECOMMENDER SYSTEMS WITH FEATURE AND TIME MODULATION	4035
<i>Javier Maroto, Clément Vignac, Pascal Frossard, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
MLSP-31.6: SIG2SIG : SIGNAL TRANSLATION NETWORKS TO TAKE THE REMAINS OF THE PAST	4040
<i>SangYeon Kim, Hyunwoo Lee, Jonghee Han, Joon-Ho Kim, Samsung Research, South Korea</i>	
 MLSP-32: OPTIMIZATION ALGORITHMS FOR MACHINE LEARNING	
MLSP-32.1: SOLVING A CLASS OF NON-CONVEX MIN-MAX GAMES USING ADAPTIVE MOMENTUM METHODS	3595
<i>Babak Barazandeh, Splunk, United States; Davoud Ataee Tarzanagh, George Michailidis, University of Florida, United States</i>	
MLSP-32.2: MINIMIZING WEIGHTED CONCAVE IMPURITY PARTITION UNDER CONSTRAINTS	3600
<i>Thuan Nguyen, Thinh Nguyen, Oregon State University, United States</i>	
MLSP-32.3: CONSTANT APPROXIMATION ALGORITHM FOR MINIMIZING CONCAVE IMPURITY	3605
<i>Thuan Nguyen, Hoang Le, Thinh Nguyen, Oregon State University, United States</i>	
MLSP-32.4: FUSING MULTITASK MODELS BY RECURSIVE LEAST SQUARES	3610
<i>Xiaobin Li, Lianlei Shan, Weiqiang Wang, University of Chinese Academy of Sciences, China</i>	
MLSP-32.5: CENTRALITY BASED NUMBER OF CLUSTER ESTIMATION IN GRAPH CLUSTERING	3615
<i>Mahdi Shamsi, Soosan Beheshti, Ryerson University, Canada</i>	
MLSP-32.6: DEPENDENCE-GUIDED MULTI-VIEW CLUSTERING	3620
<i>Xia Dong, Danyang Wu, Feiping Nie, Rong Wang, Xuelong Li, Northwestern Polytechnical University, China</i>	
 MLSP-33: OPTIMIZATION METHODS	
MLSP-33.1: IMPROVED STEP-SIZE SCHEDULES FOR NOISY GRADIENT METHODS	3365
<i>Sarit Khirirat, Xiaoyu Wang, KTH Royal Institute of Technology, Sweden; Sindri Magnússon, Stockholm University, Sweden; Mikael Johansson, KTH Royal Institute of Technology, Sweden</i>	
MLSP-33.2: RESPIPE: RESILIENT MODEL-DISTRIBUTED DNN TRAINING AT EDGE NETWORKS	3370
<i>Pengzhen Li, Erdem Koyuncu, Hulya Seferoglu, University of Illinois at Chicago, United States</i>	
MLSP-33.3: AN OPTIMAL STOCHASTIC COMPOSITIONAL OPTIMIZATION METHOD WITH APPLICATIONS TO META LEARNING	3375
<i>Yuejiao Sun, University of California, Los Angeles, United States; Tianyi Chen, Rensselaer Polytechnic Institute, United States; Wotao Yin, University of California, Los Angeles, United States</i>	

MLSP-33.4: DECENTRALIZED OPTIMIZATION ON TIME-VARYING DIRECTED GRAPHS UNDER COMMUNICATION CONSTRAINTS	3380
<i>Yiyue Chen, Abolfazl Hashemi, Haris Vikalo, University of Texas at Austin, United States</i>	
MLSP-33.5: DECENTRALIZED DEEP LEARNING USING MOMENTUM-ACCELERATED CONSENSUS	3385
<i>Aditya Balu, Iowa State University, United States; Zhanhong Jiang, Johnson Controls, United States; Sin Yong Tan, Iowa State University, United States; Chinmay Hedge, New York University, United States; Young M Lee, Johnson Controls, United States; Soumik Sarkar, Iowa State University, United States</i>	
MLSP-33.6: DEMYSTIFYING MODEL AVERAGING FOR COMMUNICATION-EFFICIENT FEDERATED MATRIX FACTORIZATION	3390
<i>Shuai Wang, Richard Cornelius Suwandi, Tsung-Hui Chang, The Chinese University of Hong Kong, Shenzhen, China</i>	
MLSP-34: SUBSPACE LEARNING AND APPLICATIONS	
MLSP-34.1: SAMPLE EFFICIENT SUBSPACE-BASED REPRESENTATIONS FOR NONLINEAR META-LEARNING	3475
<i>Ibrahim Gulluk, Bogazici University, Turkey; Yue Sun, University of Washington, United States; Samet Oymak, University of California, Riverside, United States; Maryam Fazel, University of Washington, United States</i>	
MLSP-34.2: MULTI-TASK LEARNING VIA SHARING INEXACT LOW-RANK SUBSPACE	3480
<i>Xiaoqian Wang, Purdue University, United States; Feiping Nie, University of Texas at Arlington, United States</i>	
MLSP-34.3: ON THE ADVERSARIAL ROBUSTNESS OF PRINCIPAL COMPONENT ANALYSIS	3485
<i>Ying Li, Tongji University, China; Fuwei Li, Lifeng Lai, University of California, Davis, United States; Jun Wu, Fudan University, China</i>	
MLSP-34.4: FAST MANIFOLD LANDMARKING USING EXTREME EIGEN-PAIRS	3490
<i>Fen Wang, Xidian University, China; Gene Cheung, York University, Canada; Yongchao Wang, Xidian University, China; Wai-Tian Tan, Innovation Labs, Cisco Systems, United States</i>	
MLSP-34.5: AFFINE PROJECTION SUBSPACE TRACKING	3495
<i>Marc Vilà, Carlos Alejandro López, Jaume Riba, Technical University of Catalonia, Spain</i>	
MLSP-34.6: A HIERARCHICAL SUBSPACE MODEL FOR LANGUAGE-ATTUNED ACOUSTIC UNIT DISCOVERY	3500
<i>Bolaji Yusuf, Bogazici University, Turkey; Lucas Ondel, Lukáš Burget, Jan “Honza” Cernocky, Brno University of Technology, Czechia; Murat Saraclar, Bogazici University, Turkey</i>	
MLSP-35: INDEPENDENT COMPONENT ANALYSIS	
MLSP-35.1: INDEPENDENT VECTOR ANALYSIS USING SEMI-PARAMETRIC DENSITY ESTIMATION VIA MULTIVARIATE ENTROPY MAXIMIZATION	3175
<i>Lucas Damasceno, Charles Cavalcante, Federal University of Ceará, Brazil; Tülay Adalı, University of Maryland, Baltimore County, United States; Zois Boukouvalas, American University, United States</i>	
MLSP-35.2: ICA WITH ORTHOGONALITY CONSTRAINT: IDENTIFIABILITY AND A NEW EFFICIENT ALGORITHM	3180
<i>Benjamin Gabrielson, Mohammad Akhonda, University of Maryland, Baltimore County, United States; Zois Boukouvalas, American University, United States; Seung Jun Kim, Tülay Adalı, University of Maryland, Baltimore County, United States</i>	
MLSP-35.4: BLIND EXTRACTION OF MOVING SOURCES VIA INDEPENDENT COMPONENT AND VECTOR ANALYSIS: EXAMPLES	3185
<i>Nesrine Amor, Jaroslav Cmejla, Technical University of Liberec, Czechia; Vaclav Kautsky, Czech Technical University in Prague, Czechia; Zbynek Koldovsky, Tomas Kounovsky, Technical University of Liberec, Czechia</i>	

MLSP-35.5: SINGLE CHANNEL VOICE SEPARATION FOR UNKNOWN NUMBER OF SPEAKERS UNDER REVERBERANT AND NOISY SETTINGS	3190
<i>Shlomo E. Chazan, Lior Wolf, Eliya Nachmani, Yossi Adi, Facebook AI Research, Israel</i>	
MLSP-35.6: UNSUPERVISED MUSICAL TIMBRE TRANSFER FOR NOTIFICATION SOUNDS	3195
<i>Jing Yang, Tristan Cinquin, ETH Zurich, Switzerland; Gábor Sörös, Nokia Bell Labs, Hungary</i>	
MLSP-36: PATTERN RECOGNITION AND CLASSIFICATION 1	
MLSP-36.1: VISUAL PRIVACY PROTECTION VIA MAPPING DISTORTION	3685
<i>Yiming Li, Peidong Liu, Yong Jiang, Shu-Tao Xia, Tsinghua University, China</i>	
MLSP-36.2: L-RED: EFFICIENT POST-TRAINING DETECTION OF IMPERCEPTIBLE BACKDOOR ATTACKS WITHOUT ACCESS TO THE TRAINING SET	3690
<i>Zhen Xiang, Pennsylvania State University, United States; David Miller, George Kesidis, Penn State University, United States</i>	
MLSP-36.3: MULTI-VIEW CONTRASTIVE LEARNING FOR ONLINE KNOWLEDGE DISTILLATION	3695
<i>Chuanguang Yang, Zhulin An, Yongjun Xu, Institute of Computing Technology, Chinese Academy of Sciences, China</i>	
MLSP-36.4: DYNAMIC TEXTURE RECOGNITION VIA NUCLEAR DISTANCES ON KERNELIZED SCATTERING HISTOGRAM SPACES	3700
<i>Alexander Sagel, Julian Wörmann, Hao Shen, fortiss - The Research Institute of the Free State of Bavaria, Germany</i>	
MLSP-36.5: CLUSTERING A COLLECTION OF NETWORKS WITH MIXTURES OF L1-SPARSE GRAPHICAL MODELS	3705
<i>Zuogong Yue, Victor Solo, University of New South Wales, Australia</i>	
MLSP-36.6: TAKING A CLOSER LOOK AT SYNTHESIS: FINE-GRAINED ATTRIBUTE ANALYSIS FOR PERSON RE-IDENTIFICATION	3710
<i>Suncheng Xiang, Yuzhuo Fu, Shanghai Jiao Tong University, China; Guanjie You, National University of Defense Technology, China; Ting Liu, Shanghai Jiao Tong University, China</i>	
MLSP-37: PATTERN RECOGNITION AND CLASSIFICATION 2	
MLSP-37.1: UNIFIED CLUSTERING AND OUTLIER DETECTION ON SPECIALIZED HARDWARE	3805
<i>Eldan Cohen, University of Toronto, Canada; Hayato Ushijima-Mwesigwa, Avradip Mandal, Arnab Roy, Fujitsu Laboratories of America, United States</i>	
MLSP-37.2: CLASS-IMBALANCED CLASSIFIERS USING ENSEMBLES OF GAUSSIAN PROCESSES AND GAUSSIAN PROCESS LATENT VARIABLE MODELS	3810
<i>Liu Yang, Stony Brook University, United States; Cassandra Heiselman, J. Gerald Quirk, Stony Brook University Hospital, United States; Petar M. Djurić, Stony Brook University, United States</i>	
MLSP-37.3: IMPROVING DEEP LEARNING SOUND EVENTS CLASSIFIERS USING GRAM MATRIX FEATURE-WISE CORRELATIONS	3815
<i>Antonio Joia Neto, Andre G. C. Pacheco, Diogo Carbonera Luvizon, Samsung, Brazil</i>	
MLSP-37.4: ADVERSARIALY ROBUST CLASSIFICATION BASED ON GLRT	3820
<i>Bhagyashree Puranik, Upamanyu Madhow, Ramtin Pedarsani, University of California, Santa Barbara, United States</i>	
MLSP-37.5: CROSS-CORPUS SPEECH EMOTION RECOGNITION USING JOINT DISTRIBUTION ADAPTIVE REGRESSION	3825
<i>Jiacheng Zhang, Lin Jiang, Yuan Zong, Wenming Zheng, Li Zhao, Southeast University, China</i>	

MLSP-37.6: META-COGNITION-BASED SIMPLE AND EFFECTIVE APPROACH TO OBJECT DETECTION	3830
<i>Sannidhi P Kumar, Chandan Gautam, Suresh Sundaram, Indian Institute of Science, Bangalore, India</i>	
 MLSP-38: NEURAL NETWORKS FOR CLUSTERING AND CLASSIFICATION	
MLSP-38.1: GRAPHNET: GRAPH CLUSTERING WITH DEEP NEURAL NETWORKS	3775
<i>Xianchao Zhang, Jie Mu, Han Liu, Xiaotong Zhang, Dalian University of Technology, China</i>	
MLSP-38.2: ATTENTION ENHANCED SPATIAL TEMPORAL NEURAL NETWORK FOR HRRP RECOGNITION	3780
<i>Yuchen Chu, Zunhua Guo, Shandong University, China</i>	
MLSP-38.3: DHCN: DEEP HIERARCHICAL CONTEXT NETWORKS FOR IMAGE ANNOTATION	3785
<i>Mingyuan Jiu, Zhengzhou University, China; Hichem Sahbi, CNRS Sorbonne University, France</i>	
MLSP-38.4: ONLINE CLASSIFICATION OF DYNAMIC MULTILAYER-NETWORK TIME SERIES IN RIEMANNIAN MANIFOLDS	3790
<i>Cong Ye, Konstantinos Slavakis, Johan Nakuci, Sarah Muldoon, University at Buffalo, State University of New York, United States; John Medaglia, Drexel University, United States</i>	
MLSP-38.5: ON THE POWER OF DEEP BUT NAIVE PARTIAL LABEL LEARNING	3795
<i>Junghoon Seo, SI Analytics Co. Ltd, South Korea; Joon Suk Huh, UW—Madison, United States</i>	
MLSP-38.6: ADVANCES IN MORPHOLOGICAL NEURAL NETWORKS: TRAINING, PRUNING AND ENFORCING SHAPE CONSTRAINTS	3800
<i>Nikolaos Dimitriadis, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Petros Maragos, National Technical University of Athens (NTUA), Greece</i>	
 MLSP-39: ADVERSARIAL MACHINE LEARNING	
MLSP-39.1: ADVERSARIAL LEARNING VIA PROBABILISTIC PROXIMITY ANALYSIS	2725
<i>Jarrod Hollis, Jinsub Kim, Raviv Raich, Oregon State University, United States</i>	
MLSP-39.2: CLASS AWARE ROBUST TRAINING	2730
<i>Zhikang Xia, Bin Chen, Tao Dai, Shutao Xia, Tsinghua Shenzhen International Graduate School, Tsinghua University, China</i>	
MLSP-39.3: NON-SINGULAR ADVERSARIAL ROBUSTNESS OF NEURAL NETWORKS	2735
<i>Yu-Lin Tsai, Chia-Yi Hsu, Chia-Mu Yu, National Chiao Tung University, Taiwan; Pin-Yu Chen, IBM Research, United States</i>	
MLSP-39.4: TOWARDS ADVERSARIAL ROBUSTNESS VIA COMPACT FEATURE REPRESENTATIONS	2740
<i>Muhammad Shah, Raphael Olivier, Bhiksha Raj, Carnegie Mellon University, United States</i>	
MLSP-39.5: ADVERSARIAL EXAMPLES DETECTION BEYOND IMAGE SPACE	2745
<i>Kejiang Chen, University of Science and Technology of China, China; Yuefeng Chen, Alibaba group, China; Hang Zhou, Chuan Qin, University of Science and Technology of China, China; Xiaofeng Mao, Alibaba group, China; Weiming Zhang, NengHai Yu, University of Science and Technology of China, China</i>	
MLSP-39.6: STRONG DATA AUGMENTATION SANITIZES POISONING AND BACKDOOR ATTACKS WITHOUT AN ACCURACY TRADEOFF	2750
<i>Eitan Borgnia, Valeriia Cherepanova, Liam Fowl, Amin Ghiasi, University of Maryland, College Park, United States; Jonas Geiping, University of Siegen, Germany; Micah Goldblum, Tom Goldstein, Arjun Gupta, University of Maryland, College Park, United States</i>	

MLSP-40: CONTRASTIVE LEARNING

MLSP-40.1: CONTRASTIVE PREDICTIVE CODING SUPPORTED FACTORIZED 3085
VARIATIONAL AUTOENCODER FOR UNSUPERVISED LEARNING OF DISENTANGLED SPEECH
REPRESENTATIONS

Janek Ebberts, Michael Kuhlmann, Tobias Cord-Landwehr, Reinhold Haeb-Umbach, Paderborn University, Germany

MLSP-40.2: CONTRASTIVE SEPARATIVE CODING FOR SELF-SUPERVISED 3090
REPRESENTATION LEARNING

Jun Wang, Max W. Y. Lam, Dan Su, Dong Yu, Tencent, China

MLSP-40.3: CONTRASTIVE SEMI-SUPERVISED LEARNING FOR ASR 3095

Alex Xiao, Christian Fuegen, Abdelrahman Mohamed, Facebook, United States

MLSP-40.4: CONTRASTIVE LEARNING OF GENERAL-PURPOSE AUDIO 3100
REPRESENTATIONS

Aaqib Saeed, Eindhoven University of Technology, Netherlands; David Grangier, Neil Zeghidour, Google Research, France

MLSP-40.5: SEQ-CPC : SEQUENTIAL CONTRASTIVE PREDICTIVE CODING FOR 3105
AUTOMATIC SPEECH RECOGNITION

Yulong Chen, Jianping Zhao, Weiqi Wang, Ming Fang, Haimei Kang, Lu Wang, Tao Wei, Jun Ma, Shaojun Wang, Jing Xiao, Ping An Technology, China

MLSP-40.6: ON SCALING CONTRASTIVE REPRESENTATIONS FOR 3110
LOW-RESOURCE SPEECH RECOGNITION

Lasse Borgholt, University of Copenhagen, Denmark; Tycho M. S. Tax, Independent researcher (no affiliation), Denmark; Jakob D. Havtorn, Lars Maaløe, Corti, Denmark; Christian Igel, University of Copenhagen, Denmark

MLSP-41: DEEP LEARNING OPTIMIZATION

MLSP-41.1: CONVEX NEURAL AUTOREGRESSIVE MODELS: TOWARDS 2905
TRACTABLE, EXPRESSIVE, AND THEORETICALLY-BACKED MODELS FOR SEQUENTIAL
FORECASTING AND GENERATION

Vikul Gupta, Burak Bartan, Tolga Ergen, Mert Pilanci, Stanford University, United States

MLSP-41.2: INERTIAL PROXIMAL DEEP LEARNING ALTERNATING MINIMIZATION 2910
FOR EFFICIENT NEUTRAL NETWORK TRAINING

Linbo Qiao, Tao Sun, Hengyue Pan, Dongsheng Li, National University of Defense Technology, China

MLSP-41.3: KALMAN OPTIMIZER FOR CONSISTENT GRADIENT DESCENT 2915

Xingyi Yang, University of California, San Diego, United States

MLSP-41.4: KALMANNET: DATA-DRIVEN KALMAN FILTERING 2920

Guy Revach, ETH Zurich, Switzerland; Nir Shlezinger, Ben-Gurion University of the Negev, Israel; Ruud J. G. van Sloun, Eindhoven University of Technology, and with Phillips Research, Netherlands; Yonina C. Eldar, Weizmann Institute of Science, Israel

MLSP-41.5: HCGM-NET: A DEEP UNFOLDING NETWORK FOR FINANCIAL INDEX 2925
TRACKING

Ruben Pauwels, VRIJE UNIVERSITEIT BRUSSELS, Belgium; Evaggelia Tsiligianni, University of Ioannina, Greece; Nikos Deligiannis, VRIJE UNIVERSITEIT BRUSSELS, Belgium

MLSP-41.6: AUGMENTING TRANSFERRED REPRESENTATIONS FOR STOCK 2930
CLASSIFICATION

Elizabeth Fons, University of Manchester, United Kingdom; Paula Dawson, AllianceBernstein, United Kingdom; Xiaojun Zeng, John Keane, University of Manchester, United Kingdom; Alexandros Iosifidis, Aarhus University, Denmark

MLSP-42: NEURAL NETWORK PRUNING

MLSP-42.1: A FRAMEWORK FOR PRUNING DEEP NEURAL NETWORKS USING ENERGY-BASED MODELS 2875

Hojjat Salehinejad, Shahrokh Valaee, University of Toronto, Canada

MLSP-42.2: PROTOTYPE-BASED PERSONALIZED PRUNING 2880

Jangho Kim, Seoul National University, South Korea; Simyung Chang, Sungrack Yun, Qualcomm AI Research, South Korea; Nojun Kwak, Seoul National University, South Korea

MLSP-42.3: TENSOR REORDERING FOR CNN COMPRESSION 2885

Matej Ulicny, Trinity College Dublin, Ireland; Vladimir A. Krylov, Dublin City University, Ireland; Rozenn Dahyot, Trinity College Dublin, Ireland

MLSP-42.4: PRUNING OF CONVOLUTIONAL NEURAL NETWORKS USING ISING ENERGY MODEL 2890

Hojjat Salehinejad, Shahrokh Valaee, University of Toronto, Canada

MLSP-42.5: REWEIGHTED DYNAMIC GROUP CONVOLUTION 2895

Weiwei Chen, Chong Wang, Zhehao Zhang, Zheng Huo, Linlin Gao, Ningbo University, China

MLSP-42.6: LAYER-WISE INTERPRETATION OF DEEP NEURAL NETWORKS USING IDENTITY INITIALIZATION 2900

Shohei Kubota, Hideaki Hayashi, Kyushu University, Japan; Tomohiro Hayase, Fujitsu Laboratories, Japan; Seiichi Uchida, Kyushu University, Japan

MLSP-43: BIOMEDICAL APPLICATIONS

MLSP-43.1: DETECTION OF POST-TRAUMATIC STRESS DISORDER USING LEARNED TIME-FREQUENCY REPRESENTATIONS FROM PUPILLOMETRY 3865

Bilal Taha, University of Toronto, Canada; Megan Kirk, Paul Ritvo, York University, Canada; Dimitrios Hatzinakos, University of Toronto, Canada

MLSP-43.2: SUBJECT-INVARIANT EEG REPRESENTATION LEARNING FOR EMOTION RECOGNITION 3870

Soheil Rayatdoost, University of Geneva, Switzerland; Yufeng Yin, University of Southern California, United States; David Rudrauf, University of Geneva, Switzerland; Mohammad Soleymani, University of Southern California, United States

MLSP-43.3: TOWARDS PARKINSON'S DISEASE PROGNOSIS USING SELF-SUPERVISED LEARNING AND ANOMALY DETECTION 3875

Hongchao Jiang, Wei Yang Bryan Lim, Jer Shyuan Ng, Nanyang Technological University, Singapore; Yu Wang, Ying Chi, Alibaba Group, Singapore; Chunyan Miao, Nanyang Technological University, Singapore

MLSP-43.4: IN-BED PRESSURE-BASED POSE ESTIMATION USING IMAGE SPACE REPRESENTATION LEARNING 3880

Vandad Davoodnia, Queen's University, Canada; Saeed Ghorbani, York University, Canada; Ali Etemad, Queen's University, Canada

MLSP-43.5: TOWARDS THE DEVELOPMENT OF SUBJECT-INDEPENDENT INVERSE METABOLIC MODELS 3885

Syedhooman Sajjadi, Anurag Das, Ricardo Gutierrez-Osuna, Theodora Chaspari, Projna Paromita, Laura Ruebush, Nicolaas Deutz, Bobak Mortazavi, Texas A&M University, United States

MLSP-43.6: HUMAN-EXPERT-LEVEL BRAIN TUMOR DETECTION USING DEEP LEARNING WITH DATA DISTILLATION AND AUGMENTATION 3890

Diyuan Lu, Frankfurt Institute for Advanced Studies, Germany; Nenad Polomac, Iskra Gacheva, Elke Hattingen, Institute for Neuroradiology Frankfurt university hospital Frankfurt am Main, Germany; Jochen Triesch, Frankfurt Institute for Advanced Studies, Germany

MLSP-44: MULTIMODAL DATA AND APPLICATIONS

MLSP-44.1: MULTIMODAL PUNCTUATION PREDICTION WITH CONTEXTUAL 3535 DROPOUT

Andrew Silva, Georgia Institute of Technology, United States; Barry-John Theobald, Nicholas Apostoloff, Apple, United States

MLSP-44.2: MULTI-MODAL LABEL DEQUANTIZED GAUSSIAN PROCESS LATENT 3540 VARIABLE MODEL FOR ORDINAL LABEL ESTIMATION

Masanao Matsumoto, Keisuke Maeda, Hokkaido University, Japan; Naoki Saito, National Institute of Technology, Kushiro College, Japan; Takahiro Ogawa, Miki Haseyama, Hokkaido University, Japan

MLSP-44.3: GENERATIVE INFORMATION FUSION 3545

Kenneth Tran, North Carolina State University, United States; Wesam Sakla, Lawrence Livermore National Laboratory, United States; Hamid Krim, North Carolina State University, United States

MLSP-44.4: SELF-AUGMENTED MULTI-MODAL FEATURE EMBEDDING 3550

Shinnosuke Matsuo, Seiichi Uchida, Brian Kenji Iwana, Kyushu University, Japan

MLSP-44.5: OPTIMIZE WHAT MATTERS: TRAINING DNN-HMM KEYWORD 3555 SPOTTING MODEL USING END METRIC

Ashish Shrivastava, Arnav Kundu, Chandra Dhir, Devang Naik, Oncel Tuzel, Apple, United States

MLSP-44.6: CO-ATTENTIONAL TRANSFORMERS FOR STORY-BASED VIDEO 3560 UNDERSTANDING

Björn Bebensee, Byoung-Tak Zhang, Seoul National University, South Korea

MLSP-45: PERFORMANCE BOUNDS

MLSP-45.1: DEEP GENERATIVE DEMIXING: ERROR BOUNDS FOR DEMIXING 3505 SUBGAUSSIAN MIXTURES OF LIPSCHITZ SIGNALS

Aaron Berk, University of British Columbia, Canada

MLSP-45.2: TOWARDS AN INTRINSIC DEFINITION OF ROBUSTNESS FOR A 3510 CLASSIFIER

Théo Giraudon, Vincent Gripon, IMT Atlantique, France; Matthias Löwe, University of Münster, Germany; Franck Vermet, University of Brest, France

MLSP-45.3: PHASE TRANSITIONS FOR ONE-VS-ONE AND ONE-VS-ALL LINEAR 3515 SEPARABILITY IN MULTICLASS GAUSSIAN MIXTURES

Ganesh Ramachandra Kini, University of California, Santa Barbara, United States; Christos Thrampoulidis, University of British Columbia, Canada

MLSP-45.4: LEAKY INTEGRATOR DYNAMICAL SYSTEMS AND REACHABLE SETS 3520

Brian Whiteaker, Peter Gerstoft, University of California, San Diego, United States

MLSP-45.5: BENIGN OVERFITTING IN BINARY CLASSIFICATION OF GAUSSIAN 3525 MIXTURES

Ke Wang, University of California, Santa Barbara, United States; Christos Thrampoulidis, University of British Columbia, Canada

MLSP-45.6: AN ORDER-OPTIMAL ADAPTIVE TEST PLAN FOR NOISY GROUP 3530 TESTING UNDER UNKNOWN NOISE MODELS

Sudeep Salgia, Qing Zhao, Cornell University, United States

MLSP-46: THEORY AND APPLICATIONS

MLSP-46.1: SAPAUGMENT: LEARNING A SAMPLE ADAPTIVE POLICY FOR DATA 4105 AUGMENTATION

Ting-Yao Hu, Carnegie Mellon University, United States; Ashish Shrivastava, Rick Chang, Hema Koppula, Stefan Braun, Kyuyeon Hwang, Ozlem Kalinli, Oncel Tuzel, Apple, United States

MLSP-46.2: HIERARCHICAL CODED ELASTIC COMPUTING 4110 *Shahrzad Kianidehkordi, Tharindu Adikari, Stark Draper, University of Toronto, Canada*

MLSP-46.3: SYNTHESIZE & LEARN: JOINTLY OPTIMIZING GENERATIVE AND 4115 CLASSIFIER NETWORKS FOR IMPROVED DROWSINESS DETECTION

Sandipan Banerjee, Ajjen Joshi, Ahmed Ghoneim, Survi Kyal, Affectiva, United States; Taniya Mishra, SureStart, United States

MLSP-46.4: A JOINT CONVOLUTIONAL AND SPATIAL QUAD-DIRECTIONAL LSTM 4120 NETWORK FOR PHASE UNWRAPPING

Malsha V. Perera, Ashwin De Silva, University of Moratuwa, Sri Lanka

MLSP-47: APPLICATIONS OF MACHINE LEARNING

MLSP-47.1: INTEGRATED CLASSIFICATION AND LOCALIZATION OF TARGETS USING 3925 BAYESIAN FRAMEWORK IN AUTOMOTIVE RADARS

Anand Dubey, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany; Avik Santra, Infineon Technologies AG, Germany; Jonas Fuchs, Maximilian Luebke, Robert Weigel, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany; Fabian Lurz, Hamburg University of Technology, Germany

MLSP-47.2: A DNN AUTOENCODER FOR AUTOMOTIVE RADAR INTERFERENCE 3930 MITIGATION

Shengyi Chen, Ruhr-Universität Bochum & HELLA GmbH & Co. KGaA, Germany; Jalal Taghia, Tai Fei, Uwe Kühnau, HELLA GmbH & Co. KGaA, Germany; Nils Pohl, Rainer Martin, Ruhr-Universität Bochum, Germany

MLSP-47.3: DURAS: DEEP UNFOLDED RADAR SENSING USING DOPPLER 3935 FOCUSING

Pranav Goyal, Indraprastha Institute of Information Technology Delhi, India; Satish Mulleti, Weizmann Institute of Science, Israel; Anubha Gupta, Indraprastha Institute of Information Technology Delhi, India; Yonina C. Eldar, Weizmann Institute of Science, Israel

MLSP-47.4: NNAKF: A NEURAL NETWORK ADAPTED KALMAN FILTER FOR TARGET 3940 TRACKING

Sami Jouaber, Mines ParisTech/Thales LAS, France; Silvère Bonnabel, Mines ParisTech/UNC, France; Santiago Velasco-Forero, Mines ParisTech, France; Marion Pilté, Thales LAS, France

MLSP-47.5: MULTI-SAMPLE ONLINE LEARNING FOR SPIKING NEURAL 3945 NETWORKS BASED ON GENERALIZED EXPECTATION MAXIMIZATION

Hyeryung Jang, Dongguk University, South Korea; Osvaldo Simeone, King's College London, United Kingdom

MLSP-47.6: PROBABILISTIC GRAPH NEURAL NETWORKS FOR TRAFFIC SIGNAL 3950 CONTROL

Ting Zhong, Zheyang Xu, Fan Zhou, University of Electronic Science and Technology of China, China

MLSP-48: NEURAL NETWORK APPLICATIONS

MLSP-48.1: TASK-AWARE NEURAL ARCHITECTURE SEARCH..... 3025 *Cat Le, Mohammadreza Soltani, Robert Ravier, Vahid Tarokh, Duke University, United States*

MLSP-48.2: F-NET: FUSION NEURAL NETWORK FOR VEHICLE TRAJECTORY PREDICTION IN AUTONOMOUS DRIVING	3030
<i>Jue Wang, Peking University / Tencent Technology (Beijing) Company Limited, China; Ping Wang, Chao Zhang, Peking University, China; Kuifeng Su, Tencent Company, China; Jun Li, University of Chinese Academy of Sciences, China</i>	
MLSP-48.3: UNSUPERVISED RECONSTRUCTION OF SEA SURFACE CURRENTS FROM AIS MARITIME TRAFFIC DATA USING LEARNABLE VARIATIONAL MODELS	3035
<i>Simon Benaïchouche, IMT Atlantique, France; Clement Le Goff, Yann Guichoux, Eodyn, France; François Rousseau, Ronan Fablet, IMT Atlantique, France</i>	
MLSP-48.4: A COMPACT JOINT DISTILLATION NETWORK FOR VISUAL FOOD RECOGNITION	3040
<i>Heng Zhao, Kim-Hui Yap, Alex Chichung Kot, Nanyang Technological University, Singapore</i>	
MLSP-48.5: PIPELINE SAFETY EARLY WARNING METHOD FOR DISTRIBUTED SIGNAL USING BILINEAR CNN AND LIGHTGBM	3045
<i>Yiyuan Yang, Yi Li, Haifeng Zhang, Tsinghua University, China</i>	
MLSP-48.6: DEEP LEARNING BASED HYBRID PRECODING IN DUAL-BAND COMMUNICATION SYSTEMS	3050
<i>Rafail Ismayilov, Renato L. G. Cavalcante, Sławomir Stańczak, Fraunhofer Heinrich-Hertz-Institut, Germany</i>	
MLSP-48.7: DEEP LEARNING-BASED CROSS-LAYER RESOURCE ALLOCATION FOR WIRED COMMUNICATION SYSTEMS	3055
<i>Pourya Behmandpoor, Jeroen Verdyck, Marc Moonen, KU Leuven, Belgium</i>	
 MMSP-1: MULTIMEDIA SIGNAL PROCESSING	
MMSP-1.1: ATVIO: ATTENTION GUIDED VISUAL-INERTIAL ODOMETRY	4125
<i>Li Liu, Ge Li, Peking University Shenzhen Graduate School, China; Thomas H Li, Peking University, China</i>	
MMSP-1.2: FEATURE INTEGRATION VIA SEMI-SUPERVISED ORDINALLY MULTI-MODAL GAUSSIAN PROCESS LATENT VARIABLE MODEL	4130
<i>Kyohei Kamikawa, Keisuke Maeda, Takahiro Ogawa, Miki Haseyama, Hokkaido University, Japan</i>	
MMSP-1.3: A MULTI-LAYER MULTI-CHANNEL ATTENTIVE NETWORK FOR GENDER AND AGE RECOGNITION	4135
<i>Jia Chen, Haiping Yu, Yimei Kang, Beihang University, China</i>	
MMSP-1.4: EFFECT OF LANGUAGE PROFICIENCY ON SUBJECTIVE EVALUATION OF NOISE SUPPRESSION ALGORITHMS	4140
<i>Babak Naderi, Gabriel Mittag, Rafael Zequeira Jiménez, Technische Universität Berlin, Germany; Sebastian Möller, Technische Universität Berlin, Deutsches Forschungszentrum für Künstliche Intelligenz, Germany</i>	
MMSP-1.5: MELODY HARMONIZATION USING ORDERLESS NADE, CHORD BALANCING, AND BLOCKED GIBBS SAMPLING	4145
<i>Chung-En Sun, Yi-Wei Chen, Hung-Shin Lee, Yen-Hsing Chen, Hsin-Min Wang, Institute of Information Science, Academia Sinica, Taiwan</i>	
 MMSP-2: DEEP LEARNING FOR MULTIMEDIA ANALYSIS AND PROCESSING	
MMSP-2.1: CROSS-DOMAIN SEMI-SUPERVISED DEEP METRIC LEARNING FOR IMAGE SENTIMENT ANALYSIS	4150
<i>Yun Liang, Keisuke Maeda, Takahiro Ogawa, Miki Haseyama, Hokkaido University, Japan</i>	

MMSP-2.2: AUDIOVISUAL HIGHLIGHT DETECTION IN VIDEOS	4155
<i>Karel Mundnich, University of Southern California, United States; Alexandra Fenster, Aparna Khare, Shiva Sundaram, Amazon, United States</i>	
MMSP-2.3: TEACHER-ASSISTED MINI-BATCH SAMPLING FOR BLIND DISTILLATION USING METRIC LEARNING	4160
<i>Nakamasa Inoue, Tokyo Institute of Technology, Japan</i>	
MMSP-2.4: RULE-EMBEDDED NETWORK FOR AUDIO-VISUAL VOICE ACTIVITY DETECTION IN LIVE MUSICAL VIDEO STREAMS	4165
<i>Yuanbo Hou, Ghent University, Belgium; Yi Deng, New York University, United States; Bilei Zhu, Zejun Ma, Bytedance AI Lab, China; Dick Botteldooren, Ghent University, Belgium</i>	
MMSP-2.5: REINFORCEMENT STACKED LEARNING WITH SEMANTIC-ASSOCIATED ATTENTION FOR VISUAL QUESTION ANSWERING	4170
<i>Xinyu Xiao, Tencent, China; Chunxia Zhang, School of Computer Science and Technology, Beijing Institute of Technology, China; Shiming Xiang, Chunhong Pan, Institute of Automation, Chinese Academy of Sciences, China</i>	
MMSP-2.6: HIERARCHICAL REFINED ATTENTION FOR SCENE TEXT RECOGNITION	4175
<i>Min Zhang, Meng Ma, Ping Wang, Peking University, China</i>	
 MMSP-3: MULTIMEDIA SYNTHESIS AND ENHANCEMENT	
MMSP-3.2: COLLABORATIVE LEARNING TO GENERATE AUDIO-VIDEO JOINTLY	4180
<i>Vinod Kurmi, Vipul Bajaj, Badri Patro, Venkatesh K Subramanian, Indian Institute of Technology, Kanpur, India; Vinay P Namboodiri, University of Bath, United Kingdom; Preethi Jyothi, Indian Institute of Technology, Bombay, India</i>	
MMSP-3.3: AN ATTENTION-SEQ2SEQ MODEL BASED ON CRNN ENCODING FOR AUTOMATIC LABANOTATION GENERATION FROM MOTION CAPTURE DATA	4185
<i>Min Li, Zhenjiang Miao, Beijing Jiaotong University, China; Xiao-Ping Zhang, Ryerson University, Canada; Wanru Xu, Beijing Jiaotong University, China</i>	
MMSP-3.4: SHOW AND SPEAK: DIRECTLY SYNTHESIZE SPOKEN DESCRIPTION OF IMAGES	4190
<i>Xinsheng Wang, Xi'an Jiaotong University, China; Siyuan Feng, Delft University of Technology, Netherlands; Jihua Zhu, Xi'an Jiaotong University, China; Mark Hasegawa-Johnson, University of Illinois at Urbana-Champaign, United States; Odette Scharenborg, Delft University of Technology, Netherlands</i>	
MMSP-3.5: DRAWGAN: TEXT TO IMAGE SYNTHESIS WITH DRAWING GENERATIVE ADVERSARIAL NETWORKS	4195
<i>Zhiqiang Zhang, Jinjia Zhou, Hosei University, Japan; Wenxin Yu, Ning Jiang, Southwest University of Science and Technology, China</i>	
MMSP-3.6: DISENTANGLING SUBJECT-DEPENDENT/-INDEPENDENT REPRESENTATIONS FOR 2D MOTION RETARGETING	4200
<i>Fanglu Xie, Go Irie, Tatsushi Matsubayashi, Nippon Telegraph and Telephone Corporation, Japan</i>	
 MMSP-4: IMAGE, VIDEO AND POINT CLOUD CODING	
MMSP-4.1: NETWORK AND CONTENT-DEPENDENT BITRATE LADDER ESTIMATION FOR ADAPTIVE BITRATE VIDEO STREAMING	4205
<i>Pierre Lebreton, Kazuhisa Yamagishi, NTT Corporation, Japan</i>	

MMSP-4.2: ULTRA-LOW BITRATE VIDEO CONFERENCING USING DEEP IMAGE ANIMATION	4210
<i>Goluck Konuko, Telecom Paris- IP Paris, France; Giuseppe Valenzise, CNRS, CentraleSupélec, France; Stéphane Lathuilière, Telecom Paris- IP Paris, France</i>	
MMSP-4.3: HIERARCHICAL BIT-WISE DIFFERENTIAL CODING (HBDC) OF POINT CLOUD ATTRIBUTES	4215
<i>Yan Huang, Bin Wang, Shandong University, China; C.-C. Jay Kuo, University of Southern California, United States; Hui Yuan, Shandong University, China; Jingliang Peng, University of Jinan, China</i>	
MMSP-4.4: LEARNING-BASED LOSSLESS COMPRESSION OF 3D POINT CLOUD GEOMETRY	4220
<i>Dat Thanh Nguyen, Maurice Quach, Giuseppe Valenzise, Pierre Duhamel, University Paris-Saclay, CNRS, CentraleSupélec, L2S, France</i>	
MMSP-4.5: IMAGE CODING WITH NEURAL NETWORK-BASED COLORIZATION	4225
<i>Diogo Lopes, João Ascenso, Catarina Brites, Fernando Pereira, Instituto Superior Técnico, Universidade de Lisboa - Instituto de Telecomunicações, Portugal</i>	
MMSP-4.6: JOINT REINFORCEMENT LEARNING AND GAME THEORY BITRATE CONTROL METHOD FOR 360-DEGREE DYNAMIC ADAPTIVE STREAMING	4230
<i>Xuekai Wei, City University of Hong Kong, Hong Kong SAR China; Mingliang Zhou, Chongqing University, China; Sam Kwong, City University of Hong Kong, Hong Kong SAR China; Hui Yuan, Shandong University, China; Tao Xiang, Chongqing University, China</i>	
 MMSP-5: HUMAN CENTRIC MULTIMEDIA 1	
MMSP-5.1: HCAG: A HIERARCHICAL CONTEXT-AWARE GRAPH ATTENTION MODEL FOR DEPRESSION DETECTION	4235
<i>Meng Niu, Kai Chen, Qingcai Chen, Lufeng Yang, Harbin Institute of Technology, Shenzhen, China</i>	
MMSP-5.2: WHEN FACE RECOGNITION MEETS OCCLUSION: A NEW BENCHMARK	4240
<i>Baojin Huang, Zhongyuan Wang, Guangcheng Wang, Kui Jiang, Kangli Zeng, Zhen Han, Xin Tian, Yuhong Yang, Wuhan University, China</i>	
MMSP-5.3: A TRIPLET APPEARANCE PARSING NETWORK FOR PERSON RE-IDENTIFICATION	4245
<i>Mingfu Xiong, Engineering Research Center of Hubei Province for Clothing Information, School of Mathematics and Computer Science, Wuhan Textile University, China; Zhongyuan Wang, School of Computer Science, Wuhan University, Wuhan 430072, China, China; Ruhan He, Xinrong Hu, School of Mathematics and Computer Science, Wuhan Textile University, China; Ming Cheng, Engineering Research Center of Hubei Province for Clothing Information, School of Mathematics and Computer Science, Wuhan Textile University, China; Xiao Qin, Shelby Center for Engineering Technology, Samuel Ginn College of Engineering, American Samoa; Jia Chen, School of Mathematics and Computer Science, Wuhan Textile University, China</i>	
MMSP-5.4: PART-ALIGNED NETWORK WITH BACKGROUND FOR MISALIGNED PERSON SEARCH	4250
<i>Xian Zhong, Yiting Liu, Wuhan University of Technology, China; Wenxin Huang, Hubei University, China; Xiao Wang, Wuhan University, China; Bo Ma, Independent Researcher, United States; Jingling Yuan, Wuhan University of Technology, China</i>	
MMSP-5.5: LEARNING POSE-ADAPTIVE LIP SYNC WITH CASCADED TEMPORAL CONVOLUTIONAL NETWORK	4255
<i>Ruobing Zheng, Bo Song, Changjiang Ji, Moviebook, China</i>	

MMSP-5.6: ASSESSMENT OF BIPOLAR DISORDER USING HETEROGENEOUS DATA OF SMARTPHONE-BASED DIGITAL PHENOTYPING	4260
<i>Hung-Yi Su, Chung-Hsien Wu, Cheng-Ray Liou, Esther Ching-Lan Lin, Po-See Chen, National Cheng Kung University, Taiwan</i>	
 MMSP-6: HUMAN CENTRIC MULTIMEDIA 2	
MMSP-6.1: MULTI-GRANULARITY FEATURE INTERACTION AND RELATION REASONING FOR 3D DENSE ALIGNMENT AND FACE RECONSTRUCTION	4265
<i>Lei Li, Xiangzheng Li, Kangbo Wu, Kui Lin, Suping Wu, Ningxia University, China</i>	
MMSP-6.2: INDEPENDENT SIGN LANGUAGE RECOGNITION WITH 3D BODY, HANDS, AND FACE RECONSTRUCTION	4270
<i>Agelos Kratimenos, National Technical University of Athens, Greece; Georgios Pavlakos, University of Berkeley, Greece; Petros Maragos, National Technical University of Athens, Greece</i>	
MMSP-6.3: MULTIMODAL CROSS- AND SELF-ATTENTION NETWORK FOR SPEECH EMOTION RECOGNITION	4275
<i>Licai Sun, University of Chinese Academy of Sciences, China; Bin Liu, Jianhua Tao, Zheng Lian, Institute of Automation, Chinese Academy of Sciences, China</i>	
MMSP-6.4: MULTI-TARGET DOA ESTIMATION WITH AN AUDIO-VISUAL FUSION MECHANISM	4280
<i>Xinyuan Qian, Maulik Madhavi, Zexu Pan, Jiadong Wang, Haizhou Li, National University of Singapore, Singapore</i>	
MMSP-6.5: IMPROVING MULTIMODAL SPEECH ENHANCEMENT BY INCORPORATING SELF-SUPERVISED AND CURRICULUM LEARNING	4285
<i>Ying Cheng, Mengyu He, Jiashuo Yu, Rui Feng, Fudan University, China</i>	
MMSP-6.6: AUTOENCODER FOR VIBROTACTILE SIGNAL COMPRESSION	4290
<i>Zhuoran Li, University of Waterloo, Canada; Rania Hassen, Assiut University, Egypt; Zhou Wang, University of Waterloo, Canada</i>	
 MMSP-7: MULTIMODAL PERCEPTION, INTEGRATION AND MULTISENSORY FUSION	
MMSP-7.1: CROSS-MODAL KNOWLEDGE DISTILLATION FOR FINE-GRAINED ONE-SHOT CLASSIFICATION	4295
<i>Jiabao Zhao, Xin Lin, East China Normal University, China; Yifan Yang, Transwarp Technology, China; Jing Yang, Liang He, East China Normal University, China</i>	
MMSP-7.2: LEARNING AUDIO-VISUAL CORRELATIONS FROM VARIATIONAL CROSS-MODAL GENERATION	4300
<i>Ye Zhu, Illinois Institute of Technology, United States; Yu Wu, University of Technology Sydney, Australia; Hugo Latapie, Cisco, United States; Yi Yang, University of Technology Sydney, Australia; Yan Yan, Illinois Institute of Technology, United States</i>	
MMSP-7.3: ECCL: EXPLICIT CORRELATION-BASED CONVOLUTION BOUNDARY LOCATOR FOR MOMENT LOCALIZATION	4305
<i>Xinfang Liu, Shandong University, China; Xiushan Nie, Shandong Jianzhu University, China; Junya Teng, Shandong University, China; Fanchang Hao, Shandong Jianzhu University, China; Yilong Yin, Shandong University, China</i>	
MMSP-7.4: COOPNET: MULTI-MODAL COOPERATIVE GENDER PREDICTION IN SOCIAL MEDIA USER PROFILING	4310
<i>Lin Li, Kaixi Hu, Yunpei Zheng, Wuhan University of Technology, China; Jianquan Liu, NEC Corporation, Japan; Kong Aik Lee, Agency for Science, Technology and Research (A*STAR), Singapore</i>	

MMSP-7.5: ROBUST LATENT REPRESENTATIONS VIA CROSS-MODAL TRANSLATION AND ALIGNMENT	4315
<i>Vandana Rajan, Queen Mary University of London, United Kingdom; Alessio Brutti, FBK, Italy; Andrea Cavallaro, Queen Mary University of London, United Kingdom</i>	
MMSP-7.6: SEMI-SUPERVISED MULTIMODAL IMAGE TRANSLATION FOR MISSING MODALITY IMPUTATION	4320
<i>Wangbin Sun, Fei Ma, Yang Li, Shao-Lun Huang, Shiguang Ni, Lin Zhang, Tsinghua University, China</i>	
MMSP-8: MULTIMEDIA RETRIEVAL AND SIGNAL DETECTION	
MMSP-8.1: DEEP ADVERSARIAL QUANTIZATION NETWORK FOR CROSS-MODAL RETRIEVAL	4325
<i>Yu Zhou, Yong Feng, Chongqing University, China; Mingliang Zhou, University of Macau, China; Baohua Qiang, Guilin University of Electronic Technology, China; Leong Hou U, University of Macau, China; Jiajie Zhu, Chongqing University, China</i>	
MMSP-8.2: SCALABLE DISCRIMINATIVE DISCRETE HASHING FOR LARGE-SCALE CROSS-MODAL RETRIEVAL	4330
<i>Jiayang Qin, Lunke Fei, Jian Zhu, Guangdong University of Technology, China; Jie Wen, Chunwei Tian, Shuai Wu, Harbin Institute of Technology, China</i>	
MMSP-8.3: HIERARCHICAL SIMILARITY LEARNING FOR LANGUAGE-BASED PRODUCT IMAGE RETRIEVAL	4335
<i>Zhe Ma, Fenghao Liu, Zhejiang University, China; Jianfeng Dong, Zhejiang Gongshang University, China; Xiaoye Qu, Huazhong University of Science and Technology, China; Yuan He, Alibaba Group, China; Shouling Ji, Zhejiang University, China</i>	
MMSP-8.4: BIDIRECTIONAL FOCUSED SEMANTIC ALIGNMENT ATTENTION NETWORK FOR CROSS-MODAL RETRIEVAL	4340
<i>Shuli Cheng, Liejun Wang, Anyu Du, Yongming Li, Xinjiang University, China</i>	
MMSP-8.5: DETECTION OF AUDIO-VIDEO SYNCHRONIZATION ERRORS VIA EVENT DETECTION	4345
<i>Joshua Ebenezer, University of Texas at Austin, United States; Yongjun Wu, Hai Wei, Sriram Sethuraman, Zongyi Liu, Amazon Prime Video, United States</i>	
MMSP-8.6: FC2RN: A FULLY CONVOLUTIONAL CORNER REFINEMENT NETWORK FOR ACCURATE MULTI-ORIENTED SCENE TEXT DETECTION	4350
<i>Xugong Qin, Yu Zhou, Youhui Guo, Dayan Wu, Weiping Wang, Institute of Information Engineering, Chinese Academy of Sciences, China</i>	
SAM-1: DIRECTION OF ARRIVAL ESTIMATION 1	
SAM-1.1: DOA ESTIMATION OF A HIDDEN RF SOURCE EXPLOITING SIMPLE BACKSCATTER RADIO TAGS	4355
<i>Georgios Vougioukas, Aggelos Bletsas, Technical University of Crete, Greece</i>	
SAM-1.2: PROBABILITY OF RESOLUTION OF G-MUSIC: AN ASYMPTOTIC APPROACH	4360
<i>David Schenck, Technische Universität Darmstadt, Germany; Xavier Mestre, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), Spain; Marius Pesavento, Technische Universität Darmstadt, Germany</i>	
SAM-1.3: A PARTIALLY-RELAXED ROBUST DOA ESTIMATOR UNDER NON-GAUSSIAN LOW-RANK INTERFERENCE AND NOISE	4365
<i>Minh Trinh-Hoang, Technical University of Darmstadt, Germany; Mohammed Nabil El Korso, Paris-Nanterre University, France; Marius Pesavento, Technische Universität Darmstadt, Germany</i>	

SAM-1.4: NON-COHERENT DOA ESTIMATION OF OFF-GRID SIGNALS WITH UNIFORM CIRCULAR ARRAYS	4370
<i>Zhengyu Wan, Wei Liu, University of Sheffield, United Kingdom</i>	
SAM-1.5: ENHANCED STANDARD ESPRIT FOR OVERCOMING IMPERFECTIONS IN DOA ESTIMATION	4375
<i>Majdoddin Esfandiari, Sergiy A. Vorobyov, Aalto University, Finland</i>	
 SAM-2: DIRECTION OF ARRIVAL ESTIMATION 2	
SAM-2.2: CONSTRAINED TENSOR DECOMPOSITION FOR 2D DOA ESTIMATION IN TRANSMIT BEAMSPACE MIMO RADAR WITH SUBARRAYS	4605
<i>Feng Xu, Beijing Institute of Technology, China; Sergiy A. Vorobyov, Aalto University, Finland</i>	
SAM-2.3: ALTERNATING PROJECTIONS GRIDLESS COVARIANCE-BASED ESTIMATION FOR DOA	4610
<i>Yongsung Park, Peter Gerstoft, University of California, San Diego, United States</i>	
SAM-2.4: SYNTHETIC DATA FOR DNN-BASED DOA ESTIMATION OF INDOOR SPEECH	4615
<i>Femke B. Gelderblom, Norwegian University of Science and Technology & SINTEF, Norway; Yi Liu, Johannes Kvam, SINTEF, Norway; Tor Andre Myrvoll, Norwegian University of Science and Technology & SINTEF, Norway</i>	
SAM-2.5: DIRECTION OF ARRIVAL ESTIMATION FOR NON-COHERENT SUB-ARRAYS VIA JOINT SPARSE AND LOW-RANK SIGNAL RECOVERY	4620
<i>Tom Tirer, Tel-Aviv University, Israel; Oded Bialer, General Motors, Israel</i>	
SAM-2.6: SPARSITY AND NONNEGATIVITY CONSTRAINED KRYLOV APPROACH FOR DIRECTION OF ARRIVAL ESTIMATION	4625
<i>Hamza Baali, Hamad bin Khalifa University, Qatar; Abdesselam Bouzerdoum, University of Wollongong, Australia; Abdelkrim Khelif, Univ. Bourgogne Franche-Comté, CNRS/UFC/ENSMM/UTBM, France</i>	
 SAM-3: MIMO RADAR ARRAY PROCESSING	
SAM-3.1: HYBRID ANALOG-DIGITAL MIMO RADAR RECEIVERS WITH BIT-LIMITED ADCS	4425
<i>Feng Xi, Nanjing University of Science and Technology, China; Nir Shlezinger, Ben-Gurion University, Israel; Yonina C. Eldar, Weizmann Institute of Science, Israel</i>	
SAM-3.2: SPARSE ARRAY TRANSCEIVER DESIGN FOR ENHANCED ADAPTIVE BEAMFORMING IN MIMO RADAR	4430
<i>Syed A. Hamza, School of Engineering, Widener University, United States; Weitong Zhai, Xiangrong Wang, School of Electronic and Information Engineering, Beihang University, China; Moeness G. Amin, Villanova University, United States</i>	
SAM-3.3: SPARSE PARAMETER ESTIMATION FOR PMCW MIMO RADAR USING FEW-BIT ADCS	4435
<i>Chao-Yi Wu, Jian Li, Tan F. Wong, University of Florida, United States</i>	
SAM-3.4: PARAMETER IDENTIFIABILITY OF SPATIAL-SMOOTHING-BASED BISTATIC MIMO RADAR	4440
<i>Junpeng Shi, National University of Defense Technology, China; Fangqing Wen, Yangtze University, China; Yongxiang Liu, Qinmu Shen, Zhihui Li, Zhen Liu, National University of Defense Technology, China</i>	
SAM-3.5: PARAMETER ESTIMATION FOR COHERENT PASSIVE MIMO RADAR WITH UNKNOWN SIGNALS UNDER DIRECT PATH INFLUENCE	4445
<i>Zhen Wang, Qian He, University of Electronic Science and Technology of China, China</i>	

SAM-3.6: RIEMANNIAN GEOMETRIC OPTIMIZATION METHODS FOR JOINT DESIGN OF TRANSMIT SEQUENCE AND RECEIVE FILTER OF MIMO RADAR	4450
<i>Jie Li, Nanjing University of Aeronautics and Astronautics, China; Guisheng Liao, Xidian University, China; Yan Huang, Southeast University, China; Arye Nehorai, Washington University in St. Louis, United States</i>	
 SAM-4: MIMO AND MASSIVE MIMO ARRAY PROCESSING	
SAM-4.1: HIGH ACCURACY TRACKING OF TARGETS USING MASSIVE MIMO	4515
<i>Xiaolu Zeng, Feng Zhang, Beibei Wang, K. J. Ray Liu, University of Maryland, United States</i>	
SAM-4.2: ADMM-BASED FAST ALGORITHM FOR ROBUST MULTI-GROUP MULTICAST BEAMFORMING	4520
<i>Niloofer Mohamadi, Min Dong, Shahram ShahbazPanahi, Ontario Tech University, Canada</i>	
SAM-4.3: SCALABLE AND DISTRIBUTED MMSE ALGORITHMS FOR UPLINK RECEIVE COMBINING IN CELL-FREE MASSIVE MIMO SYSTEMS	4525
<i>Robbe Van Rompaey, Marc Moonen, KU Leuven, Belgium</i>	
SAM-4.4: ANTENNA SELECTION FOR MASSIVE MIMO SYSTEMS BASED ON POMDP FRAMEWORK	4530
<i>Sara Sharifi, Shahram ShahbazPanahi, Min Dong, Ontario Tech University, Canada</i>	
SAM-4.5: RIS-AIDED JOINT LOCALIZATION AND SYNCHRONIZATION WITH A SINGLE-ANTENNA MMWAVE RECEIVER	4535
<i>Alessio Fascista, Angelo Coluccia, University of Salento, Italy; Henk Wymeersch, Chalmers University of Technology, Sweden; Gonzalo Seco-Granados, Autonomous University of Barcelona, Spain</i>	
SAM-4.6: JOINT CHANNEL, DATA, AND PHASE-NOISE ESTIMATION IN MIMO-OFDM SYSTEMS USING A TENSOR MODELING APPROACH	4540
<i>Bruno Sokal, Federal University of Ceará, Brazil; Paulo Gomes, Federal Institute of Education, Science and Technology of Ceara, Brazil; André de Almeida, Federal University of Ceará, Brazil; Martin Haardt, Ilmenau University of Technology, Germany</i>	
 SAM-5: MICROPHONE ARRAY SIGNAL PROCESSING	
SAM-5.1: ROBUST STEERABLE DIFFERENTIAL BEAMFORMERS WITH NULL CONSTRAINTS FOR CONCENTRIC CIRCULAR MICROPHONE ARRAYS	4545
<i>Xuehan Wang, Northwestern Polytechnical University, China; Gongping Huang, Israel Cohen, Technion - Israel Institute of Technology, Israel; Jacob Benesty, INRS-EMT, University of Quebec, Canada; Jingdong Chen, Northwestern Polytechnical University, China</i>	
SAM-5.2: CLOSE-TALKING RECORDING WITH PLANARLY DISTRIBUTED MICROPHONES	4550
<i>Takuma Okamoto, National Institute of Information and Communications Technology, Japan</i>	
SAM-5.3: (W)EARABLE MICROPHONE ARRAY AND ULTRASONIC ECHO LOCALIZATION FOR COARSE INDOOR ENVIRONMENT MAPPING	4555
<i>Felix Pfreundtner, Jing Yang, Gábor Sörös, ETH Zurich, Switzerland</i>	
SAM-5.4: CHARACTERIZATION OF MEMS MICROPHONE SENSITIVITY AND PHASE DISTRIBUTIONS WITH APPLICATIONS IN ARRAY PROCESSING	4560
<i>Patrick W.A. Wijnings, Eindhoven University of Technology / Sorama, Netherlands; Sander Stuijk, Eindhoven University of Technology, Netherlands; Rick Scholte, Sorama, Netherlands; Henk Corporaal, Eindhoven University of Technology, Netherlands</i>	

SAM-5.5: DIRECTIONAL SPARSE FILTERING USING WEIGHTED LEHMER MEAN FOR BLIND SEPARATION OF UNBALANCED SPEECH MIXTURES	4565
<i>Karn Watcharasupat, Anh H. T. Nguyen, Ching-Hui Ooi, Andy W. H. Khong, Nanyang Technological University, Singapore</i>	
SAM-5.6: DISTRIBUTED SPEECH SEPARATION IN SPATIALLY UNCONSTRAINED MICROPHONE ARRAYS	4570
<i>Nicolas Furnon, Romain Serizel, Irina Illina, Université de Lorraine, CNRS, Inria, Loria, France; Slim ESSID, LTCI, Télécom ParisTech, France</i>	
 SAM-6: BEAMFORMING	
SAM-6.1: AN ADAPTIVE NON-LINEAR PROCESS FOR UNDER-DETERMINED VIRTUAL MICROPHONE BEAMFORMING	4380
<i>Mehdi Bekrani, Qom University of Technology, Iran; Anh H. T. Nguyen, Andy W. H. Khong, Nanyang Technological University, Singapore</i>	
SAM-6.3: WINDOW BEAMFORMER FOR SPARSE CONCENTRIC CIRCULAR ARRAY	4385
<i>Rajib Sharma, Israel Cohen, Baruch Berdugo, Technion - Israel Institute of Technology, Israel</i>	
SAM-6.5: SINGLE-POINT ARRAY RESPONSE CONTROL WITH MINIMUM PATTERN DEVIATION	4390
<i>Xiaoyu Ai, Lu Gan, University of Electronic Science and Technology of China, China</i>	
SAM-6.6: FOCUSING-BASED WIDEBAND ADAPTIVE BEAMFORMING USING COVARIANCE MATRIX RECONSTRUCTION	4395
<i>Peng Chen, Wei Wang, Jingjie Gao, Chang'an University, China</i>	
 SAM-7: DETECTION AND ESTIMATION 1	
SAM-7.1: BAYESIAN MULTIPLE CHANGE-POINT DETECTION OF PROPAGATING EVENTS	4575
<i>Topi Halme, Eyal Nitzan, Visa Koivunen, Aalto University, Finland</i>	
SAM-7.2: ONE-BIT AUTOCORRELATION ESTIMATION WITH NON-ZERO THRESHOLDS	4580
<i>Chun-Lin Liu, Zi-Min Lin, National Taiwan University, Taiwan</i>	
SAM-7.3: A NOVEL BAYESIAN APPROACH FOR THE TWO-DIMENSIONAL HARMONIC RETRIEVAL PROBLEM	4585
<i>Rohan R. Pote, Bhaskar D. Rao, University of California, San Diego, United States</i>	
SAM-7.4: ON OVERFITTING IN DISCRETE SUPER-RESOLUTION RECOVERY	4590
<i>Wenzhe Lu, Heng Qiao, University of Michigan - Shanghai Jiao Tong University Joint Institute, China</i>	
SAM-7.5: SIML: SIEVED MAXIMUM LIKELIHOOD FOR ARRAY SIGNAL PROCESSING	4595
<i>Matthieu Simeoni, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Paul Hurley, Western Sydney University (WSU), Australia</i>	
SAM-7.6: ESTIMATION OF GROUNDWATER STORAGE VARIATIONS IN INDUS RIVER BASIN USING GRACE DATA	4600
<i>Yahya Sattar, University of California, Riverside, United States; Zubair Khalid, LUMS, Pakistan</i>	

SAM-8: DETECTION AND ESTIMATION 2

SAM-8.1: TEMPORAL EXEMPLAR CHANNELS IN HIGH-MULTIPATH ENVIRONMENTS 4690

Mohamed Kashef, Peter Vouras, Robert Jones, Richard Candell, Kate Remley, National Institute of Standards and Technology (NIST), United States

SAM-8.2: MULTI-VEHICLE VELOCITY ESTIMATION USING IEEE 802.11AD WAVEFORM 4695

Geonho Han, Sucheol Kim, Junil Choi, Korea Advanced Institute of Science and Technology (KAIST), South Korea

SAM-8.3: REAL-TIME INTERAURAL TIME DELAY ESTIMATION VIA ONSET DETECTION 4700

Elizabeth Ren, Gustavo Cid Ornelas, Hans-Andrea Loeliger, ETH Zurich, Switzerland

SAM-8.4: EKFNET: LEARNING SYSTEM NOISE STATISTICS FROM MEASUREMENT DATA 4705

Liang Xu, Ruixin Niu, Virginia Commonwealth University, United States

SAM-8.5: SLIDING-CAPON BASED CONVOLUTIONAL BEAMSPACE FOR LINEAR ARRAYS 4710

Po-Chih Chen, P. P. Vaidyanathan, California Institute of Technology, United States

SAM-9: DETECTION AND CLASSIFICATION

SAM-9.1: TARGET DETECTION FROM DISTRIBUTED PASSIVE SENSORS: SEMI-LABELED DATA QUANTIZATION 4455

Zachariah Sutton, Peter Willett, University of Connecticut, United States; Stefano Marano, University of Salerno, Italy

SAM-9.2: SPARSE FACTORIZATION-BASED DETECTION OF OFF-THE-GRID MOVING TARGETS USING FMCW RADARS 4460

Gilles Monnoyer de Galland, Thomas Feuillen, Luc Vandendorpe, Laurent Jacques, Université catholique de Louvain, Belgium

SAM-9.3: A ROBUST COPULA MODEL FOR RADAR-BASED LANDMINE DETECTION..... 4465

Afief D. Pambudi, Technische Universität Darmstadt, Germany; Fauzia Ahmad, Temple University, United States; Abdelhak M. Zoubir, Technische Universität Darmstadt, Germany

SAM-9.4: RADAR CLUTTER CLASSIFICATION USING EXPECTATION-MAXIMIZATION METHOD 4470

Sudan Han, Defense Innovation Institute, China; Pia Addabbo, Università degli studi Giustino Fortunato, Italy; Danilo Orlando, Università degli Studi "Niccoò Cusano", Italy; Giuseppe Ricci, Università del Salento, Italy

SAM-9.5: A META-LEARNING FRAMEWORK FOR FEW-SHOT CLASSIFICATION OF REMOTE SENSING SCENE 4475

Pei Zhang, Yunpeng Bai, Dong Wang, Northwestern Polytechnical University, China; Bendu Bai, Xi'an University of Posts and Telecommunications, China; Ying Li, Northwestern Polytechnical University, China

SAM-9.6: DIFFERENTIAL CONVOLUTION FEATURE GUIDED DEEP MULTI-SCALE MULTIPLE INSTANCE LEARNING FOR AERIAL SCENE CLASSIFICATION 4480

Beichen Zhou, Jingjun Yi, Qi Bi, Wuhan University, China

SAM-10: SPARSE ARRAY DESIGN AND PROCESSING

SAM-10.1: GENERALIZED THINNED COPRIME ARRAY FOR DOA ESTIMATION 4400

Junpeng Shi, Yongxiang Liu, National University of Defense Technology, China; Fangqing Wen, Yangtze University, China; Zhen Liu, Panhe Hu, Zhenghui Gong, National University of Defense Technology, China

SAM-10.2: TCLA ARRAY: A NEW SPARSE ARRAY DESIGN WITH LESS MUTUAL COUPLING	4405
<i>Ahmed M. A. Shaalan, Jun Du, Yanhui Tu, University of Science and Technology of China, China</i>	
SAM-10.3: LOW MUTUAL COUPLING SPARSE ARRAY DESIGN USING ULA FITTING	4410
<i>Wanlu Shi, Yingsong Li, Harbin Engineering University, China; Sergiy A. Vorobyov, Aalto University, Finland</i>	
SAM-10.5: LOW-RANK AND SPARSE DECOMPOSITION FOR JOINT DOA ESTIMATION AND CONTAMINATED SENSORS DETECTION WITH SPARSELY CONTAMINATED ARRAYS	4415
<i>Huiping Huang, Technical University of Darmstadt, Germany; Abdelhak M. Zoubir, Technische Universität Darmstadt, Germany</i>	
SAM-10.6: FUNDAMENTAL TRADE-OFFS IN NOISY SUPER-RESOLUTION WITH SYNTHETIC APERTURES	4420
<i>Sina Shahsavari, Jacob Millhiser, Piya Pal, University of California, San Diego, United States</i>	
 SAM-11: ARRAY CALIBRATION AND PERFORMANCE ANALYSIS	
SAM-11.1: ENHANCED BLIND CALIBRATION OF UNIFORM LINEAR ARRAYS WITH ONE-BIT QUANTIZATION BY KULLBACK-LEIBLER DIVERGENCE COVARIANCE FITTING	4630
<i>Amir Weiss, Weizmann Institute of Science, Israel; Arie Yeredor, Tel-Aviv University, Israel</i>	
SAM-11.2: NON-ITERATIVE BLIND CALIBRATION OF NESTED ARRAYS WITH ASYMPTOTICALLY OPTIMAL WEIGHTING	4635
<i>Amir Weiss, Weizmann Institute of Science, Israel; Arie Yeredor, Tel-Aviv University, Israel</i>	
SAM-11.3: SENSOR NETWORKS TDOA SELF-CALIBRATION: 2D COMPLEXITY ANALYSIS AND SOLUTIONS	4640
<i>Luca Ferranti, University of Vaasa, Finland; Kalle Åström, Magnus Oskarsson, Lund University, Sweden; Jani Boutellier, University of Vaasa, Finland; Juho Kannala, Aalto University, Finland</i>	
SAM-11.4: FAST AND ROBUST STRATIFIED SELF-CALIBRATION USING TIME-DIFFERENCE-OF-ARRIVAL MEASUREMENTS	4645
<i>Martin Larsson, Gabrielle Flood, Magnus Oskarsson, Kalle Åström, Lund University, Sweden</i>	
SAM-11.5: STABILITY ANALYSIS OF THE RC-PLMS ADAPTIVE BEAMFORMER USING A SIMPLE TRANSFER FUNCTION APPROXIMATION	4650
<i>Ghattas Akkad, Ali Mansour, ENSTA Bretagne, France; Bachar ElHassan, Lebanese University, Lebanon; Elie Inaty, University of Balamand, Lebanon</i>	
SAM-11.6: ON THE ASYMPTOTIC PERFORMANCE OF ONE-BIT CO-ARRAY-BASED MUSIC	4655
<i>Saeid Sedighi, Bhavani Shankar, University of Luxembourg, Luxembourg; Mojtaba Soltanalian, University of Illinois at Chicago, United States; Bjorn Ottersten, University of Luxembourg, Luxembourg</i>	
 SAM-12: TRACKING AND LOCALIZATION	
SAM-12.1: KLD MINIMIZATION-BASED CONSTRAINED MEASUREMENT FILTERING FOR TWO-STEP TDOA INDOOR TRACKING	4485
<i>Rui Huang, Southeast University, China; Le Yang, University of Canterbury, New Zealand; Jun Tao, Southeast University, China; Yanbo Xue, Kanzhun Technology, China</i>	
SAM-12.2: A CORRENTROPY BASED ALGORITHM FOR ROBUST LOCALIZATION IN WIRELESS NETWORKS	4490
<i>Mahboobeh Sedighizad, Babak Seyfe, Information Theoretic Learning Systems Lab. (ITLSL), Dept. of Electrical Engineering, Shahed University, Iran; Shahrokh Valaee, University of Toronto, Canada</i>	

**SAM-12.3: MUG : A MULTIPATH-EXPLOITED AND GRID-FREE LOCALISATION 4495
METHOD**

Hengyan Liu, Wei Dai, Imperial College London, United Kingdom; Yuan Shen, Tsinghua University, China

SAM-12.4: SPARSE BAYESIAN LEARNING FOR ACOUSTIC SOURCE LOCALIZATION 4500

Ruchi Pandey, Santosh Nannuru, IIIT Hyderabad, India; Aditya Siripuram, IIT Hyderabad, India

**SAM-12.5: AUTOMATIC FINE-GRAINED LOCALIZATION OF UTILITY POLE 4505
LANDMARKS ON DISTRIBUTED ACOUSTIC SENSING TRACES BASED ON BILINEAR RESNETS**

You Lu, Virginia Tech, United States; Yue Tian, Shaobo Han, Eric Cosatto, Sarper Ozharar, Yangmin Ding, NEC Laboratories America, Inc., United States

**SAM-12.6: SSLIDE: SOUND SOURCE LOCALIZATION FOR INDOORS BASED ON 4510
DEEP LEARNING**

Yifan Wu, Roshan Ayyalasomayajula, Michael Bianco, Dinesh Bharadia, Peter Gerstoft, University of California, San Diego, United States

SAM-13: MULTI-CHANNEL DATA FUSION AND PROCESSING

**SAM-13.1: PHYSICAL-LAYER SECURITY VIA DISTRIBUTED BEAMFORMING IN THE 4660
PRESENCE OF ADVERSARIES WITH UNKNOWN LOCATIONS**

Yagiz Savas, Abolfazl Hashemi, University of Texas at Austin, United States; Abraham P. Vinod, Mitsubishi Electric Research Laboratories (MERL), United States; Brian M. Sadler, U.S. Army Research Laboratory, United States; Ufuk Topcu, University of Texas at Austin, United States

**SAM-13.2: CANONICAL POLYADIC TENSOR DECOMPOSITION WITH LOW-RANK 4665
FACTOR MATRICES**

Anh-Huy Phan, Skolkovo Institute of Science and Technology, Russia; Petr Tichavsky, The Czech Academy of Sciences, Institute of Information Theory and Automation, Czechia; Konstantin Sobolev, Konstantin Sozykin, Dmitry Ermilov, Andrzej Cichocki, Skolkovo Institute of Science and Technology, Russia

**SAM-13.3: A DIFFUSION FXLMS ALGORITHM FOR MULTI-CHANNEL ACTIVE NOISE 4670
CONTROL AND VARIABLE SPATIAL SMOOTHING**

Yijing Chu, South China University of Technology, China; S. C. Chan, University of Hong Kong, China; C. M. Mak, The Hong Kong Polytechnic University, China; Ming Wu, Chinese Academy of Sciences, China

**SAM-13.4: ADAPT-THEN-COMBINE FULL WAVEFORM INVERSION FOR 4675
DISTRIBUTED SUBSURFACE IMAGING IN SEISMIC NETWORKS**

Ban-Sok Shin, Dmitriy Shutin, German Aerospace Center, Germany

**SAM-13.5: DATA FUSION FOR AUDIOVISUAL SPEAKER LOCALIZATION: EXTENDING 4680
DYNAMIC STREAM WEIGHTS TO THE SPATIAL DOMAIN**

Julio Wissing, Benedikt Boenninghoff, Dorothea Kolossa, Ruhr University Bochum, Germany; Tsubasa Ochiai, Marc Delcroix, Keisuke Kinoshita, Tomohiro Nakatani, Shoko Araki, NTT Corporation, Japan; Christopher Schymura, Ruhr University Bochum, Germany

**SAM-13.6: TOWARDS ROBUST TRAINING OF MULTI-SENSOR DATA FUSION 4685
NETWORK AGAINST ADVERSARIAL EXAMPLES IN SEMANTIC SEGMENTATION**

Youngjoon Yu, Hong Joo Lee, Byeong Cheon Kim, Jung Uk Kim, Yong Man Ro, Korea Advanced Institute of Science and Technology (KAIST), South Korea

SPCOM-1: SIGNAL PROCESSING FOR NETWORKS

**SPCOM-1.1: DATA-DRIVEN ADAPTIVE NETWORK RESOURCE SLICING FOR 4715
MULTI-TENANT NETWORKS**

Navid Reyhanian, University of Minnesota, United States; Hamid Farmanbar, Huawei Canada Research Center, Canada; Zhi-Quan Luo, Shenzhen Research Institute of Big Data, and The Chinese University of Hong Kong, Shenzhen, China

SPCOM-1.2: DISTRIBUTED SCHEDULING USING GRAPH NEURAL NETWORKS..... 4720
Zhongyuan Zhao, Rice University, United States; Gunjan Verma, Chirag Rao, Ananthram Swami, US Army's CCDC Army Research Laboratory, United States; Santiago Segarra, Rice University, United States

SPCOM-1.3: EFFICIENT POWER ALLOCATION USING GRAPH NEURAL NETWORKS 4725 AND DEEP ALGORITHM UNFOLDING
Arindam Chowdhury, Rice University, United States; Gunjan Verma, Chirag Rao, Ananthram Swami, US Army's CCDC Army Research Laboratory, United States; Santiago Segarra, Rice University, United States

SPCOM-1.4: A SAMPLE-EFFICIENT SCHEME FOR CHANNEL RESOURCE 4730 ALLOCATION IN NETWORKED ESTIMATION
Marcos Vasconcelos, Virginia Tech, United States; Urbashi Mitra, University of Southern California, United States

SPCOM-1.5: AN EFFICIENT LINEAR PROGRAMMING 4735 ROUNDING-AND-REFINEMENT ALGORITHM FOR LARGE-SCALE NETWORK SLICING PROBLEM
Wei-Kun Chen, Beijing Institute of Technology, China; Ya-Feng Liu, Yu-Hong Dai, Chinese Academy of Sciences, China; Zhi-Quan Luo, Shenzhen Research Institute of Big Data and The Chinese University of Hong Kong, China

SPCOM-1.6: EFFICIENT MIGRATION TO THE NEXT GENERATION OF NETWORKS 4740 BASED ON DIGITAL ANNEALING
Mohammad Javad-Kalbasi, Shahrokh Valaee, University of Toronto, Canada

SPCOM-2: INFORMATION THEORY, CODING AND SECURITY

SPCOM-2.1: A TECHNIQUE FOR OFDM SYMBOL SLICING 4890
Ana Perez-Neira, Miguel A. Lagunas, Universitat Politecnica de Catalunya/CTTC, Spain

SPCOM-2.2: COMMUNICATION OVER BLOCK FADING CHANNELS - AN 4895 ALGORITHMIC PERSPECTIVE ON OPTIMAL TRANSMISSION SCHEMES
Holger Boche, Technische Universität München, Germany; Rafael F. Schaefer, Universität Siegen, Germany; H. Vincent Poor, Princeton University, United States

SPCOM-2.3: SECURE UAV COMMUNICATIONS UNDER UNCERTAIN 4900 EAVESDROPPERS LOCATIONS
Silei Wang, Fanxiang Kong, Qiang Li, University of Electronic Science and Technology of China, China

SPCOM-2.4: ON STRATEGIC JAMMING IN DISTRIBUTED DETECTION NETWORKS..... 4905
Chen Quan, Baocheng Geng, Pramod K. Varshney, Syracuse University, United States

SPCOM-2.5: REAL NUMBER SIGNAL PROCESSING CAN DETECT 4910 DENIAL-OF-SERVICE ATTACKS
Holger Boche, Technische Universität München, Germany; Rafael F. Schaefer, Universität Siegen, Germany; H. Vincent Poor, Princeton University, United States

SPCOM-2.6: A HYBRID APPROACH TO CODED COMPRESSED SENSING WHERE 4915 COUPLING TAKES PLACE VIA THE OUTER CODE
Jamison Ebert, Vamsi Amalladinne, Jean-Francois Chamberland, Krishna Narayanan, Texas A&M University, United States

SPCOM-3: BEAMFORMING

SPCOM-3.1: GLOBALLY OPTIMAL BEAMFORMING FOR RATE SPLITTING 4830 MULTIPLE ACCESS
Bho Matthiesen, University of Bremen, Germany; Yijie Mao, Imperial College London, United Kingdom; Petar Popovski, Aalborg University, Denmark; Bruno Clerckx, Imperial College London, United Kingdom

SPCOM-3.2: BEAM FOCUSING FOR MULTI-USER MIMO COMMUNICATIONS WITH DYNAMIC METASURFACE ANTENNAS	4835
<i>Haiyang Zhang, Weizmann Institute of Science, Israel; Nir Shlezinger, Ben-Gurion University, Israel; Francesco Guidi, National Research Council of Italy, Israel; Davide Dardari, University of Bologna, Israel; Mohammadreza F. Imani, Arizona State University, Israel; Yonina C. Eldar, Weizmann Institute of Science, Israel</i>	
SPCOM-3.3: PUSHING THE LIMIT OF TYPE I CODEBOOK FOR FDD MASSIVE MIMO BEAMFORMING: A CHANNEL COVARIANCE RECONSTRUCTION APPROACH	4840
<i>Kai Li, Ying Li, Chinese University of Hong Kong, Shenzhen, China; Lei Cheng, Shenzhen Research Institute of Big Data, China; Qingjiang Shi, Tongji University, China; Zhi-Quan Luo, Chinese University of Hong Kong, Shenzhen, China</i>	
SPCOM-3.4: FIRST-ORDER FAST ALGORITHM FOR STRUCTURALLY OPTIMAL MULTI-GROUP MULTICAST BEAMFORMING IN LARGE-SCALE SYSTEMS	4845
<i>Chong Zhang, University of Toronto, Canada; Min Dong, Ontario Tech University, Canada; Ben Liang, University of Toronto, Canada</i>	
SPCOM-3.5: ANALOG BEAMFORMING WITH ANTENNA SELECTION FOR LARGE-SCALE ANTENNA ARRAYS	4850
<i>Aakash Arora, Christos Tsinos, Bhavani Shankar Mysore R., Symeon Chatzinotas, Bjorn Ottersten, University of Luxembourg, Luxembourg</i>	
SPCOM-3.6: BEAMFORMING FOR BIDIRECTIONAL MIMO FULL DUPLEX UNDER THE JOINT SUM POWER AND PER ANTENNA POWER CONSTRAINTS	4855
<i>Chandan Kumar Sheemar, Dirk Slock, EURECOM, France</i>	
SPCOM-4: CHANNEL ESTIMATION FOR MIMO AND MULTIUSER SYSTEMS	
SPCOM-4.1: ITERATIVE REWEIGHTED ALGORITHMS FOR JOINT USER IDENTIFICATION AND CHANNEL ESTIMATION IN SPATIALLY CORRELATED MASSIVE MTC	4860
<i>Hamza Djelouat, Markus Leinonen, Markku Juntti, University of Oulu, Finland</i>	
SPCOM-4.2: MILLIMETER WAVE MIMO CHANNEL ESTIMATION WITH 1-BIT SPATIAL SIGMA-DELTA ANALOG-TO-DIGITAL CONVERTERS	4865
<i>R. S. Prasobh Sankar, Sundeep Prabhakar Chepuri, Indian Institute of Science, Bangalore, India</i>	
SPCOM-4.3: AN EFFICIENT ALGORITHM FOR DEVICE DETECTION AND CHANNEL ESTIMATION IN ASYNCHRONOUS IOT SYSTEMS	4870
<i>Liang Liu, The Hong Kong Polytechnic University, China; Ya-Feng Liu, Chinese Academy of Sciences, China</i>	
SPCOM-4.4: KALMAN FILTER BASED MIMO CSI PHASE RECOVERY FOR COTS WIFI DEVICES	4875
<i>Chu Li, Ruhr University Bochum, Germany; Jeremy Brauer, PHYSEC GmbH, Germany; Aydin Sezgin, Ruhr University Bochum, Germany; Christian Zenger, PHYSEC GmbH, Germany</i>	
SPCOM-4.5: IMPROVED ATOMIC NORM BASED CHANNEL ESTIMATION FOR TIME-VARYING NARROWBAND LEAKED CHANNELS	4880
<i>Jianxiu Li, Urbashi Mitra, University of Southern California, United States</i>	
SPCOM-4.6: BAYESIAN MASSIVE MIMO CHANNEL ESTIMATION WITH PARAMETER ESTIMATION USING LOW-RESOLUTION ADCS	4885
<i>Shuai Huang, Deqiang Qiu, Emory University, United States; Trac D. Tran, Johns Hopkins University, United States</i>	
SPCOM-5: DETECTION AND DECODING	
SPCOM-5.1: OPTIMAL DETECTION IN THE PRESENCE OF NON-GAUSSIAN JAMMING	4800
<i>Khalid Almahorg, Ramy Gohary, Carleton university, Canada</i>	

SPCOM-5.2: AN EFFICIENT ACTIVE SET ALGORITHM FOR COVARIANCE BASED JOINT DATA AND ACTIVITY DETECTION FOR MASSIVE RANDOM ACCESS WITH MASSIVE MIMO 4805

Ziyue Wang, University of Chinese Academy of Sciences, China; Zhilin Chen, University of Toronto, Canada; Ya-Feng Liu, Chinese Academy of Sciences, China; Foad Sohrabi, Wei Yu, University of Toronto, Canada

SPCOM-5.3: NEURAL LAYERED MIN-SUM DECODING FOR PROTOGRAPH LDPC CODES 4810

Dexin Zhang, Jincheng Dai, Kailin Tan, Kai Niu, Beijing University of Posts and Telecommunications, China; Mingzhe Chen, H. Vincent Poor, Princeton University, United States; Shuguang Cui, Chinese University of Hong Kong, China

SPCOM-5.4: INTEGER CARRIER FREQUENCY OFFSET ESTIMATION IN OFDM WITH ZADOFF-CHU SEQUENCES 4815

John Roth, David Garren, Clark Robertson, Naval Postgraduate School, United States

SPCOM-5.5: PLUG-AND-PLAY LEARNED GAUSSIAN-MIXTURE APPROXIMATE MESSAGE PASSING 4820

Osman Musa, Peter Jung, Giuseppe Caire, Technische Universität Berlin, Germany

SPCOM-5.6: LOW-LATENCY POLAR DECODER USING OVERLAPPED SCL PROCESSING 4825

Dongyun Kam, Pohang University of Science and Technology, South Korea; Byeong Yong Kong, Kongju National University, South Korea; Youngjoo Lee, Pohang University of Science and Technology, South Korea

SPCOM-6: SYSTEM DESIGN AND OPTIMIZATION

SPCOM-6.1: MODULAR BINARY TREE ARCHITECTURE FOR DISTRIBUTED LARGE INTELLIGENT SURFACE 4920

Juan Vidal Alegría, Fredrik Rusek, Jesús Rodríguez Sánchez, Ove Edfors, Lund University, Sweden

SPCOM-6.2: STOCHASTIC SUCCESSIVE WEIGHTED SUM-RATE MAXIMIZATION FOR MULTIUSER MIMO SYSTEMS WITH FINITE-ALPHABET INPUTS 4925

Xin Guan, Xiaotong Zhao, Qingjiang Shi, Tongji University, China

SPCOM-6.3: RATE 1 QUASI ORTHOGONAL UNIVERSAL TRANSMISSION AND COMBINING FOR MIMO SYSTEMS ACHIEVING FULL DIVERSITY 4930

Barak Avraham, Uri Erez, Tel-Aviv University, Israel; Elad Domanovitz, University of Toronto, Canada

SPCOM-6.4: ENERGY EFFICIENCY OPTIMIZATION TECHNIQUE FOR SWIPT-ENABLED MULTI-GROUP MULTICASTING SYSTEMS WITH HETEROGENEOUS USERS 4935

Sumit Gautam, Symeon Chatzinotas, Bjorn Ottersten, University of Luxembourg, Luxembourg

SPCOM-6.5: MULTI-BRANCH TOMLINSON-HARASHIMA PRECODING FOR RATE SPLITTING BASED SYSTEMS WITH MULTIPLE ANTENNAS 4940

Andre Robert Flores, Rodrigo de Lamare, Pontifical Catholic University of Rio de Janeiro, Brazil; Bruno Clerckx, Imperial College London, United Kingdom

SPCOM-6.6: DIVIDE AND CONQUER: ONE-BIT MIMO-OFDM DETECTION BY INEXACT EXPECTATION MAXIMIZATION 4945

Mingjie Shao, Wing-Kin Ma, The Chinese University of Hong Kong, China

SPCOM-7: COMMUNICATION-ENABLED APPLICATIONS

SPCOM-7.1: DIFFERENTIAL CHAOS SHIFT KEYING-BASED WIRELESS POWER TRANSFER 4950

Priyadarshi Mukherjee, Constantinos Psomas, Ioannis Krikidis, University of Cyprus, Cyprus

SPCOM-7.2: VGAI: END-TO-END LEARNING OF VISION-BASED DECENTRALIZED CONTROLLERS FOR ROBOT SWARMS	4955
<i>Ting-Kuei Hu, Texas A&M University, United States; Fernando Gama, University of Pennsylvania, United States; Tianlong Chen, Zhangyang Wang, University of Texas at Austin, United States; Alejandro Ribeiro, University of Pennsylvania, United States; Brian M. Sadler, US Army Research Laboratory, United States</i>	
SPCOM-7.3: RECOGNITION OF DYNAMIC HAND GESTURE BASED ON MM-WAVE FMCW RADAR MICRO-DOPPLER SIGNATURES	4960
<i>Wen Jiang, Yihui Ren, Ying Liu, University of Chinese Academy of Sciences, China; Ziao Wang, Xinghua Wang, Beijing Institute of Technology, China</i>	
SPCOM-7.4: DYNAMIC RESOURCE OPTIMIZATION FOR ADAPTIVE FEDERATED LEARNING AT THE WIRELESS NETWORK EDGE	4965
<i>Paolo Di Lorenzo, Claudio Battiloro, Mattia Merluzzi, Sergio Barbarossa, Sapienza University of Rome, Italy</i>	
 SPCOM-8: DEEP LEARNING FOR COMMUNICATIONS	
SPCOM-8.1: DEEP WEIGHTED MMSE DOWNLINK BEAMFORMING	4745
<i>Lissy Pellaco, Mats Bengtsson, Joakim Jaldén, KTH Royal Institute of Technology, Sweden</i>	
SPCOM-8.2: DEEP GENERATIVE MODEL LEARNING FOR BLIND SPECTRUM CARTOGRAPHY WITH NMF-BASED RADIO MAP DISAGGREGATION	4750
<i>Sagar Shrestha, Xiao Fu, Oregon State University, United States; Mingyi Hong, University of Minnesota, United States</i>	
SPCOM-8.3: MITIGATING CLIPPING DISTORTION IN OFDM USING DEEP RESIDUAL LEARNING	4755
<i>Muhammad Shahmeer Omar, Xiaoli Ma, Georgia Institute of Technology, United States</i>	
SPCOM-8.4: A LOW-COMPLEXITY ADMM-BASED MASSIVE MIMO DETECTORS VIA DEEP NEURAL NETWORKS	4760
<i>Isayiyas Nigatu Tiba, Quan Zhang, Jing Jiang, Yongchao Wang, Xidian University, China</i>	
SPCOM-8.5: REAL-TIME RADIO MODULATION CLASSIFICATION WITH AN LSTM AUTO-ENCODER	4765
<i>Ziqi Ke, Haris Vikalo, University of Texas at Austin, United States</i>	
 SPCOM-9: ONLINE AND ACTIVE LEARNING FOR COMMUNICATIONS	
SPCOM-9.1: DEEP ACTIVE LEARNING APPROACH TO ADAPTIVE BEAMFORMING FOR MMWAVE INITIAL ALIGNMENT	4770
<i>Foad Sohrabi, Zhilin Chen, Wei Yu, University of Toronto, Canada</i>	
SPCOM-9.2: LEARNING TO CONTINUOUSLY OPTIMIZE WIRELESS RESOURCE IN EPISODICALLY DYNAMIC ENVIRONMENT	4775
<i>Haoran Sun, University of Minnesota, United States; Wenqiang Pu, Minghe Zhu, The Chinese University of Hong Kong, Shenzhen, China; Xiao Fu, Oregon State University, United States; Tsung-Hui Chang, The Chinese University of Hong Kong, Shenzhen, China; Mingyi Hong, University of Minnesota, United States</i>	
SPCOM-9.3: ADAPTIVE CONTENTION WINDOW DESIGN USING DEEP Q-LEARNING	4780
<i>Abhishek Kumar, Rice University, United States; Gunjan Verma, Chirag Rao, Ananthram Swami, US Army's CCDC Army Research Laboratory, United States; Santiago Segarra, Rice University, United States</i>	
SPCOM-9.4: ON INFORMATION ASYMMETRY IN ONLINE REINFORCEMENT LEARNING	4785
<i>Ezra Tampubolon, Haris Ceribasic, Holger Boche, Technical University of Munich, Germany</i>	

SPCOM-9.5: JAMMING STRATEGY GENERATION FOR HIDDEN COMMUNICATION MODES VIA GRAPH CONVOLUTION NETWORKS	4790
<i>Fanxiang Kong, Qiang Li, Huaizong Shao, University of Electronic Science and Technology of China, China</i>	
SPCOM-9.6: CONTRASTIVE SELF-SUPERVISED LEARNING FOR WIRELESS POWER CONTROL	4795
<i>Navid Naderializadeh, HRL Laboratories, LLC, United States</i>	
 SPTM-1: DETECTION THEORY AND METHODS 1	
SPTM-1.1: MEASURE-TRANSFORMED COVARIANCE TEST FOR ROBUST SPECTRUM SENSING	4970
<i>Yair Sorek, Koby Todros, Ben-Gurion University, Israel</i>	
SPTM-1.2: SEARCHING FOR ANOMALIES WITH MULTIPLE PLAYS UNDER DELAY AND SWITCHING COSTS	4975
<i>Tidhar Lambez, Kobi Cohen, Ben-Gurion University of the Negev, Israel</i>	
SPTM-1.3: ROBUST ESTIMATION OF HIGH-ORDER PHASE DYNAMICS USING VARIATIONAL BAYES INFERENCE	4980
<i>Fabio Fabozzi, Stéphanie Bidon, ISAE-SUPAERO, Université de Toulouse, France; Sébastien Roche, Airbus Defence and Space SAS, France</i>	
SPTM-1.4: ROBUST PCA THROUGH MAXIMUM CORRENTROPY POWER ITERATIONS	4985
<i>Jean Chereau, Bruno Scalzo, Danilo P. Mandic, Imperial College London, United Kingdom</i>	
SPTM-1.5: SCORE-BASED CHANGE DETECTION FOR GRADIENT-BASED LEARNING MACHINES	4990
<i>Lang Liu, University of Washington, United States; Joseph Salmon, University of Montpellier, France; Zaid Harchaoui, University of Washington, United States</i>	
SPTM-1.6: SUPER-RESOLUTION OF PERIODIC SIGNALS FROM SHORT SEQUENCES OF SAMPLES	4995
<i>Marek Rupuniewski, Warsaw University of Technology, Poland</i>	
 SPTM-2: DETECTION THEORY AND METHODS 2	
SPTM-2.1: QUICKEST CHANGE DETECTION WITH TIME INCONSISTENT ANTICIPATORY AGENTS IN CYBER-PHYSICAL SYSTEMS	5090
<i>Vikram Krishnamurthy, Cornell University, United States</i>	
SPTM-2.2: TREATMENT EFFECT ESTIMATION USING INVARIANT RISK MINIMIZATION	5095
<i>Abhin Shah, IBM Research / Massachusetts Institute of Technology, United States; Kartik Ahuja, Karthikeyan Shanmugam, Dennis Wei, Kush Varshney, Amit Dhurandhar, IBM Research, United States</i>	
SPTM-2.3: AN F-TEST FOR POLYNOMIAL FREQUENCY MODULATION	5100
<i>Kian Blanchette, Queen's University, Canada; Wesley Burr, Trent University, Canada; Glen Takahara, Queen's University, Canada</i>	
SPTM-2.4: QUICKEST JOINT DETECTION AND CLASSIFICATION OF FAULTS IN STATISTICALLY PERIODIC PROCESSES	5105
<i>Taposh Banerjee, University of Texas at San Antonio, United States; Smruti Padhy, University of Texas at Austin, United States; Ahmad Taha, Eugene John, University of Texas at San Antonio, United States</i>	

SPTM-2.5: AN ASYMPTOTICALLY POINTWISE OPTIMAL PROCEDURE FOR SEQUENTIAL JOINT DETECTION AND ESTIMATION	5110
<i>Dominik Reinhard, Technische Universität Darmstadt, Germany; Michael Fauß, Princeton University, United States; Abdelhak M. Zoubir, Technische Universität Darmstadt, Germany</i>	
SPTM-2.6: LOCALLY OPTIMAL DETECTION OF STOCHASTIC TARGETED UNIVERSAL ADVERSARIAL PERTURBATIONS	5115
<i>Amish Goel, Pierre Moulin, University of Illinois Urbana Champaign, United States</i>	
SPTM-3: ESTIMATION, DETECTION AND LEARNING OVER NETWORKS 1	
SPTM-3.2: A DECENTRALIZED VARIANCE-REDUCED METHOD FOR STOCHASTIC OPTIMIZATION OVER DIRECTED GRAPHS	5210
<i>Muhammad Qureshi, Tufts University, United States; Ran Xin, Soumya Kar, Carnegie Mellon University, United States; Usman Khan, Tufts University, United States</i>	
SPTM-3.4: ON DISTRIBUTED COMPOSITE TESTS WITH DEPENDENT OBSERVATIONS IN WSN	5215
<i>Juan Augusto Maya, Leonardo Rey Vega, University of Buenos Aires/ CSC-Conicet, Argentina</i>	
SPTM-3.5: BYZANTINE-RESILIENT DECENTRALIZED TD LEARNING WITH LINEAR FUNCTION APPROXIMATION	5220
<i>Zhaoxian Wu, Sun Yat-Sen University, China; Han Shen, Tianyi Chen, Rensselaer Polytechnic Institute, United States; Qing Ling, Sun Yat-Sen University, China</i>	
SPTM-3.6: ON THE EFFECT OF SPATIAL CORRELATION ON DISTRIBUTED ENERGY DETECTION OF A STOCHASTIC PROCESS	5225
<i>Juan Augusto Maya, Leonardo Rey Vega, University of Buenos Aires/ CSC-Conicet, Argentina</i>	
SPTM-4: ESTIMATION, DETECTION AND LEARNING OVER NETWORKS 2	
SPTM-4.2: PROVABLY FAST ASYNCHRONOUS AND DISTRIBUTED ALGORITHMS FOR PAGERANK CENTRALITY COMPUTATION	5260
<i>Yiran He, Hoi-To Wai, The Chinese University of Hong Kong, Hong Kong SAR China</i>	
SPTM-4.5: DECENTRALIZED OPTIMIZATION OVER NOISY, RATE-CONSTRAINED NETWORKS: HOW WE AGREE BY TALKING ABOUT HOW WE DISAGREE	5265
<i>Rajarshi Saha, Stanford University, United States; Stefano Rini, National Chiao Tung University, Taiwan; Milind Rao, Amazon Alexa, United States; Andrea Goldsmith, Princeton University, United States</i>	
SPTM-4.6: A MULTIPLE ACCESS CHANNEL GAME USING LATENCY METRIC	5270
<i>Andrey Garnaev, Athina Petropulu, Wade Trappe, Rutgers University, United States</i>	
SPTM-5: SAMPLING, MULTIRATE SIGNAL PROCESSING AND DIGITAL SIGNAL PROCESSING 1	
SPTM-5.1: LINEAR COMPUTATION CODING	5060
<i>Ralf Müller, Bernhard Gäde, Ali Berekhi, FAU Erlangen-Nürnberg, Germany</i>	
SPTM-5.2: SPECTRAL FOLDING AND TWO-CHANNEL FILTER-BANKS ON ARBITRARY GRAPHS	5065
<i>Eduardo Pavez, University of Southern California, United States; Benjamin Girault, Université de Rennes, France; Antonio Ortega, University of Southern California, United States; Philip A. Chou, Google Research, United States</i>	
SPTM-5.3: SPARSE TIME-FREQUENCY REPRESENTATION VIA ATOMIC NORM MINIMIZATION	5070
<i>Tsubasa Kusano, Kohei Yatabe, Yasuhiro Oikawa, Waseda University, Japan</i>	

SPTM-5.4: MESSAGE TRANSMISSION OVER RAPIDLY TIME-VARYING CHANNELS	5075
<i>Alihan Kaplan, Volker Pohl, Technical University of Munich, Germany</i>	
SPTM-5.5: A ROBUST AND EFFICIENT MULTI-SCALE SEASONAL-TREND DECOMPOSITION	5080
<i>Linxiao Yang, Qingsong Wen, Bo Yang, Liang Sun, Alibaba Group, China</i>	
SPTM-5.6: NOISE-ASSISTED MULTIVARIATE VARIATIONAL MODE DECOMPOSITION	5085
<i>Charilaos Zisou, Georgios Apostolidis, Leontios Hadjileontiadis, Aristotle University of Thessaloniki, Greece</i>	
SPTM-6: SAMPLING, MULTIRATE SIGNAL PROCESSING AND DIGITAL SIGNAL PROCESSING	
2	
SPTM-6.1: APPROXIMATE WEIGHTED CR CODED MATRIX MULTIPLICATION	5365
<i>Neophytos Charalambides, University of Michigan, United States; Mert Pilanci, Stanford University, United States; Alfred Hero, University of Michigan, United States</i>	
SPTM-6.2: PERIODIC SIGNAL DENOISING: AN ANALYSIS-SYNTHESIS FRAMEWORK BASED ON RAMANUJAN FILTER BANKS AND DICTIONARIES	5370
<i>Pranav Kulkarni, P. P. Vaidyanathan, California Institute of Technology, United States</i>	
SPTM-6.3: COMPRESSIVE SIGNAL RECOVERY UNDER SENSING MATRIX ERRORS COMBINED WITH UNKNOWN MEASUREMENT GAINS	5375
<i>Jian Vora, Ajit Rajwade, Indian Institute of Technology, Bombay, India</i>	
SPTM-6.4: GRID OPTIMIZATION FOR MATRIX-BASED SOURCE LOCALIZATION UNDER INHOMOGENEOUS SENSOR TOPOLOGY	5380
<i>Hao Sun, Junting Chen, The Chinese University of Hong Kong, Shenzhen, China</i>	
SPTM-6.5: MSR-GAN: MULTI-SEGMENT RECONSTRUCTION VIA ADVERSARIAL LEARNING	5385
<i>Mona Zehni, Zhizhen Zhao, University of Illinois at Urbana-Champaign, United States</i>	
SPTM-6.6: COUNT SKETCH WITH ZERO CHECKING: EFFICIENT RECOVERY OF HEAVY COMPONENTS	5390
<i>Guanqiang Zhou, Zhi Tian, George Mason University, United States</i>	
SPTM-7: ESTIMATION THEORY AND METHODS 1	
SPTM-7.1: NUMERICAL SOLUTION OF STOCHASTIC DIFFERENTIAL EQUATIONS IN STIEFEL MANIFOLDS VIA TANGENT SPACE PARAMETRIZATION	5000
<i>Victor Solo, Zhichao Wang, University of New South Wales, Australia</i>	
SPTM-7.2: ON THE ACCURACY LIMIT OF JOINT TIME-DELAY/DOPPLER/ACCELERATION ESTIMATION WITH A BAND-LIMITED SIGNAL	5005
<i>Hamish Mcphee, ISAE-SUPAERO, France; Lorenzo Ortega, TésA, France; Jordi Vilà-Valls, Eric Chaumette, ISAE-SUPAERO, France</i>	
SPTM-7.3: AUTOMATIC ORDER SELECTION IN AUTOREGRESSIVE MODELING WITH APPLICATION IN EEG SLEEP-STAGE CLASSIFICATION	5010
<i>Farah Nassif, Soosan Beheshti, Ryerson University, Canada</i>	
SPTM-7.4: NEW VARIANTS OF DFA BASED ON LOESS AND LOWESS METHODS: GENERALIZATION OF THE DETRENDING MOVING AVERAGE	5015
<i>Bastien Berthelot, Thales AVS, France; Éric Grivel, Pierrick Legrand, Bordeaux University, France</i>	

SPTM-7.5: PARAMETER ESTIMATION FOR STUDENT'S T VAR MODEL WITH MISSING DATA	5020
<i>Rui Zhou, Junyan Liu, The Hong Kong University of Science and Technology, Hong Kong SAR China; Sandeep Kumar, Indian Institute of Technology, Delhi, India; Daniel Palomar, The Hong Kong University of Science and Technology, Hong Kong SAR China</i>	
SPTM-7.6: FAST AND ROBUST ADMM FOR BLIND SUPER-RESOLUTION	5025
<i>Yifan Ran, Wei Dai, Imperial College London, United Kingdom</i>	
SPTM-8: ESTIMATION THEORY AND METHODS 2	
SPTM-8.1: NONSTATIONARY PORTFOLIOS: DIVERSIFICATION IN THE SPECTRAL DOMAIN	5424
<i>Bruno Scalzo, Alvaro Arroyo, Imperial College London, United Kingdom; Ljubisa Stankovic, University of Montenegro, Montenegro; Anthony G. Constantinides, Danilo P. Mandic, Imperial College London, United Kingdom</i>	
SPTM-8.2: A TYLER-TYPE ESTIMATOR OF LOCATION AND SCATTER LEVERAGING RIEMANNIAN OPTIMIZATION	5429
<i>Antoine Collas, Florent Bouchard, CentraleSupélec, Université Paris-Saclay, France; Arnaud Breloy, Université Paris Nanterre, France; Chengfang Ren, CentraleSupélec, Université Paris-Saclay, France; Guillaume Ginolhac, Université Savoie Mont Blanc, France; Jean-Philippe Ovarlez, CentraleSupélec/ONERA, Université Paris-Saclay, France</i>	
SPTM-8.3: STATISTICAL PROPERTIES OF A MODIFIED WELCH METHOD THAT USES SAMPLE PERCENTILES	5434
<i>Felix Schwock, Shima Abadi, University of Washington, United States</i>	
SPTM-8.4: SWITCHED HAWKES PROCESSES	5439
<i>Namrata Nadagouda, Mark Davenport, Georgia Institute of Technology, United States</i>	
SPTM-8.5: AN ADAPTIVE REGULARIZATION APPROACH TO PORTFOLIO OPTIMIZATION	5444
<i>Tarig Ballal, King Abdullah University for Science and Technology, Saudi Arabia; Abdelrahman Abdelrahman, Ali Muqaibel, King Fahd University of Petroleum and Minerals, Saudi Arabia; Tareq Al-Naffouri, King Abdullah University for Science and Technology, Saudi Arabia</i>	
SPTM-8.6: ACTIVE ESTIMATION FROM MULTIMODAL DATA	5449
<i>Arpan Mukherjee, Ali Tajer, Rensselaer Polytechnic Institute, United States; Pin-Yu Chen, Payel Das, IBM, United States</i>	
SPTM-9: ESTIMATION, DETECTION AND LEARNING OVER NETWORKS 3	
SPTM-9.1: NETWORK CLASSIFIERS BASED ON SOCIAL LEARNING	5275
<i>Virginia Bordignon, Stefan Vlaski, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Vincenzo Matta, University of Salerno, Italy; Ali H. Sayed, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
SPTM-9.2: BAYES-OPTIMAL METHODS FOR FINDING THE SOURCE OF A CASCADE	5280
<i>Anirudh Sridhar, H. Vincent Poor, Princeton University, United States</i>	
SPTM-9.3: PRIVATE WIRELESS FEDERATED LEARNING WITH ANONYMOUS OVER-THE-AIR COMPUTATION	5285
<i>Burak Hasircioğlu, Deniz Gündüz, Imperial College London, United Kingdom</i>	
SPTM-9.4: SCALABLE MULTILEVEL QUANTIZATION FOR DISTRIBUTED DETECTION	5290
<i>Gökhan Gül, Michael Bessler, Fraunhofer IMM, Germany</i>	

SPTM-9.5: STABILITY OF ALGEBRAIC NEURAL NETWORKS TO SMALL PERTURBATIONS	5295
<i>Alejandro Parada-Mayorga, Alejandro Ribeiro, University of Pennsylvania, United States</i>	
SPTM-9.6: RESOLUTION LIMITS OF 20 QUESTIONS SEARCH STRATEGIES FOR MOVING TARGETS	5300
<i>Lin Zhou, Beihang University, China; Alfred Hero, University of Michigan, Ann Arbor, United States</i>	
SPTM-10: DISTRIBUTED LEARNING OVER GRAPHS	
SPTM-10.1: GRAMIAN-BASED ADAPTIVE COMBINATION POLICIES FOR DIFFUSION LEARNING OVER NETWORKS	5335
<i>Y. Efe Erginbas, Bilkent University, Turkey; Stefan Vlaski, Ali H. Sayed, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
SPTM-10.2: GRAPH-ADAPTIVE INCREMENTAL LEARNING USING AN ENSEMBLE OF GAUSSIAN PROCESS EXPERTS	5340
<i>Konstantinos D. Polyzos, Qin Lu, Georgios B. Giannakis, University of Minnesota, United States</i>	
SPTM-10.3: FAST DECENTRALIZED LINEAR FUNCTIONS VIA SUCCESSIVE GRAPH SHIFT OPERATORS	5345
<i>Siavash Mollaebrahim Ghari, Daniel Romero, Baltasar Beferull-Lozano, University of Agder (UiA), Norway</i>	
SPTM-10.4: ONLINE LEARNING OF TIME-VARYING SIGNALS AND GRAPHS	5350
<i>Stefania Sardellitti, Sergio Barbarossa, Paolo Di Lorenzo, Sapienza University of Rome, Italy</i>	
SPTM-10.5: KERNEL REGRESSION ON GRAPHS IN RANDOM FOURIER FEATURES SPACE	5355
<i>Vitor Elias, Federal University of Rio de Janeiro, Brazil; Vinay Gogineni, Simula Research Laboratory, Norway; Wallace Martins, University of Luxembourg, Luxembourg; Stefan Werner, Norwegian University of Science and Technology, Norway</i>	
SPTM-10.6: GRAPH-HOMOMORPHIC PERTURBATIONS FOR PRIVATE DECENTRALIZED LEARNING	5360
<i>Stefan Vlaski, Ali H. Sayed, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
SPTM-11: GRAPHS NEURAL NETWORKS	
SPTM-11.1: VARIANCE-CONSTRAINED LEARNING FOR STOCHASTIC GRAPH NEURAL NETWORKS	5484
<i>Zhan Gao, University of Pennsylvania, United States; Elvin Isufi, Delft University of Technology, Netherlands; Alejandro Ribeiro, University of Pennsylvania, United States</i>	
SPTM-11.2: GRAPH NEURAL NETWORK FOR LARGE-SCALE NETWORK LOCALIZATION	5489
<i>Wenzhong Yan, Chinese University of Hong Kong, Shenzhen, China; Di Jin, Technische Universität Darmstadt, Germany; Zhidi Lin, Feng Yin, Chinese University of Hong Kong, Shenzhen, China</i>	
SPTM-11.3: GRAPHON AND GRAPH NEURAL NETWORK STABILITY	5494
<i>Luana Ruiz, Zhiyang Wang, Alejandro Ribeiro, University of Pennsylvania, United States</i>	
SPTM-11.4: GRAPH NEURAL NETWORKS FOR DECENTRALIZED CONTROLLERS	5499
<i>Fernando Gama, University of California, Berkeley, United States; Ekaterina Tolstaya, Alejandro Ribeiro, University of Pennsylvania, United States</i>	

SPTM-11.5: NONLINEAR STATE-SPACE GENERALIZATIONS OF GRAPH CONVOLUTIONAL NEURAL NETWORKS	5504
<i>Luana Ruiz, University of Pennsylvania, United States; Fernando Gama, University of California, Berkeley, United States; Alejandro Ribeiro, University of Pennsylvania, United States; Elvin Isufi, Delft University of Technology, United States</i>	
SPTM-11.6: WIDE AND DEEP GRAPH NEURAL NETWORKS WITH DISTRIBUTED ONLINE LEARNING	5509
<i>Zhan Gao, University of Pennsylvania, United States; Fernando Gama, University of California, Berkeley, United States; Alejandro Ribeiro, University of Pennsylvania, United States</i>	
SPTM-12: SAMPLING, FILTERING AND DENOISING OVER GRAPHS	
SPTM-12.1: DESIGN OF GRAPH SIGNAL SAMPLING MATRICES FOR ARBITRARY SIGNAL SUBSPACES	5514
<i>Junya Hara, Koki Yamada, Tokyo University of Agriculture and Technology, Japan; Shunsuke Ono, Tokyo Institute of Technology, Japan; Yuichi Tanaka, Tokyo University of Agriculture and Technology, Japan</i>	
SPTM-12.2: GRAPH SIGNAL DENOISING USING NESTED-STRUCTURED DEEP ALGORITHM UNROLLING	5519
<i>Masatoshi Nagahama, Koki Yamada, Yuichi Tanaka, Tokyo University of Agriculture and Technology, Japan; Stanley Chan, Purdue University, United States; Yonina C. Eldar, Weizmann Institute of Science, Israel</i>	
SPTM-12.3: IDENTIFYING FIRST-ORDER LOWPASS GRAPH SIGNALS USING PERRON FROBENIUS THEOREM	5524
<i>Yiran He, Hoi-To Wai, The Chinese University of Hong Kong, Hong Kong SAR China</i>	
SPTM-12.4: GRAPH SIGNAL DENOISING VIA UNROLLING NETWORKS	5529
<i>Siheng Chen, Mitsubishi Electric Research Laboratories (MERL), United States; Yonina C. Eldar, Weizmann Institute of Science, Israel</i>	
SPTM-12.5: ADAPTIVE SUBSAMPLING OF MULTIDOMAIN SIGNALS WITH PRODUCT GRAPHS	5534
<i>Théo Gnassounou, Pierre Humbert, Laurent Oudre, Ecole Normale Supérieure Paris Saclay, France</i>	
SPTM-12.6: ROBUST GRAPH-FILTER IDENTIFICATION WITH GRAPH DENOISING REGULARIZATION	5539
<i>Samuel Rey, Antonio G. Marques, King Juan Carlos University, Spain</i>	
SPTM-13: MODELS, METHODS AND ALGORITHMS 1	
SPTM-13.1: FAST AND PROVABLE ROBUST PCA VIA NORMALIZED COHERENCE PURSUIT	5454
<i>Mostafa Rahmani, Amazon, United States; Ping Li, Baidu USA, United States</i>	
SPTM-13.2: ALIGNING SETS OF TEMPORAL SIGNALS WITH RIEMANNIAN GEOMETRY AND KOOPMAN OPERATOR	5459
<i>Ohad Rahamim, Ronen Talmon, Technion - Israel Institute of Technology, Israel</i>	
SPTM-13.3: WEIGHT IDENTIFICATION THROUGH GLOBAL OPTIMIZATION IN A NEW HYSTERETIC NEURAL NETWORK MODEL	5464
<i>Elie Leroy, Arthur Marmin, Université Paris-Saclay, CentraleSupélec, Inria, Center for Visual Computing, France; Marc Castella, Samovar, Telecom SudParis, Institut Polytechnique de Paris, France; Laurent Duval, ESIEE Paris, LIGM, Université Gustave-Eiffel and IFP Energies nouvelles, France</i>	

SPTM-13.4: MULTIVIEW VARIATIONAL GRAPH AUTOENCODERS FOR CANONICAL CORRELATION ANALYSIS	5469
<i>Yacouba Kaloga, Pierre Borgnat, ENS de LYON, France; Sundeep Prabhakar Chepuri, Indian Institute of Science, India; Patrice Abry, ENS de Lyon, France; Amaury Habrard, Universite Jean Monnet de Saint-Etienne, France</i>	
SPTM-13.5: COGNITIVE MEMORY CONSTRAINED HUMAN DECISION MAKING BASED ON MULTI-SOURCE INFORMATION	5474
<i>Baocheng Geng, Chen Quan, Pramod Varshney, Syracuse University, United States</i>	
SPTM-13.6: BINARY CONTROL AND DIGITAL-TO-ANALOG CONVERSION USING COMPOSITE NUV PRIORS AND ITERATIVE GAUSSIAN MESSAGE PASSING	5479
<i>Raphael Keusch, Hampus Malmberg, Hans-Andrea Loeliger, Swiss Federal Institute of Technology in Zurich, Switzerland</i>	
 SPTM-14: MODELS, METHODS AND ALGORITHMS 2	
SPTM-14.1: OUTLIER-ROBUST KERNEL HIERARCHICAL-OPTIMIZATION RLS ON A BUDGET WITH AFFINE CONSTRAINTS	5574
<i>Konstantinos Slavakis, University at Buffalo, State University of New York, United States; Masahiro Yukawa, Keio University, Japan</i>	
SPTM-14.2: ADAPTIVE REAL-TIME FILTER FOR PARTIALLY-OBSERVED BOOLEAN DYNAMICAL SYSTEMS	5579
<i>Mahdi Imani, George Washington University, United States; Seyede Fatemeh Ghoreishi, University of Maryland, United States</i>	
SPTM-14.3: IMPROVING THE ENERGY-EFFICIENCY OF A KALMAN FILTER USING UNRELIABLE MEMORIES	5584
<i>Jonathan Kern, IMT Atlantique / Polytechnique Montréal, France; Elsa Dupraz, Abdeldjalil Aissa-El-Bey, IMT Atlantique, France; François Leduc-Primeau, Polytechnique Montréal, Canada</i>	
SPTM-14.4: PARALLEL ITERATED EXTENDED AND SIGMA-POINT KALMAN SMOOTHERS	5589
<i>Fatemeh Yaghoobi, Adrien Corenflos, Sakira Hassan, Simo Särkkä, Aalto University, Finland</i>	
SPTM-14.6: WIENER FILTER ON MEET/JOIN LATTICES	5594
<i>Bastian Seifert, Chris Wendler, Markus Püschel, ETH Zürich, Switzerland</i>	
 SPTM-15: GRAPH TOPOLOGY INFERENCE AND CLUSTERING	
SPTM-15.1: LEARNING BOLLOBÁS-RIORDAN GRAPHS UNDER PARTIAL OBSERVABILITY	5230
<i>Michele Cirillo, Vincenzo Matta, University of Salerno, Italy; Ali H. Sayed, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
SPTM-15.2: LEARNING SPARSE GRAPH LAPLACIAN WITH K EIGENVECTOR PRIOR VIA ITERATIVE GLASSO AND PROJECTION	5235
<i>Saghar Bagheri, Gene Cheung, York University, Canada; Antonio Ortega, University of Southern California, United States; Fen Wang, Xidian University, China</i>	
SPTM-15.3: LEARNING MIXED MEMBERSHIP FROM ADJACENCY GRAPH VIA SYSTEMATIC EDGE QUERY: IDENTIFIABILITY AND ALGORITHM	5240
<i>Shahana Ibrahim, Xiao Fu, Oregon State University, United States</i>	
SPTM-15.4: CONVERGENCE ANALYSIS OF THE GRAPH-TOPOLOGY-INFERENCE KERNEL LMS ALGORITHM	5245
<i>Mircea Moscu, Ricardo Borsoi, Cédric Richard, Université Côte d'Azur, France</i>	

SPTM-15.5: AN EFFICIENT ALTERNATING DIRECTION METHOD FOR GRAPH LEARNING FROM SMOOTH SIGNALS	5250
<i>Xiaolu Wang, Chaorui Yao, Haoyu Lei, Anthony Man-Cho So, The Chinese University of Hong Kong, Hong Kong SAR China</i>	
SPTM-15.6: TOPOLOGICAL VOLTERRA FILTERS	5255
<i>Geert Leus, Maosheng Yang, Mario Coutino, Elvin Isufi, Delft University of Technology, Netherlands</i>	
SPTM-16: GRAPH TOPOLOGY INFERENCE	
SPTM-16.1: NETWORK TOPOLOGY INFERENCE WITH GRAPHON SPECTRAL PENALTIES	5305
<i>T. Mitchell Roddenberry, Madeline Navarro, Santiago Segarra, Rice University, United States</i>	
SPTM-16.2: NETWORK TOPOLOGY CHANGE-POINT DETECTION FROM GRAPH SIGNALS WITH PRIOR SPECTRAL SIGNATURES	5310
<i>Chiraag Kaushik, T. Mitchell Roddenberry, Santiago Segarra, Rice University, United States</i>	
SPTM-16.3: ONLINE TIME-VARYING TOPOLOGY IDENTIFICATION VIA PREDICTION-CORRECTION ALGORITHMS	5315
<i>Alberto Natali, Mario Coutino, Elvin Isufi, Geert Leus, Delft University of Technology, Netherlands</i>	
SPTM-16.4: GRAPH LEARNING UNDER SPECTRAL SPARSITY CONSTRAINTS	5320
<i>Subbareddy Batreddy, Indian Institute of Technology, Hyderabad and Swinburne university of technology, Australia; Aditya Siripuram, Indian Institute of Technology, Hyderabad, India; Jingxin Zhang, Swinburne University of Technology, Australia</i>	
SPTM-16.5: A GRAPH LEARNING ALGORITHM BASED ON GAUSSIAN MARKOV RANDOM FIELDS AND MINIMAX CONCAVE PENALTY	5325
<i>Tatsuya Koyakumar, Masahiro Yukawa, Keio University, Japan; Eduardo Pavez, Antonio Ortega, University of Southern California, United States</i>	
SPTM-16.6: FIGLEARN: FILTER AND GRAPH LEARNING USING OPTIMAL TRANSPORT	5330
<i>Matthias Minder, Zahra Farsijani, Dhruti Shah, Mireille El Gheche, Pascal Frossard, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
SPTM-17: SAMPLING, MULTIRATE SIGNAL PROCESSING AND DIGITAL SIGNAL PROCESSING 3	
SPTM-17.1: CONSTRUCTION OF UNIT-NORM TIGHT FRAME BASED PRECONDITIONER FOR SPARSE CODING	5395
<i>Huang Bai, Hangzhou Normal University, China; Chuanrong Hong, Alibaba Group, China; Xiumei Li, Hangzhou Normal University, China</i>	
SPTM-17.2: SPARSE HIGH-ORDER PORTFOLIOS VIA PROXIMAL DCA AND SCA	5400
<i>Jinxin Wang, The Chinese University of Hong Kong, Hong Kong SAR China; Zengde Deng, Cainiao Network, China; Taoli Zheng, Anthony Man-Cho So, The Chinese University of Hong Kong, Hong Kong SAR China</i>	
SPTM-17.3: A CONVEX PENALTY FOR BLOCK-SPARSE SIGNALS WITH UNKNOWN STRUCTURES	5405
<i>Hiroki Kuroda, Daichi Kitahara, Akira Hirabayashi, Ritsumeikan University, Japan</i>	
SPTM-17.4: EVENT-DRIVEN MODULO SAMPLING	5410
<i>Dorian Florescu, Imperial College London, United Kingdom; Felix Krahmer, Technische Universität München, Germany; Ayush Bhandari, Imperial College London, United Kingdom</i>	

SPTM-17.5: NO RELAXATION: GUARANTEED RECOVERY OF FINITE-VALUED SIGNALS FROM UNDERSAMPLED MEASUREMENTS	5415
<i>Pulak Sarangi, Piya Pal, University of California, San Diego, United States</i>	
SPTM-17.6: ERROR ESTIMATES IN SECOND-ORDER CONTINUOUS-TIME SIGMA-DELTA MODULATORS	5420
<i>Dilshad Surroop, PSL University, France; Pascal Combes, Schneider Electric, France; Philippe Martin, PSL University, France</i>	
SPTM-18: SAMPLING THEORY, ANALYSIS AND METHODS	
SPTM-18.1: BANRAW: BAND-LIMITED RADAR WAVEFORM DESIGN VIA PHASE RETRIEVAL	5030
<i>Samuel Pinilla, Universidad Industrial de Santander, Colombia; Kumar Vijay Mishra, Brian M. Sadler, United States CDC Army Research Laboratory, United States; Henry Arguello, Universidad Industrial de Santander, Colombia</i>	
SPTM-18.2: SUB-NYQUIST MULTICHANNEL BLIND DECONVOLUTION	5035
<i>Satish Mulleti, Weizmann Institute of Science, Israel; Kiryung Lee, The Ohio State University, United States; Yonina C. Eldar, Weizmann Institute of Science, Israel</i>	
SPTM-18.3: MODIFIED ARCSINE LAW FOR ONE-BIT SAMPLED STATIONARY SIGNALS WITH TIME-VARYING THRESHOLDS	5040
<i>Arian Eamaz, University of Illinois at Chicago, United States; Farhang Yeganegi, Amirkabir University of Technology, Iran; Mojtaba Soltanalian, University of Illinois at Chicago, United States</i>	
SPTM-18.4: NEAR-OPTIMAL RESAMPLING IN PARTICLE FILTERS USING THE ISING ENERGY MODEL	5045
<i>Muhammed Tahsin Rahman, Mohammad Javad-Kalbasi, Shahrokh Valaee, University of Toronto, Canada</i>	
SPTM-18.5: TIME-DOMAIN CONCENTRATION AND APPROXIMATION OF COMPUTABLE BANDLIMITED SIGNALS	5050
<i>Holger Boche, Ullrich Mönich, Technical University of Munich, Germany</i>	
SPTM-18.6: GUARANTEED RECONSTRUCTION FROM INTEGRATE-AND-FIRE NEURONS WITH ALPHA SYNAPTIC ACTIVATION	5055
<i>Marek Hilton, Roxana Alexandru, Pier Luigi Dragotti, Imperial College London, United Kingdom</i>	
SPTM-19: INFERENCE OVER GRAPHS	
SPTM-19.1: SOCIAL LEARNING UNDER INFERENCE ATTACKS	5544
<i>Konstantinos Ntemos, Virginia Bordignon, Stefan Vlaski, Ali H. Sayed, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
SPTM-19.2: SEGREGATION IN SOCIAL NETWORKS: MARKOV BRIDGE MODELS AND ESTIMATION	5549
<i>Vikram Krishnamurthy, Rui Luo, Buddhika Nettasinghe, Cornell University, United States</i>	
SPTM-19.3: CONTROLLED TESTING AND ISOLATION FOR SUPPRESSING COVID-19	5554
<i>Kobi Cohen, Ben-Gurion University of the Negev, Israel; Amir Leshem, Bar-Ilan University, Israel</i>	
SPTM-19.4: TWO-STAGE GRAPH-CONSTRAINED GROUP TESTING: THEORY AND APPLICATION	5559
<i>Saurabh Sihag, Ali Tajer, Rensselaer Polytechnic Institute, United States; Urbashi Mitra, University of Southern California, United States</i>	

SPTM-19.5: UNVEILING ANOMALOUS NODES VIA RANDOM SAMPLING AND CONSENSUS ON GRAPHS	5564
<i>Vassilis N. Ioannidis, Dimitris Berberidis, Georgios B. Giannakis, University of Minnesota, United States</i>	
SPTM-19.6: ESTIMATING FIEDLER VALUE ON LARGE NETWORKS BASED ON RANDOM WALK OBSERVATIONS	5569
<i>Alexandre Reiffers-Masson, Thierry Chonavel, IMT Atlantique and Lab-STICC UMR CNRS 6285, France; Yezekael Hayel, LIA, University of Avignon, France</i>	
 SPTM-20: SIGNAL PROCESSING OVER GRAPHS AND SPARSITY-AWARE SIGNAL PROCESSING	
SPTM-20.2: ORTHOGONALITY AND ZERO DC TRADEOFFS IN BIORTHOGONAL GRAPH FILTERBANKS	5599
<i>Dion E.O. Tzamaras, Universitat Autònoma de Barcelona, Spain; Eduardo Pavez, University of Southern California, United States; Benjamin Girault, Université de Rennes, ENSAI, France; Antonio Ortega, University of Southern California, United States; Ian Blanes, Joan Serra-Sagristà, Universitat Autònoma de Barcelona, Spain</i>	
SPTM-20.3: GRAPH SIGNAL COMPRESSION VIA TASK-BASED QUANTIZATION	5604
<i>Pei Li, Nanjing University of Posts and Telecommunications, China; Nir Shlezinger, Ben-Gurion University of the Negev, Israel; Haiyang Zhang, Weizmann Institute of Science, Israel; Baoyun Wang, Nanjing University of Posts and Telecommunications, China; Yonina C. Eldar, Weizmann Institute of Science, Israel</i>	
SPTM-20.4: A PARTIALLY COLLAPSED GIBBS SAMPLER FOR UNSUPERVISED NONNEGATIVE SPARSE SIGNAL RESTORATION	5609
<i>Mehdi Chahine Amrouche, Hervé Carfantan, Institut de Recherche en Astrophysique et Planétologie, Université de Toulouse, CNRS/UPS/CNES, France; Jérôme Idier, Laboratoire des Sciences du Numérique de Nantes, CNRS/ECN, France</i>	
SPTM-20.5: A STRUCTURE-GUIDED AND SPARSE-REPRESENTATION-BASED 3D SEISMIC INVERSION METHOD	5614
<i>Bin She, Yaojun Wang, Guangmin Hu, University of Electronic Science and Technology of China, China</i>	
 SPTM-21: OPTIMIZATION METHODS FOR SIGNAL PROCESSING	
SPTM-21.1: ACCELERATING FRANK-WOLFE WITH WEIGHTED AVERAGE GRADIENTS	5180
<i>Yilang Zhang, Bingcong Li, Georgios B. Giannakis, University of Minnesota, United States</i>	
SPTM-21.2: YAPA: ACCELERATED PROXIMAL ALGORITHM FOR CONVEX COMPOSITE PROBLEMS	5185
<i>Giovanni Chierchia, LIGM, Univ Gustave Eiffel, CNRS, ESIEE Paris, France; Mireille El Gheche, Ecole Polytechnique Fédérale de Lausanne (EPFL) / LTS4, Switzerland</i>	
SPTM-21.3: DATA DISCOVERY USING LOSSLESS COMPRESSION-BASED SPARSE REPRESENTATION	5190
<i>Elyas Sabeti, Peter Song, Alfred Hero, University of Michigan, Ann Arbor, United States</i>	
SPTM-21.4: SAFE SCREENING FOR SPARSE REGRESSION WITH THE KULLBACK-LEIBLER DIVERGENCE	5195
<i>Cassio Dantas, Emmanuel Soubies, Cédric Févotte, IRIT, Université de Toulouse, CNRS, France</i>	
SPTM-21.5: ON THE CONVERGENCE OF RANDOMIZED BREGMAN COORDINATE DESCENT FOR NON-LIPSCHITZ COMPOSITE PROBLEMS	5200
<i>Tianxiang Gao, Iowa State University, United States; Songtao Lu, IBM, United States; Jia Liu, Ohio Stat University, United States; Chris Chu, Iowa Stat University, United States</i>	

SPTM-21.6: A GLOBAL CAYLEY PARAMETRIZATION OF STIEFEL MANIFOLD\	FOR	5205
DIRECT UTILIZATION OF OPTIMIZATION MECHANISMS OVER VECTOR SPACES			
<i>Keita Kume, Isao Yamada, Tokyo Institute of Technology, Japan</i>			
 SPTM-22: SIGNAL PROCESSING THEORY AND METHODS			
SPTM-22.4: TRAINING LOGICAL NEURAL NETWORKS BY PRIMAL-DUAL METHODS	5619	
FOR NEURO-SYMBOLIC REASONING			
<i>Songtao Lu, Naweed Khan, Ismail Akhalwaya, Ryan Riegel, Lior Horesh, Alexander Gray, IBM Research, United States</i>			
 SPTM-23: BAYESIAN SIGNAL PROCESSING			
SPTM-23.1: COOPERATIVE PARAMETER TRACKING ON THE UNIT SPHERE USING	5120	
DISTRIBUTED ADAPT-THEN-COMBINE PARTICLE FILTERS AND PARALLEL TRANSPORT			
<i>Caio de Figueiredo, Instituto Tecnológico de Aeronáutica, Brazil; Claudio Bordin, Universidade Federal do ABC, Brazil; Marcelo Bruno, Instituto Tecnológico de Aeronáutica, Brazil</i>			
SPTM-23.2: BAYESIAN ESTIMATION OF A TAIL-INDEX WITH MARGINALIZED	5125	
THRESHOLD			
<i>Douglas Johnston, Farmingdale State College, United States; Petar M. Djurić, Stony Brook University, United States</i>			
SPTM-23.3: BLOCK KALMAN FILTER: AN ASYMPTOTIC BLOCK PARTICLE FILTER	5130	
IN THE LINEAR GAUSSIAN CASE			
<i>Rui Min, University of Lille, France; Christelle Garnier, IMT Lille Douai, France; François Septier, University of Bretagne Sud, France; John Klein, University of Lille, France</i>			
SPTM-23.4: PARTICLE GIBBS SAMPLING FOR REGIME-SWITCHING STATE-SPACE	5135	
MODELS			
<i>Yousef El-Laham, Liu Yang, Heather Lynch, Petar Djuric, Monica Bugallo, Stony Brook University, United States</i>			
SPTM-23.5: ADAPTIVE IMPORTANCE SAMPLING VIA AUTO-REGRESSIVE	5140	
GENERATIVE MODELS AND GAUSSIAN PROCESSES			
<i>Hechuan Wang, Monica Bugallo, Petar Djuric, Stony Brook University, United States</i>			
SPTM-23.6: VARIATIONAL PARAMETER LEARNING IN SEQUENTIAL STATE-SPACE	5145	
MODEL VIA PARTICLE FILTERING			
<i>Chenhao Li, Simon Godsill, University of Cambridge, United Kingdom</i>			
 SPTM-24: SPARSITY-AWARE PROCESSING			
SPTM-24.1: CORRELATION-BASED ROBUST LINEAR REGRESSION WITH	5150	
ITERATIVE OUTLIER REMOVAL			
<i>Jian Ding, Jianji Wang, Xi'an Jiaotong University, China; Yue Zhang, DongFang Electric Machinery Co., Ltd, China; Yuanjie Li, DEC Academy of Science and Technology Co., Ltd, China; Nanning Zheng, Xi'an Jiaotong University, China</i>			
SPTM-24.2: ON THE OPTIMALITY OF BACKWARD REGRESSION: SPARSE	5155	
RECOVERY AND SUBSET SELECTION			
<i>Sebastian Ament, Carla Gomes, Cornell University, United States</i>			
SPTM-24.3: GENERAL TOTAL VARIATION REGULARIZED SPARSE BAYESIAN	5160	
LEARNING FOR ROBUST BLOCK-SPARSE SIGNAL RECOVERY			
<i>Aditya Sant, University of California, San Diego, United States; Markus Leinonen, University of Oulu, Finland; Bhaskar D. Rao, University of California, San Diego, United States</i>			

SPTM-24.4: AUTOMATIC REGISTRATION AND CLUSTERING OF TIME SERIES.....	5165
<i>Michael Weylandt, George Michailidis, University of Florida, United States</i>	
SPTM-24.5: LOW-RANK ON GRAPHS PLUS TEMPORALLY SMOOTH SPARSE DECOMPOSITION FOR ANOMALY DETECTION IN SPATIOTEMPORAL DATA	5170
<i>Seyyid Emre Sofuoglu, Selin Aviyente, Michigan State University, United States</i>	
SPTM-24.6: A PARALLEL ALGORITHM FOR PHASE RETRIEVAL WITH DICTIONARY LEARNING	5175
<i>Tianyi Liu, Technische Universitaet Darmstadt, Germany; Andreas M. Tillmann, Technische Universität Braunschweig, Germany; Yang Yang, Fraunhofer ITWM, Germany; Yonina C. Eldar, Weizmann Institute of Science, Israel; Marius Pesavento, Technische Universitaet Darmstadt, Germany</i>	
SPE-1: SPEECH RECOGNITION 1: NEURAL TRANSDUCER MODELS 1	
SPE-1.1: IMPROVING RNN TRANSDUCER MODELING FOR SMALL-FOOTPRINT KEYWORD SPOTTING	6714
<i>Yao Tian, Haitao Yao, Meng Cai, Yaming Liu, Zejun Ma, Bytedance, China</i>	
SPE-1.2: CASCADED ENCODERS FOR UNIFYING STREAMING AND NON-STREAMING ASR	6719
<i>Arun Narayanan, Tara N. Sainath, Ruoming Pang, Jiahui Yu, Chung-Cheng Chiu, Rohit Prabhavalkar, Ehsan Variiani, Trevor Strohman, Google Inc., United States</i>	
SPE-1.3: A BETTER AND FASTER END-TO-END MODEL FOR STREAMING ASR	6724
<i>Bo Li, Anmol Gulati, Jiahui Yu, Tara N. Sainath, Chung-Cheng Chiu, Arun Narayanan, Shuo-Yiin Chang, Ruoming Pang, Yanzhang He, James Qin, Wei Han, Qiao Liang, Yu Zhang, Trevor Strohman, Yonghui Wu, Google, United States</i>	
SPE-1.4: EFFICIENT KNOWLEDGE DISTILLATION FOR RNN-TRANSDUCER MODELS	6729
<i>Sankaran Panchapagesan, Daniel Park, Chung-Cheng Chiu, Google, LLC, United States; Yuan Shangguan, Facebook, Inc., United States; Qiao Liang, Alexander Gruenstein, Google, LLC, United States</i>	
SPE-1.5: PHONEME BASED NEURAL TRANSDUCER FOR LARGE VOCABULARY SPEECH RECOGNITION	6734
<i>Wei Zhou, Simon Berger, Ralf Schlüter, Hermann Ney, RWTH Aachen University, Germany</i>	
SPE-1.6: RNN-T BASED OPEN-VOCABULARY KEYWORD SPOTTING IN MANDARIN WITH MULTI-LEVEL DETECTION	6739
<i>Zuozhen Liu, Ta Li, Pengyuan Zhang, Key Laboratory of Speech Acoustics and Content Understanding, Institute of Acoustics, China</i>	
SPE-2: SPEECH RECOGNITION 2: NEURAL TRANSDUCER MODELS 2	
SPE-2.1: ADVANCING RNN TRANSDUCER TECHNOLOGY FOR SPEECH RECOGNITION	6744
<i>George Saon, Zoltan Tieske, Daniel Bolanos, Brian Kingsbury, IBM Research AI, United States</i>	
SPE-2.2: LESS IS MORE: IMPROVED RNN-T DECODING USING LIMITED LABEL CONTEXT AND PATH MERGING	6749
<i>Rohit Prabhavalkar, Yanzhang He, David Rybach, Sean Campbell, Arun Narayanan, Trevor Strohman, Tara N. Sainath, Google, United States</i>	
SPE-2.3: SIMPLEFLAT: A SIMPLE WHOLE-NETWORK PRE-TRAINING APPROACH FOR RNN TRANSDUCER-BASED END-TO-END SPEECH RECOGNITION	6754
<i>Takafumi Moriya, Takanori Ashihara, Tomohiro Tanaka, Tsubasa Ochiai, Hiroshi Sato, Atsushi Ando, Yusuke Ijima, Ryo Masumura, Yusuke Shinohara, NTT Corporation, Japan</i>	

SPE-2.4: ECHO STATE SPEECH RECOGNITION.....	6759
<i>Harsh Shrivastava, Georgia Institute of Technology, United States; Ankush Garg, Yuan Cao, Yu Zhang, Tara N. Sainath, Google, United States</i>	
SPE-2.5: USING SYNTHETIC AUDIO TO IMPROVE THE RECOGNITION OF OUT-OF-VOCABULARY WORDS IN END-TO-END ASR SYSTEMS	6764
<i>Xianrui Zheng, University of Cambridge, United Kingdom; Yulan Liu, Deniz Gunceler, Daniel Willett, Amazon, United Kingdom</i>	
SPE-3: SPEECH SYNTHESIS 1: ARCHITECTURE	
SPE-3.1: WAVE-TACOTRON: SPECTROGRAM-FREE END-TO-END TEXT-TO-SPEECH SYNTHESIS	5679
<i>Ron Weiss, RJ Skerry-Ryan, Eric Battenberg, Soroosh Mariooryad, Diederik Kingma, Google, United States</i>	
SPE-3.2: PATNET : A PHONEME-LEVEL AUTOREGRESSIVE TRANSFORMER NETWORK FOR SPEECH SYNTHESIS	5684
<i>Shiming Wang, Zhenhua Ling, University of Science and Technology of China, China; Ruibo Fu, Jiangyan Yi, Jianhua Tao, Institute of Automation, Chinese Academy of Sciences, China</i>	
SPE-3.3: MULTI-RATE ATTENTION ARCHITECTURE FOR FAST STREAMABLE TEXT-TO-SPEECH SPECTRUM MODELING	5689
<i>Qing He, Zhiping Xiu, Thilo Koehler, Jilong Wu, Facebook Inc, United States</i>	
SPE-3.4: END-TO-END TEXT-TO-SPEECH USING LATENT DURATION BASED ON VQ-VAE	5694
<i>Yusuke Yasuda, Xin Wang, Junichi Yamagishi, National Institute of Informatics, Japan</i>	
SPE-3.5: LIGHTSPEECH: LIGHTWEIGHT AND FAST TEXT TO SPEECH WITH NEURAL ARCHITECTURE SEARCH	5699
<i>Renqian Luo, University of Science and Technology of China, China; Xu Tan, Rui Wang, Tao Qin, Microsoft Research Asia, China; Jinzhu Li, Sheng Zhao, Microsoft Azure Speech, China; Enhong Chen, University of Science and Technology of China, China; Tie-Yan Liu, Microsoft Research Asia, China</i>	
SPE-3.6: A NEW HIGH QUALITY TRAJECTORY TILING BASED HYBRID TTS IN REAL TIME	5704
<i>Feng-Long Xie, Xin-Hui Li, Wen-Chao Su, Li Lu, Tencent, China; Frank K. Soong, Microsoft, China</i>	
SPE-4: SPEECH SYNTHESIS 2: CONTROLLABILITY	
SPE-4.1: PARALLEL TACOTRON: NON-AUTOREGRESSIVE AND CONTROLLABLE TTS	5709
<i>Isaac Elias, Heiga Zen, Jonathan Shen, Yu Zhang, Ye Jia, Ron Weiss, Yonghui Wu, Google, Israel</i>	
SPE-4.2: FCL-TACO2: TOWARDS FAST, CONTROLLABLE AND LIGHTWEIGHT TEXT-TO-SPEECH SYNTHESIS	5714
<i>Disong Wang, The Chinese University of Hong Kong, Hong Kong SAR China; Liqun Deng, Yang Zhang, Nianzu Zheng, Yu Ting Yeung, Xiao Chen, Huawei Noah's Ark Lab, China; Xunying Liu, Helen Meng, The Chinese University of Hong Kong, Hong Kong SAR China</i>	
SPE-4.3: PROSODIC CLUSTERING FOR PHONEME-LEVEL PROSODY CONTROL IN END-TO-END SPEECH SYNTHESIS	5719
<i>Alexandra Vioni, Myrsini Christidou, Nikolaos Ellinas, Georgios Vamvoukakis, Panos Kakoulidis, Innoetics, Samsung Electronics, Greece; Taehoon Kim, June Sig Sung, Hyoungmin Park, Mobile Communications Business, Samsung Electronics, South Korea; Aimilios Chalamandaris, Pirros Tsiakoulis, Innoetics, Samsung Electronics, Greece</i>	

SPE-4.4: IMPROVING NATURALNESS AND CONTROLLABILITY OF SEQUENCE-TO-SEQUENCE SPEECH SYNTHESIS BY LEARNING LOCAL PROSODY REPRESENTATIONS	5724
<i>Cheng Gong, Longbiao Wang, Tianjin University, China; Zhenhua Ling, University of Science and Technology of China, China; Shaotong Guo, Tianjin University, China; Ju Zhang, Huiyan Technology (Tianjin) Co., Ltd, China; Jianwu Dang, Japan Advanced Institute of Science and Technology, Japan</i>	
SPE-4.5: MULTI-SPEAKER EMOTIONAL SPEECH SYNTHESIS WITH FINE-GRAINED PROSODY MODELING	5729
<i>Chunhui Lu, Xue Wen, Ruolan Liu, Xiao Chen, Samsung Research China-Beijing, China</i>	
SPE-4.6: EMOTION CONTROLLABLE SPEECH SYNTHESIS USING EMOTION-UNLABELED DATASET WITH THE ASSISTANCE OF CROSS-DOMAIN SPEECH EMOTION RECOGNITION	5734
<i>Xiong Cai, Dongyang Dai, Zhiyong Wu, Xiang Li, Jingbei Li, Tsinghua University, China; Helen Meng, Chinese University of Hong Kong, Hong Kong SAR China</i>	
 SPE-5: SPEECH ENHANCEMENT 1: SPEECH SEPARATION	
SPE-5.1: DUAL-PATH MODELING FOR LONG RECORDING SPEECH SEPARATION IN MEETINGS	6474
<i>Chenda Li, Shanghai Jiao Tong University, China; Zhuo Chen, Microsoft, United States; Yi Luo, Cong Han, Columbia University, United States; Tianyan Zhou, Microsoft, United States; Keisuke Kinoshita, Marc Delcroix, NTT Corporation, Japan; Shinji Watanabe, Johns Hopkins University, United States; Yanmin Qian, Shanghai Jiao Tong University, China</i>	
SPE-5.2: TIME-DOMAIN LOSS MODULATION BASED ON OVERLAP RATIO FOR MONAURAL CONVERSATIONAL SPEAKER SEPARATION	6479
<i>Hassan Taherian, DeLiang Wang, The Ohio State Universtiy, United States</i>	
SPE-5.3: CONTINUOUS SPEECH SEPARATION WITH CONFORMER	6484
<i>Sanyuan Chen, Harbin Institute of Technology, China; Yu Wu, Zhuo Chen, Jian Wu, Jinyu Li, Takuya Yoshioka, Chengyi Wang, Shujie Liu, Ming Zhou, Microsoft Corporation, China</i>	
SPE-5.4: A FLOW-BASED NEURAL NETWORK FOR TIME DOMAIN SPEECH ENHANCEMENT	6489
<i>Martin Strauss, Bernd Edler, International Audio Laboratories Erlangen, Germany</i>	
SPE-5.5: SANDGLASSET: A LIGHT MULTI-GRANULARITY SELF-ATTENTIVE NETWORK FOR TIME-DOMAIN SPEECH SEPARATION	6494
<i>Max W. Y. Lam, Jun Wang, Dan Su, Dong Yu, Tencent AI Lab, China</i>	
SPE-5.6: TRANSMASK: A COMPACT AND FAST SPEECH SEPARATION MODEL BASED ON TRANSFORMER	6499
<i>Zining Zhang, National University of Singapore, PVoice technology, Singapore; Bingsheng He, National University of Singapore, Singapore; Zhenjie Zhang, PVoice technology, Singapore</i>	
 SPE-6: SPEECH ENHANCEMENT 2: SPEECH SEPARATION AND DEREVERBERATION	
SPE-6.1: ONE SHOT LEARNING FOR SPEECH SEPARATION	6504
<i>Yuan-Kuei Wu, Kuan-Po Huang, National Taiwan University, Taiwan; Yu Tsao, Academia Sinica, Taiwan; Hung-yi Lee, National Taiwan University, Taiwan</i>	
SPE-6.2: TRAINING NOISY SINGLE-CHANNEL SPEECH SEPARATION WITH NOISY ORACLE SOURCES: A LARGE GAP AND A SMALL STEP	6509
<i>Matthew Maciejewski, Johns Hopkins University, United States; Jing Shi, Chinese Academy of Sciences, United States; Shinji Watanabe, Sanjeev Khudanpur, Johns Hopkins University, United States</i>	

SPE-6.3: SPEAKER AND DIRECTION INFERRED DUAL-CHANNEL SPEECH SEPARATION	6514
<i>Chenxing Li, Jiaming Xu, Institute of Automation, Chinese Academy of Sciences, China; Nima Mesgarani, Columbia University, United States; Bo Xu, Institute of Automation, Chinese Academy of Sciences, China</i>	
SPE-6.4: SPEECH DEREVERBERATION USING VARIATIONAL AUTOENCODERS	6519
<i>Deepak Baby, Amazon Alexa, Germany; Hervé Boulard, Idiap Research Institute, Switzerland</i>	
SPE-6.5: REAL-TIME DENOISING AND DEREVERBERATION WITH TINY RECURRENT U-NET	6524
<i>Hyeong-Seok Choi, Seoul national university/Supertone, South Korea; Sungjin Park, Seoul national university, South Korea; Jie Hwan Lee, Hoon Heo, Supertone, South Korea; Dongsuk Jeon, Seoul national university, South Korea; Kyogu Lee, Seoul national university/Supertone, South Korea</i>	
SPE-6.6: WEIGHTED MAGNITUDE-PHASE LOSS FOR SPEECH DEREVERBERATION	6529
<i>Jingshu Zhang, Mark Plumbley, Wenwu Wang, University of Surrey, United Kingdom</i>	
 SPE-7: SPEAKER RECOGNITION 1: BENCHMARK EVALUATION	
SPE-7.1: SPEAKER EMBEDDINGS FOR DIARIZATION OF BROADCAST DATA IN THE ALLIES CHALLENGE	5939
<i>Anthony Larcher, Ambuj Mehrish, Marie Tahon, Sylvain Meignier, LIUM - EA4023, Le Mans Université, France; Jean Carrive, David Doukhan, French National Institute of Audiovisual (INA), France; Olivier Galibert, Laboratoire National d'Essais (LNE), France; Nicholas Evans, EURECOM, France</i>	
SPE-7.2: ON THE DETECTION OF PITCH-SHIFTED VOICE: MACHINES AND HUMAN LISTENERS	5944
<i>David Looney, Nikolay D. Gaubitch, Pindrop, United Kingdom</i>	
SPE-7.3: THE INS AND OUTS OF SPEAKER RECOGNITION: LESSONS FROM VOXSRC 2020	5949
<i>Yoohwan Kwon, Yonsei University, South Korea; Hee-Soo Heo, Bong-Jin Lee, Joon Son Chung, Naver Corporation, South Korea</i>	
SPE-7.4: THE IDLAB VOXSRC-20 SUBMISSION: LARGE MARGIN FINE-TUNING AND QUALITY-AWARE SCORE CALIBRATION IN DNN BASED SPEAKER VERIFICATION	5954
<i>Jenthe Thienpondt, Brecht Desplanques, Kris Demuynck, Ghent University, Belgium</i>	
SPE-7.5: ANALYSIS OF THE BUT DIARIZATION SYSTEM FOR VOXCONVERSE CHALLENGE	5959
<i>Federico Landini, Ondřej Glembek, Pavel Matějka, Johan Rohdin, Lukáš Burget, Mireia Diez, Anna Silnova, Brno University of Technology, Czechia</i>	
SPE-7.6: MICROSOFT SPEAKER DIARIZATION SYSTEM FOR THE VOXCELEB SPEAKER RECOGNITION CHALLENGE 2020	5964
<i>Xiong Xiao, Naoyuki Kanda, Zhuo Chen, Tianyan Zhou, Takuya Yoshioka, Sanyuan Chen, Yong Zhao, Gang Liu, Yu Wu, Jian Wu, Shujie Liu, Jinyu Li, Yifan Gong, Microsoft, United States</i>	
 SPE-8: SPEAKER RECOGNITION 2: CHANNEL AND DOMAIN ROBUSTNESS	
SPE-8.1: SQUEEZING VALUE OF CROSS-DOMAIN LABELS: A DECOUPLED SCORING APPROACH FOR SPEAKER VERIFICATION	5969
<i>Lantian Li, Yang Zhang, Jiawen Kang, Thomas Fang Zheng, Dong Wang, Tsinghua University, China</i>	
SPE-8.2: SELF-SUPERVISED LEARNING BASED DOMAIN ADAPTATION FOR ROBUST SPEAKER VERIFICATION	5974
<i>Zhengyang Chen, Shuai Wang, Yanmin Qian, Shanghai Jiao Tong University, China</i>	

SPE-8.3: META-LEARNING FOR CROSS-CHANNEL SPEAKER VERIFICATION	5979
<i>Hanyi Zhang, Longbiao Wang, College of Intelligence and Computing, Tianjin University, China; Kong Aik Lee, Institute for Infocomm Research, A*STAR, Singapore; Meng Liu, Jianwu Dang, Hui Chen, College of Intelligence and Computing, Tianjin University, China</i>	
SPE-8.4: SYNAUG: SYNTHESIS-BASED DATA AUGMENTATION FOR	5984
TEXT-DEPENDENT SPEAKER VERIFICATION <i>Chenpeng Du, Bing Han, Shuai Wang, Yanmin Qian, Kai Yu, Shanghai Jiao Tong University, China</i>	
SPE-8.5: UNIT SELECTION SYNTHESIS BASED DATA AUGMENTATION FOR FIXED	5989
PHRASE SPEAKER VERIFICATION <i>Houjun Huang, Xu Xiang, Fei Zhao, AISpeech Ltd, Suzhou, China; Shuai Wang, Yanmin Qian, Shanghai Jiao Tong University, China</i>	
SPE-8.6: IMPROVING SPEAKER VERIFICATION IN REVERBERANT	5994
ENVIRONMENTS <i>Xiao Chen, Stephen Zahorian, Binghamton University, United States</i>	
 SPE-9: SPEECH RECOGNITION 3: TRANSFORMER MODELS 1	
SPE-9.1: TRANSFORMER-TRANSDUCERS FOR CODE-SWITCHED SPEECH	6769
RECOGNITION <i>Siddharth Dalmaia, Carnegie Mellon University, United States; Yuzong Liu, Srikanth Ronanki, Katrin Kirchhoff, Amazon, United States</i>	
SPE-9.2: WAKE WORD DETECTION WITH STREAMING TRANSFORMERS.....	6774
<i>Yiming Wang, Johns Hopkins University, United States; Hang Lv, Northwestern Polytechnical University, China; Daniel Povey, Xiaomi Corporation, China; Lei Xie, Northwestern Polytechnical University, China; Sanjeev Khudanpur, Johns Hopkins University, United States</i>	
SPE-9.3: CAPTURING MULTI-RESOLUTION CONTEXT BY DILATED	6779
SELF-ATTENTION <i>Niko Moritz, Takaaki Hori, Jonathan Le Roux, Mitsubishi Electric Research Laboratories (MERL), United States</i>	
SPE-9.4: RECENT DEVELOPMENTS ON ESPNET TOOLKIT BOOSTED BY	6784
CONFORMER <i>Pengcheng Guo, Northwestern Polytechnical University; Johns Hopkins University, China; Florian Boyer, LaBRI, University of Bordeaux; Airudit, France; Xuankai Chang, Johns Hopkins University, United States; Tomoki Hayashi, Nagoya University; Human Dataware Lab. Co., Ltd., Japan; Yosuke Higuchi, Waseda University, Japan; Hirofumi Inaguma, Kyoto University, Japan; Naoyuki Kamo, NTT Corporation, Japan; Chenda Li, Shanghai Jiao Tong University, China; Daniel Garcia-Romero, Jiatong Shi, Johns Hopkins University, United States; Jing Shi, Institute of Automation, Chinese Academy of Sciences, China and Johns Hopkins University, United States; Shinji Watanabe, Johns Hopkins University,, United States; Kun Wei, Northwestern Polytechnical University, China; Wangyou Zhang, Shanghai Jiao Tong University, China; Yuekai Zhang, Johns Hopkins University, United States</i>	
SPE-9.5: HIERARCHICAL TRANSFORMER-BASED LARGE-CONTEXT END-TO-END	6789
ASR WITH LARGE-CONTEXT KNOWLEDGE DISTILLATION <i>Ryo Masumura, Naoki Makishima, Mana Ihori, Akihiko Takashima, Tomohiro Tanaka, Shota Orihashi, NTT Corporation, Japan</i>	
SPE-9.6: END-TO-END MULTI-CHANNEL TRANSFORMER FOR SPEECH	6794
RECOGNITION <i>Feng-Ju Chang, Martin Radfar, Athanasios Mouchtaris, Brian King, Siegfried Kunzmann, Amazon, United States</i>	

SPE-10: SPEECH RECOGNITION 4: TRANSFORMER MODELS 2

SPE-10.1: CASS-NAT: CTC ALIGNMENT-BASED SINGLE STEP 6799
NON-AUTOREGRESSIVE TRANSFORMER FOR SPEECH RECOGNITION

Ruchao Fan, University of California, Los Angeles, United States; Wei Chu, Peng Chang, Jing Xiao, PAII Inc., United States

SPE-10.2: NON-AUTOREGRESSIVE TRANSFORMER ASR WITH CTC-ENHANCED 6804
DECODER INPUT

Xingchen Song, Zhiyong Wu, Tsinghua University, China; Yiheng Huang, Chao Weng, Dan Su, Tencent, China; Helen Meng, Chinese University of Hong Kong, China

SPE-10.3: TRANSFORMER-BASED END-TO-END SPEECH RECOGNITION WITH 6809
LOCAL DENSE SYNTHESIZER ATTENTION

Menglong Xu, Shengqiang Li, Xiao-Lei Zhang, Northwestern Polytechnical University, China

SPE-10.4: DEVELOPING REAL-TIME STREAMING TRANSFORMER TRANSDUCER 6814
FOR SPEECH RECOGNITION ON LARGE-SCALE DATASET

Xie Chen, Yu Wu, Zhenghao Wang, Shujie Liu, Jinyu Li, Microsoft, United States

SPE-10.5: HEAD-SYNCHRONOUS DECODING FOR TRANSFORMER-BASED 6819
STREAMING ASR

Mohan Li, Cătălin Zorilă, Rama Doddipatla, Toshiba Cambridge Research Laboratory, United Kingdom

SPE-10.6: HISTORY UTTERANCE EMBEDDING TRANSFORMER LM FOR SPEECH 6824
RECOGNITION

Keqi Deng, Gaofeng Cheng, Haoran Miao, Pengyuan Zhang, Yonghong Yan, Institute of Acoustics, Chinese Academy of Sciences, China

SPE-11: VOICE CONVERSION 1: NON-PARALLEL CONVERSION

SPE-11.1: MASKCYCLEGAN-VC: LEARNING NON-PARALLEL VOICE CONVERSION 5624
WITH FILLING IN FRAMES

Takuhiro Kaneko, Hirokazu Kameoka, Kou Tanaka, Nobukatsu Hojo, NTT Corporation, Japan

SPE-11.2: NON-PARALLEL MANY-TO-MANY VOICE CONVERSION BY 5629
KNOWLEDGE TRANSFER FROM A TEXT-TO-SPEECH MODEL

Xinyuan Yu, Brian Mak, The Hong Kong University of Science and Technology, Hong Kong SAR China

SPE-11.3: NON-PARALLEL MANY-TO-MANY VOICE CONVERSION USING LOCAL 5634
LINGUISTIC TOKENS

Chao Wang, Yibiao Yu, Soochow University, China

SPE-11.4: CRANK: AN OPEN-SOURCE SOFTWARE FOR NONPARALLEL VOICE 5639
CONVERSION BASED ON VECTOR-QUANTIZED VARIATIONAL AUTOENCODER

Kazuhiro Kobayashi, Wen-Chin Huang, Yi-Chiao Wu, Patrick Lumban Tobing, Tomoki Hayashi, Tomoki Toda, Nagoya University, Japan

SPE-11.5: FRAGMENTVC: ANY-TO-ANY VOICE CONVERSION BY END-TO-END 5644
EXTRACTING AND FUSING FINE-GRAINED VOICE FRAGMENTS WITH ATTENTION

Yist Y. Lin, Chung-Ming Chien, Jheng-Hao Lin, Hung-yi Lee, Lin-shan Lee, National Taiwan University, Taiwan

SPE-11.6: ANY-TO-ONE SEQUENCE-TO-SEQUENCE VOICE CONVERSION USING 5649
SELF-SUPERVISED DISCRETE SPEECH REPRESENTATIONS

Wen-Chin Huang, Yi-Chiao Wu, Tomoki Hayashi, Tomoki Toda, Nagoya University, Japan

SPE-12: VOICE CONVERSION 2: LOW-RESOURCE & CROSS-LINGUAL CONVERSION

SPE-12.1: TOWARDS LOW-RESOURCE STARGAN VOICE CONVERSION USING WEIGHT ADAPTIVE INSTANCE NORMALIZATION 5654

Mingjie Chen, Yanpei Shi, Thomas Hain, University of Sheffield, United Kingdom

SPE-12.2: AGAIN-VC: A ONE-SHOT VOICE CONVERSION USING ACTIVATION GUIDANCE AND ADAPTIVE INSTANCE NORMALIZATION 5659

Yen-Hao Chen, Da-Yi Wu, Tsung-Han Wu, Hung-yi Lee, National Taiwan University, Taiwan

SPE-12.3: ONE-SHOT VOICE CONVERSION BASED ON SPEAKER AWARE MODULE 5664

Ying Zhang, Hao Che, Chenxing Li, Xiaorui Wang, Zhongyuan Wang, Kwai, China

SPE-12.4: ZERO-SHOT VOICE CONVERSION WITH ADJUSTED SPEAKER EMBEDDINGS AND SIMPLE ACOUSTIC FEATURES 5669

Zhiyuan Tan, Jianguo Wei, Junhai Xu, Yuqing He, Wenhuan Lu, College of Intelligence and Computing, Tianjin University, China

SPE-12.5: TOWARDS NATURAL AND CONTROLLABLE CROSS-LINGUAL VOICE CONVERSION BASED ON NEURAL TTS MODEL AND PHONETIC POSTERIORGRAM 5674

Shengkui Zhao, Hao Wang, Trung Hieu Nguyen, Bin Ma, Speech Lab, Alibaba Group, Singapore

SPE-13: SPEECH RECOGNITION 5: NEW ALGORITHMS

SPE-13.1: META-LEARNING FOR IMPROVING RARE WORD RECOGNITION IN END-TO-END ASR 6829

Florian Lux, Ngoc Thang Vu, University of Stuttgart, Germany

SPE-13.2: A COMPARISON OF METHODS FOR OOV-WORD RECOGNITION ON A NEW PUBLIC DATASET 6834

Rudolf A Braun, Srikanth Madikeri, Petr Motlicek, Idiap Research Institute, Switzerland

SPE-13.3: CONVOLUTIONAL DROPOUT AND WORDPIECE AUGMENTATION FOR END-TO-END SPEECH RECOGNITION 6839

Hainan Xu, Yinghui Huang, Yun Zhu, Kartik Audhkhasi, Bhuvana Ramabhadran, Google, United States

SPE-13.4: PARTIALLY OVERLAPPED INFERENCE FOR LONG-FORM SPEECH RECOGNITION 6844

Tae Gyoon Kang, Ho-Gyeong Kim, Min-Joong Lee, Jihyun Lee, Hoshik Lee, Samsung Electronics, South Korea

SPE-13.5: FOCUS ON THE PRESENT: A REGULARIZATION METHOD FOR THE ASR SOURCE-TARGET ATTENTION LAYER 6849

Nanxin Chen, Piotr Zelasko, Jesús Villalba, Najim Dehak, Johns Hopkins University, United States

SPE-13.6: BIFOCAL NEURAL ASR: EXPLOITING KEYWORD SPOTTING FOR INFERENCE OPTIMIZATION 6854

Jon Macoskey, Grant Strimel, Ariya Rastrow, Amazon.com, United States

SPE-14: SPEECH RECOGNITION 6: NEW ALGORITHMS FOR SPARSITY/EFFICIENCY

SPE-14.1: FASTEMIT: LOW-LATENCY STREAMING ASR WITH SEQUENCE-LEVEL EMISSION REGULARIZATION 6859

Jiahui Yu, Chung-Cheng Chiu, Google Brain, United States; Bo Li, Shuo-yiin Chang, Tara N. Sainath, Yanzhang He, Arun Narayanan, Google LLC, United States; Wei Han, Anmol Gulati, Yonghui Wu, Ruoming Pang, Google Brain, United States

SPE-14.2: SPARSIFICATION VIA COMPRESSED SENSING FOR AUTOMATIC SPEECH RECOGNITION	6864
<i>Kai Zhen, Indiana University Bloomington, United States; Hieu Nguyen, Feng-Ju Chang, Athanasios Mouchtaris, Ariya Rastrow, Amazon, United States</i>	
SPE-14.3: DYNAMIC SPARSITY NEURAL NETWORKS FOR AUTOMATIC SPEECH RECOGNITION	6869
<i>Zhaofeng Wu, University of Washington, United States; Ding Zhao, Qiao Liang, Jiahui Yu, Anmol Gulati, Ruoming Pang, Google, United States</i>	
SPE-14.4: AN ASYNCHRONOUS WFST-BASED DECODER FOR AUTOMATIC SPEECH RECOGNITION	6874
<i>Hang Lv, Audio, Speech and Language Processing Group (ASLP@NPU), School of Computer Science, Northwestern Polytechnical University, China and Center of Language and Speech Processing, Johns Hopkins University, United States; Zhehuai Chen, Center of Language and Speech Processing at Johns Hopkins University, USA; SpeechLab, Departement of Computer Science and Engineering, Shanghai Jiao Tong University, China; Hainan Xu, Center for Language Speech Processing at Johns Hopkins University, United States; Daniel Povey, Xiaomi Corporation, United Kingdom; Lei Xie, Audio, Speech and Language Processing Group (ASLP@NPU), School of Computer Science, Northwestern Polytechnical University, China; Sanjeev Khudanpur, Center for Language Speech Processing at Johns Hopkins University and Human Language Technology Center of Excellence at Johns Hopkins University, United States</i>	
SPE-14.5: TINY TRANSDUCER: A HIGHLY-EFFICIENT SPEECH RECOGNITION MODEL ON EDGE DEVICES	6879
<i>Yuekai Zhang, Johns Hopkins University, United States; Sining Sun, Long Ma, Tencent Technology Co.,Ltd, China</i>	
 SPE-15: SPEECH SYNTHESIS 3: VOCODER	
SPE-15.1: NOISE LEVEL LIMITED SUB-MODELING FOR DIFFUSION PROBABILISTIC VOCODERS	5739
<i>Takuma Okamoto, National Institute of Information and Communications Technology, Japan; Tomoki Toda, Nagoya University, Japan; Yoshinori Shiga, Hisashi Kawai, National Institute of Information and Communications Technology, Japan</i>	
SPE-15.2: STYLEMELGAN: AN EFFICIENT HIGH-FIDELITY ADVERSARIAL VOCODER WITH TEMPORAL ADAPTIVE NORMALIZATION	5744
<i>Ahmed Mustafa, Nicola Pia, Guillaume Fuchs, Fraunhofer-Institut für Integrierte Schaltungen IIS, Germany</i>	
SPE-15.3: PARALLEL WAVEFORM SYNTHESIS BASED ON GENERATIVE ADVERSARIAL NETWORKS WITH VOICING-AWARE CONDITIONAL DISCRIMINATORS	5749
<i>Ryuichi Yamamoto, LINE Corp., Japan; Eunwoo Song, NAVER Corp., South Korea; Min-Jae Hwang, Search Solutions Inc., South Korea; Jae-Min Kim, NAVER Corp., South Korea</i>	
SPE-15.4: UNIVERSAL NEURAL VOCODING WITH PARALLEL WAVENET	5754
<i>Yunlong Jiao, Adam Gabrys, Amazon, United Kingdom; Georgi Tinchev, University of Oxford, United Kingdom; Bartosz Putrycz, Daniel Korzekwa, Viacheslav Klimkov, Amazon, United Kingdom</i>	
SPE-15.5: PERIODNET: A NON-AUTOREGRESSIVE WAVEFORM GENERATION MODEL WITH A STRUCTURE SEPARATING PERIODIC AND APERIODIC COMPONENTS	5759
<i>Yukiya Hono, Shinji Takaki, Kei Hashimoto, Keiichiro Oura, Yoshihiko Nankaku, Keiichi Tokuda, Nagoya Institute of Technology, Japan</i>	
SPE-15.6: LVCNET: EFFICIENT CONDITION-DEPENDENT MODELING NETWORK FOR WAVEFORM GENERATION	5764
<i>Zhen Zeng, Jianzong Wang, Ning Cheng, Jing Xiao, Ping An Technology (Shenzhen) Co., Ltd., China</i>	

SPE-16: SPEECH SYNTHESIS 4: FRONT-END

SPE-16.1: GRAPHSPEECH: SYNTAX-AWARE GRAPH ATTENTION NETWORK FOR NEURAL SPEECH SYNTHESIS 5769

Rui Liu, National University of Singapore, Singapore; Berrak Sisman, Singapore University of Technology and Design, Singapore; Haizhou Li, National University of Singapore, Singapore

SPE-16.2: SYNTACTIC REPRESENTATION LEARNING FOR NEURAL NETWORK BASED TTS WITH SYNTACTIC PARSE TREE TRAVERSAL 5774

Changhe Song, Jingbei Li, Yixuan Zhou, Zhiyong Wu, Tsinghua University, China; Helen Meng, The Chinese University of Hong Kong, China

SPE-16.3: A CHAPTER-WISE UNDERSTANDING SYSTEM FOR TEXT-TO-SPEECH IN CHINESE NOVELS 5779

Junjie Pan, Lin Wu, Xiang Yin, Pengfei Wu, Chenchang Xu, Zejun Ma, Bytedance, China

SPE-16.4: A UNIVERSAL BERT-BASED FRONT-END MODEL FOR MANDARIN TEXT-TO-SPEECH SYNTHESIS 5784

Zilong Bai, Beibei Hu, Ajmide Media Co., Ltd., China

SPE-16.5: IMPROVING PROSODY MODELLING WITH CROSS-UTTERANCE BERT EMBEDDINGS FOR END-TO-END SPEECH SYNTHESIS 5789

Guanghui Xu, Wei Song, Zhengchen Zhang, Chao Zhang, Xiaodong He, Bowen Zhou, jd.com, China

SPE-17: SPEECH ENHANCEMENT 3: TARGET SPEECH EXTRACTION

SPE-17.1: TIME-DOMAIN SPEECH EXTRACTION WITH SPATIAL INFORMATION AND MULTI SPEAKER CONDITIONING MECHANISM 6534

Jisi Zhang, University of Sheffield, United Kingdom; Cătălin Zorilă, Rama Doddipatla, Toshiba Cambridge Research Laboratory, United Kingdom; Jon Barker, University of Sheffield, United Kingdom

SPE-17.2: ADL-MVDR: ALL DEEP LEARNING MVDR BEAMFORMER FOR TARGET SPEECH SEPARATION 6539

Zhuohuang Zhang, Indiana University, United States; Yong Xu, Meng Yu, Shi-Xiong Zhang, Lianwu Chen, Dong Yu, Tencent, United States

SPE-17.3: MULTI-CHANNEL TARGET SPEECH EXTRACTION WITH CHANNEL DECORRELATION AND TARGET SPEAKER ADAPTATION 6544

Jiangyu Han, Xinyuan Zhou, Yanhua Long, Shanghai Normal University, China; Yijie Li, Unisound AI Technology Co., Ltd., China

SPE-17.4: SPEAKER ACTIVITY DRIVEN NEURAL SPEECH EXTRACTION 6549

Marc Delcroix, NTT Corporation, Japan; Katerina Zmolikova, Brno University of Technology, Czechia; Tsubasa Ochiai, Keisuke Kinoshita, Tomohiro Nakatani, NTT Corporation, Japan

SPE-17.5: WASE: LEARNING WHEN TO ATTEND FOR SPEAKER EXTRACTION IN COCKTAIL PARTY ENVIRONMENTS 6554

Yunzhe Hao, Jiaming Xu, Peng Zhang, Bo Xu, Institute of Automation, Chinese Academy of Sciences, China

SPE-17.6: MULTI-STAGE SPEAKER EXTRACTION WITH UTTERANCE AND FRAME-LEVEL REFERENCE SIGNALS 6559

Meng Ge, Tianjin University, China; Chenglin Xu, National University of Singapore, China; Longbiao Wang, Tianjin University, China; Eng Siong Chng, Nanyang Technological University, Singapore; Jianwu Dang, Tianjin University, China; Haizhou Li, National University of Singapore, Singapore

SPE-18: SPEECH ENHANCEMENT 4: MULTI-CHANNEL PROCESSING

SPE-18.1: NEURAL NETWORK-BASED VIRTUAL MICROPHONE ESTIMATOR 6564
Tsubasa Ochiai, Marc Delcroix, Tomohiro Nakatani, Rintaro Ikeshita, Keisuke Kinoshita, Shoko Araki, NTT Corporation, Japan

SPE-18.2: JOINT MAXIMUM LIKELIHOOD ESTIMATION OF POWER SPECTRAL DENSITIES AND RELATIVE ACOUSTIC TRANSFER FUNCTIONS FOR ACOUSTIC BEAMFORMING 6569
Poul Hoang, Demant A/S, Denmark; Zheng-Hua Tan, Aalborg University, Denmark; Jan Mark de Han, Jesper Jensen, Demant A/S, Denmark

SPE-18.3: CUE-PRESERVING MMSE FILTER WITH BAYESIAN SNR MARGINALIZATION FOR BINAURAL SPEECH ENHANCEMENT 6574
Stefan Thaleiser, Gerald Enzner, Ruhr-Universität Bochum, Germany

SPE-18.4: BLIND AND NEURAL NETWORK-GUIDED CONVOLUTIONAL BEAMFORMER FOR JOINT DENOISING, DEREVERBERATION, AND SOURCE SEPARATION 6579
Tomohiro Nakatani, Rintaro Ikeshita, Keisuke Kinoshita, Hiroshi Sawada, Shoko Araki, NTT Corporation, Japan

SPE-18.5: REAL-TIME SPEECH ENHANCEMENT FOR MOBILE COMMUNICATION BASED ON DUAL-CHANNEL COMPLEX SPECTRAL MAPPING 6584
Ke Tan, The Ohio State University, United States; Xueliang Zhang, Inner Mongolia University, China; DeLiang Wang, The Ohio State University, United States

SPE-18.6: DON'T SHOOT BUTTERFLY WITH RIFLES: MULTI-CHANNEL CONTINUOUS SPEECH SEPARATION WITH EARLY EXIT TRANSFORMER 6589
Sanyuan Chen, Harbin Institute of Technology, China; Yu Wu, Zhuo Chen, Takuya Yoshioka, Shujie Liu, Jinyu Li, Microsoft Corporation, China; Xiangzhan Yu, Harbin Institute of Technology, China

SPE-19: SPEAKER RECOGNITION 3: ATTENTION AND ADVERSARIAL

SPE-19.1: DOUBLE MULTI-HEAD ATTENTION FOR SPEAKER VERIFICATION 5999
Miquel India Massana, Pooyan Safari, Javier Hernando, Universitat Politècnica de Catalunya, Spain

SPE-19.2: GRAPH ATTENTION NETWORKS FOR SPEAKER VERIFICATION 6004
Jee-weon Jung, University of Seoul, South Korea; Hee-Soo Heo, Naver Corporation, South Korea; Ha-Jin Yu, University of Seoul, South Korea; Joon Son Chung, Naver Corporation, South Korea

SPE-19.3: MEMORY LAYERS WITH MULTI-HEAD ATTENTION MECHANISMS FOR TEXT-DEPENDENT SPEAKER VERIFICATION 6009
Victoria Mingote, Antonio Miguel, Alfonso Ortega, Eduardo Lleida, Vivolab - Universidad de Zaragoza, Spain

SPE-19.4: FOOLHD: FOOLING SPEAKER IDENTIFICATION BY HIGHLY IMPERCEPTIBLE ADVERSARIAL DISTURBANCES 6014
Ali Shahin Shamsabadi, Queen Mary University of London, United Kingdom; Francisco Sepúlveda Teixeira, Alberto Abad, University of Lisbon, Portugal; Bhiksha Raj, Carnegie Mellon University, United States; Andrea Cavallaro, Queen Mary University of London, United Kingdom; Isabel Trancoso, University of Lisbon, Portugal

SPE-19.5: ADVERSARIAL DEFENSE FOR DEEP SPEAKER RECOGNITION USING HYBRID ADVERSARIAL TRAINING 6019
Monisankha Pal, Arindam Jati, Raghuvveer Peri, Chin-Cheng Hsu, Wael AbdAlmageed, Shrikanth Narayanan, University of Southern California, United States

SPE-19.6: DEEAN: DISENTANGLED EMBEDDING AND ADVERSARIAL ADAPTATION NETWORK FOR ROBUST SPEAKER REPRESENTATION LEARNING 6024
Mufan Sang, Wei Xia, John H.L. Hansen, University of Texas at Dallas, United States

SPE-20: SPEAKER RECOGNITION 4: APPLICATIONS

- SPE-20.1: PLAYING A PART: SPEAKER VERIFICATION AT THE MOVIES..... 6029**
Andrew Brown, Jaesung Huh, Arsha Nagrani, University of Oxford, United Kingdom; Joon Son Chung, Naver Corporation, South Korea; Andrew Zisserman, University of Oxford, United Kingdom
- SPE-20.2: SMALL FOOTPRINT TEXT-INDEPENDENT SPEAKER VERIFICATION FOR EMBEDDED SYSTEMS 6034**
Julien Balian, Raffaele Tavarone, Mathieu Poumeyrol, Alice Coucke, Sonos Inc., France
- SPE-20.3: ASV-SUBTOOLS: OPEN SOURCE TOOLKIT FOR AUTOMATIC SPEAKER VERIFICATION 6039**
Fuchuan Tong, Miao Zhao, Jianfeng Zhou, Hao Lu, Zheng Li, Lin Li, Qingyang Hong, Xiamen University, China
- SPE-20.4: DEEPTALK: VOCAL STYLE ENCODING FOR SPEAKER RECOGNITION AND SPEECH SYNTHESIS 6044**
Anurag Chowdhury, Arun Ross, Prabu David, Michigan State University, United States
- SPE-20.6: A MULTI-VIEW APPROACH TO AUDIO-VISUAL SPEAKER VERIFICATION..... 6049**
Leda Sari, University of Illinois at Urbana-Champaign, United States; Kritika Singh, Jiatong Zhou, Lorenzo Torresani, Nayan Singhal, Yatharth Saraf, Facebook AI, United States

SPE-21: SPEECH RECOGNITION 7: TRAINING METHODS FOR END-TO-END MODELING

- SPE-21.1: TOP-DOWN ATTENTION IN END-TO-END SPOKEN LANGUAGE UNDERSTANDING 6884**
Yixin Chen, University of California, Los Angeles, United States; Weiyi Lu, Alejandro Mottini, Li Erran Li, Jasha Droppo, Zheng Du, Belinda Zeng, Amazon Alexa, United States
- SPE-21.2: FINE-TUNING OF PRE-TRAINED END-TO-END SPEECH RECOGNITION WITH GENERATIVE ADVERSARIAL NETWORKS 6889**
Md. Akmal Haidar, Mehdi Rezagholizadeh, Huawei Noah's Ark Lab, Canada
- SPE-21.3: A GENERAL MULTI-TASK LEARNING FRAMEWORK TO LEVERAGE TEXT DATA FOR SPEECH TO TEXT TASKS 6894**
Yun Tang, Juan Pino, Changhan Wang, Facebook, United States; Xutai Ma, Johns Hopkins University, United States; Dmitry Genzel, Facebook, United States
- SPE-21.4: GAUSSIAN KERNELIZED SELF-ATTENTION FOR LONG SEQUENCE DATA AND ITS APPLICATION TO CTC-BASED SPEECH RECOGNITION 6899**
Yosuke Kashiwagi, Emiru Tsunoo, Sony Corporation, Japan; Shinji Watanabe, Johns Hopkins University, United States
- SPE-21.5: LATTICE-FREE MMI ADAPTATION OF SELF-SUPERVISED PRETRAINED ACOUSTIC MODELS 6904**
Apoorv Vyas, Idiap Research Institute and EPFL, Switzerland; Srikanth Madikeri, Hervé Boudlard, Idiap Research Institute, Switzerland
- SPE-21.6: INTERMEDIATE LOSS REGULARIZATION FOR CTC-BASED SPEECH RECOGNITION 6909**
Jaesong Lee, Naver Corporation, South Korea; Shinji Watanabe, Johns Hopkins University, United States

SPE-22: SPEECH RECOGNITION 8: MULTILINGUAL SPEECH RECOGNITION

- SPE-22.1: CODE-SWITCH SPEECH RESCORING WITH MONOLINGUAL DATA..... 6914**
Guoyu Liu, Lixin Cao, Tencent, China

SPE-22.2: MIXTURE OF INFORMED EXPERTS FOR MULTILINGUAL SPEECH RECOGNITION	6919
<i>Neeraj Gaur, Brian Farris, Parisa Haghani, Isabel Leal, Pedro J. Moreno, Manasa Prasad, Bhuvana Ramabhadran, Yun Zhu, Google Inc., United States</i>	
SPE-22.3: REDUCING SPELLING INCONSISTENCIES IN CODE-SWITCHING ASR USING CONTEXTUALIZED CTC LOSS	6924
<i>Burin Naowarat, Thananchai Kongthaworn, Chulalongkorn University, Thailand; Korrawe Karunratanakul, ETH Zurich, Switzerland; Sheng Hui Wu, NewEra AI Robotics, Taiwan; Ekapol Chuangsuwanich, Chulalongkorn University, Thailand</i>	
SPE-22.4: MULTI-DIALECT SPEECH RECOGNITION IN ENGLISH USING ATTENTION ON ENSEMBLE OF EXPERTS	6929
<i>Amit Das, Kshitiz Kumar, Jian Wu, Microsoft, United States</i>	
SPE-22.5: DECOUPLING PRONUNCIATION AND LANGUAGE FOR END-TO-END CODE-SWITCHING AUTOMATIC SPEECH RECOGNITION	6934
<i>Shuai Zhang, School of Artificial Intelligence, University of Chinese Academy of Sciences, China; Jiangyan Yi, Institute of Automation, Chinese Academy of Sciences, China; Zhengkun Tian, Ye Bai, Jianhua Tao, Zhengqi Wen, School of Artificial Intelligence, University of Chinese Academy of Sciences, China</i>	
SPE-22.6: AISPEECH-SJTU ACCENT IDENTIFICATION SYSTEM FOR THE ACCENTED ENGLISH SPEECH RECOGNITION CHALLENGE	6939
<i>Houjun Huang, Xu Xiang, AISpeech Ltd, Suzhou, China; Yexin Yang, Rao Ma, Yanmin Qian, Shanghai Jiao Tong University, China</i>	
 SPE-23: SPEECH EMOTION 1: SPEECH EMOTION RECOGNITION	
SPE-23.1: META-LEARNING FOR LOW-RESOURCE SPEECH EMOTION RECOGNITION	6234
<i>Suransh Chopra, MIDAS, IIIT-Delhi, India; Puneet Mathur, University of Maryland, College Park, United States; Ramit Sawhney, MIDAS, IIIT-Delhi, India; Rajiv Ratn Shah, MIDAS, IIIT Delhi, India</i>	
SPE-23.2: PROGRESSIVE CO-TEACHING FOR AMBIGUOUS SPEECH EMOTION RECOGNITION	6239
<i>Yifei Yin, Yu Gu, Longshan Yao, Ying Zhou, Xuefeng Liang, Xidian University, China; He Zhang, Northwest University, China</i>	
SPE-23.3: EMOTION RECOGNITION BY FUSING TIME SYNCHRONOUS AND TIME ASYNCHRONOUS REPRESENTATIONS	6244
<i>Wen Wu, Chao Zhang, Phil Woodland, University of Cambridge, United Kingdom</i>	
SPE-23.4: SPEECH EMOTION RECOGNITION BASED ON LISTENER ADAPTIVE MODELS	6249
<i>Atsushi Ando, Ryo Masumura, Hiroshi Sato, Takafumi Moriya, Takanori Ashihara, Yusuke Ijima, NTT Corporation, Japan; Tomoki Toda, Nagoya University, Japan</i>	
SPE-23.5: SPEECH EMOTION RECOGNITION USING SEMANTIC INFORMATION	6254
<i>Panagiotis Tzirakis, Anh Nguyen, Stefanos Zafeiriou, Björn Schuller, Imperial College London, United Kingdom</i>	
SPE-23.6: COMPACT GRAPH ARCHITECTURE FOR SPEECH EMOTION RECOGNITION	6259
<i>Amir Shirian, Tanaya Guha, University of Warwick, United Kingdom</i>	

SPE-24: SPEECH EMOTION 2: NEURAL NETWORKS FOR SPEECH EMOTION RECOGNITION

SPE-24.1: A NOVEL END-TO-END SPEECH EMOTION RECOGNITION NETWORK 6264 WITH STACKED TRANSFORMER LAYERS

Xianfeng Wang, Min Wang, Wenbo Qi, Wanqi Su, Xiangqian Wang, Huan Zhou, Artificial Intelligence Application Research Center, Huawei Technologies, China

SPE-24.2: A NOVEL ATTENTION-BASED GATED RECURRENT UNIT AND ITS 6269 EFFICACY IN SPEECH EMOTION RECOGNITION

Srividya Tirunellai Rajamani, University of Augsburg, Germany; Kumar T. Rajamani, University of Lübeck, Germany; Adria Mallol-Ragolta, Shuo Liu, Björn Schuller, University of Augsburg, Germany

SPE-24.3: MAEC: MULTI-INSTANCE LEARNING WITH AN ADVERSARIAL 6274 AUTO-ENCODER-BASED CLASSIFIER FOR SPEECH EMOTION RECOGNITION

Changzeng Fu, Osaka University, Japan; Chaoran Liu, Carlos Toshinori Ishi, Advanced Telecommunications Research Institute International, Japan; Hiroshi Ishiguro, Osaka University, Japan

SPE-24.4: REPRESENTATION LEARNING WITH SPECTRO-TEMPORAL-CHANNEL 6279 ATTENTION FOR SPEECH EMOTION RECOGNITION

Lili Guo, Longbiao Wang, Tianjin University, China; Chenglin Xu, National University of Singapore, Singapore; Jianwu Dang, Tianjin University, China; Eng Siong Chng, Nanyang Technological University, Singapore; Haizhou Li, National University of Singapore, Singapore

SPE-24.5: SPEECH EMOTION RECOGNITION USING QUATERNION 6284 CONVOLUTIONAL NEURAL NETWORKS

Aneesh Muppidi, Martin Radfar, Stony Brook University, United States

SPE-24.6: DOMAIN-ADVERSARIAL AUTOENCODER WITH ATTENTION BASED 6289 FEATURE LEVEL FUSION FOR SPEECH EMOTION RECOGNITION

Yuan Gao, Jiaxing Liu, Longbiao Wang, Tianjin University, China; Jianwu Dang, Japan Advanced Institute of Science and Technology, Japan

SPE-25: SPEECH EMOTION 3: EMOTION RECOGNITION - REPRESENTATIONS, DATA AUGMENTATION

SPE-25.1: SPEECH EMOTION RECOGNITION WITH MULTISCALE AREA ATTENTION 6294 AND DATA AUGMENTATION

Mingke Xu, Nanjing Tech University, China; Fan Zhang, Xiaodong Cui, Wei Zhang, IBM Watson Group, United States

SPE-25.2: COPYPASTE: AN AUGMENTATION METHOD FOR SPEECH EMOTION 6299 RECOGNITION

Raghavendra Pappagari, Jesús Villalba, Piotr Zelasko, Laureano Moro-Velázquez, Najim Dehak, Johns Hopkins University, United States

SPE-25.3: CONTRASTIVE UNSUPERVISED LEARNING FOR SPEECH EMOTION 6304 RECOGNITION

Mao Li, University of Illinois at Chicago, United States; Bo Yang, Joshua Levy, Andreas Stolcke, Viktor Rozgic, Spyros Matsoukas, Constantinos Papayiannis, Daniel Bone, Chao Wang, Amazon, United States

SPE-25.4: HIERARCHICAL NETWORK BASED ON THE FUSION OF STATIC AND 6309 DYNAMIC FEATURES FOR SPEECH EMOTION RECOGNITION

Qi Cao, Mixiao Hou, Bingzhi Chen, Zheng Zhang, Guangming Lu, Harbin Institute of Technology, Shenzhen, China

SPE-25.5: MULTIMODAL EMOTION RECOGNITION WITH CAPSULE GRAPH 6314 CONVOLUTIONAL BASED REPRESENTATION FUSION

Jiaxing Liu, Sen Chen, Longbiao Wang, Zhilei Liu, Yahui Fu, Lili Guo, Tianjin University, China; Jianwu Dang, Japan Advanced Institute of Science and Technology, Japan

SPE-25.6: DISENTANGLEMENT FOR AUDIO-VISUAL EMOTION RECOGNITION USING MULTITASK SETUP	6319
<i>Raghuveer Peri, University of Southern California, United States; Srinivas Parthasarathy, Charles Bradshaw, Shiva Sundaram, Amazon Inc, United States</i>	
 SPE-26: SPEAKER VERIFICATION SPOOFING AND COUNTERMEASURES	
SPE-26.1: DATA AUGMENTATION WITH SIGNAL COMPANDING FOR DETECTION OF LOGICAL ACCESS ATTACKS	6084
<i>Rohan Kumar Das, Jichen Yang, Haizhou Li, National University of Singapore, Singapore</i>	
SPE-26.2: REPLAY AND SYNTHETIC SPEECH DETECTION WITH RES2NET ARCHITECTURE	6089
<i>Xu Li, The Chinese University of Hong Kong, Hong Kong SAR China; Na Li, Chao Weng, Tencent, China; Xunying Liu, The Chinese University of Hong Kong, Hong Kong SAR China; Dan Su, Dong Yu, Tencent, China; Helen Meng, The Chinese University of Hong Kong, Hong Kong SAR China</i>	
SPE-26.3: A CAPSULE NETWORK BASED APPROACH FOR DETECTION OF AUDIO SPOOFING ATTACKS	6094
<i>Anwei Luo, Enlei Li, Sun Yat-sen University, China; Yongliang Liu, Alibaba Group, China; Xiangui Kang, Sun Yat-sen University, China; Z. Jane Wang, University of British Columbia, Canada</i>	
SPE-26.4: CROSS-TEAGER ENERGY CEPSTRAL COEFFICIENTS FOR REPLAY SPOOF DETECTION ON VOICE ASSISTANTS	6099
<i>Rajul Acharya, Harsh Kotta, Ankur T. Patil, Hemant A. Patil, Dhirubhai Ambani Institute of Information and Communication Technology, India</i>	
SPE-26.5: END-TO-END ANTI-SPOOFING WITH RAWNET2	6104
<i>Hemlata Tak, Jose Patino, Massimiliano Todisco, Andreas Nautsch, Nicholas Evans, EURECOM, France; Anthony Larcher, Université du Maine, France</i>	
SPE-26.6: REPLAY-ATTACK DETECTION USING FEATURES WITH ADAPTIVE SPECTRO-TEMPORAL RESOLUTION	6109
<i>Meng Liu, Longbiao Wang, Tianjin University, China; Kong Aik Lee, Agency for Science, Technology and Research (A*STAR), Singapore; Xuanda Chen, Chinese Academy of Social Sciences, China; Jianwu Dang, Japan Advanced Institute of Science and Technology, Japan</i>	
 SPE-27: SPEECH RECOGNITION 9: CONFIDENCE MEASURES	
SPE-27.1: IMPROVING IDENTIFICATION OF SYSTEM-DIRECTED SPEECH UTTERANCES BY DEEP LEARNING OF ASR-BASED WORD EMBEDDINGS AND CONFIDENCE METRICS	6944
<i>Vilayphone Vilaysouk, Mila, Université de Montréal, Canada; Amr Nour-Eldin, Dermot Connolly, Nuance Communications, Canada</i>	
SPE-27.2: BLSTM-BASED CONFIDENCE ESTIMATION FOR END-TO-END SPEECH RECOGNITION	6948
<i>Atsunori Ogawa, Naohiro Tawara, Takatomo Kano, Marc Delcroix, NTT Corporation, Japan</i>	
SPE-27.3: CONFIDENCE ESTIMATION FOR ATTENTION-BASED SEQUENCE-TO-SEQUENCE MODELS FOR SPEECH RECOGNITION	6953
<i>Qiuqia Li, University of Cambridge, United Kingdom; David Qiu, Yu Zhang, Bo Li, Yanzhang He, Google LLC, United States; Phil Woodland, University of Cambridge, United Kingdom; Liangliang Cao, Trevor Strohman, Google LLC, United States</i>	

SPE-27.4: LEARNING WORD-LEVEL CONFIDENCE FOR SUBWORD END-TO-END ASR	6958
<i>David Qiu, Google, United States; Qiuqia Li, University of Cambridge, United Kingdom; Yanzhang He, Yu Zhang, Bo Li, Liangliang Cao, Rohit Prabhavalkar, Deepti Bhatia, Wei Li, Ke Hu, Tara N. Sainath, Ian McGraw, Google, United States</i>	
SPE-27.5: NEURAL UTTERANCE CONFIDENCE MEASURE FOR RNN-TRANSDUCERS AND TWO PASS MODELS	6963
<i>Ashutosh Gupta, Ankur Kumar, Samsung Research Institute, Bangalore, India; Dhananjaya Gowda, Kwangyoum Kim, Samsung Research Korea, South Korea; Sachin Singh, Samsung Bangalore, India; Shatrughan Singh, Samsung Research, India; Chanwoo Kim, Samsung Korea, South Korea</i>	
SPE-27.6: DETECTING ADVERSARIAL ATTACKS ON AUDIOVISUAL SPEECH RECOGNITION	6968
<i>Pingchuan Ma, Petridis Stavros, Maja Pantic, Imperial College London, United Kingdom</i>	
SPE-28: SPEECH RECOGNITION 10: ROBUSTNESS TO HUMAN SPEECH VARIABILITY	
SPE-28.1: REDAT: ACCENT-INVARIANT REPRESENTATION FOR END-TO-END ASR BY DOMAIN ADVERSARIAL TRAINING WITH RELABELING	6973
<i>Hu Hu, Georgia Institute of Technology, United States; Xuesong Yang, Zeynab Raeesy, Jinxi Guo, Gokce Keskin, Harish Arsikere, Ariya Rastrow, Andreas Stolcke, Roland Maas, Amazon Alexa Speech, United States</i>	
SPE-28.2: AISPEECH-SJTU ASR SYSTEM FOR THE ACCENTED ENGLISH SPEECH RECOGNITION CHALLENGE	6978
<i>Tian Tan, Aispeech, China; Yizhou Lu, Rao Ma, Shanghai Jiao Tong University, China; Sen Zhu, Jiaqi Guo, Aispeech, China; Yanmin Qian, Shanghai Jiao Tong University, China</i>	
SPE-28.3: END-TO-END MULTI-ACCENT SPEECH RECOGNITION WITH UNSUPERVISED ACCENT MODELLING	6983
<i>Song Li, Beibei Ouyang, Dexin Liao, Shipeng Xia, Lin Li, Qingyang Hong, Xiamen University, China</i>	
SPE-28.4: A COMPARATIVE STUDY OF ACOUSTIC AND LINGUISTIC FEATURES CLASSIFICATION FOR ALZHEIMER'S DISEASE DETECTION	6988
<i>Jinchao Li, Jianwei Yu, Ye Zi, Simon Wong, The Chinese University of Hong Kong, Hong Kong SAR China; Manwai Mak, The Hong Kong Polytechnic University, Hong Kong SAR China; Brian Mak, The Hong Kong University of Science and Technology, Hong Kong SAR China; Xunying Liu, Helen Meng, The Chinese University of Hong Kong, Hong Kong SAR China</i>	
SPE-28.5: SYNTHESIS OF NEW WORDS FOR IMPROVED DYSARTHIC SPEECH RECOGNITION ON AN EXPANDED VOCABULARY	6993
<i>John Harvill, University of Illinois at Urbana-Champaign, United States; Dias Issa, Korea Advanced Institute of Science and Technology (KAIST), South Korea; Mark Hasegawa-Johnson, University of Illinois at Urbana-Champaign, United States; Changdong Yoo, Korea Advanced Institute of Science and Technology (KAIST), South Korea</i>	
SPE-28.6: DEVELOPMENT OF THE CUHK ELDERLY SPEECH RECOGNITION SYSTEM FOR NEUROCOGNITIVE DISORDER DETECTION USING THE DEMENTIABANK CORPUS	6998
<i>Zi Ye, Shoukang Hu, Jinchao Li, Xurong Xie, Mengzhe Geng, Jianwei Yu, Junhao Xu, Boyang Xue, Shansong Liu, Xunying Liu, Helen Meng, The Chinese University of Hong Kong, Hong Kong SAR China</i>	
SPE-29: SPEECH PROCESSING 1: PRODUCTION	
SPE-29.1: PORTABLE PHOTOGLOTTOGRAPHY FOR MONITORING VOCAL FOLD VIBRATIONS IN SPEECH PRODUCTION	6169
<i>Yujie Chi, Kiyoshi Honda, Jianguo Wei, Tianjin Univesity, China</i>	

SPE-29.2: IMPROVING ULTRASOUND TONGUE CONTOUR EXTRACTION USING U-NET AND SHAPE CONSISTENCY-BASED REGULARIZER	6174
<i>Ming Feng, Yin Wang, Tongji University, China; Kele Xu, Huaimin Wang, Bo Ding, National University of Defense Technology, China</i>	
SPE-29.3: IMPACT OF SPEAKING RATE ON THE SOURCE FILTER INTERACTION IN SPEECH: A STUDY	6179
<i>Tilak Purohit, Achuth Rao M V, Prasanta Kumar Ghosh, Indian Institute of Science, India</i>	
SPE-29.4: A TWO-STAGE DEEP MODELING APPROACH TO ARTICULATORY INVERSION	6184
<i>Abdolreza Sabzi Shahrehabaki, Negar Olfati, Ali Shariq Imran, Magne Hallstein Johnsen, Norwegian University of Science and Technology, Norway; Sabato Marco Siniscalchi, Kore University of Enna, Italy; Torbjørn Karl Svendsen, Norwegian University of Science and Technology, Norway</i>	
SPE-29.5: ACOUSTIC-TO-ARTICULATORY INVERSION FOR DYSARTHIC SPEECH BY USING CROSS-CORPUS ACOUSTIC-ARTICULATORY DATA	6189
<i>Sarthak Kumar Maharana, Aravind Illa, Renuka Mannem, Indian Institute of Science, Bengaluru, India; Yamini Belur, Preetie Shetty, Veeramani Preethish Kumar, Seena Vengalil, Kiran Polavarapu, Nalini Atchayaram, National Institute of Mental Health and Neurosciences, India; Prasanta Kumar Ghosh, Indian Institute of Science, Bengaluru, India</i>	
SPE-29.6: SPEAKING RATE AND TONAL REALIZATION IN MANDARIN CHINESE: WHAT CAN WE LEARN FROM LARGE SPEECH CORPORA?	6194
<i>Jiahong Yuan, Kenneth Church, Baidu Research, USA, United States</i>	
 SPE-30: SPEECH PROCESSING 2: GENERAL TOPICS	
SPE-30.1: HUMANACGAN: CONDITIONAL GENERATIVE ADVERSARIAL NETWORK WITH HUMAN-BASED AUXILIARY CLASSIFIER AND ITS EVALUATION IN PHONEME PERCEPTION	6199
<i>Yota Ueda, University of Tokyo, Japan; Kazuki Fujii, National Institute of Technology, Tokuyama College, Japan; Yuki Saito, Shinnosuke Takamichi, University of Tokyo, Japan; Yukino Baba, University of Tsukuba, Japan; Hiroshi Saruwatari, University of Tokyo, Japan</i>	
SPE-30.2: IMPROVING AUDIO ANOMALIES RECOGNITION USING TEMPORAL CONVOLUTIONAL ATTENTION NETWORK	6204
<i>Qiang Huang, Thomas Hain, University of Sheffield, United Kingdom</i>	
SPE-30.3: GENERATIVE SPEECH CODING WITH PREDICTIVE VARIANCE REGULARIZATION	6209
<i>W Bastiaan Kleijn, Victoria University of Wellington, New Zealand; Andrew Storus, Michael Chinen, Tom Denton, Felicia S. C. Lim, Alejandro Luebs, Jan Skoglund, Hengchin Yeh, Google, United States</i>	
SPE-30.4: HOW TO MAKE TEXT-TO-SPEECH SYSTEM PRONOUNCE “VOLDEMORT”: AN EXPERIMENTAL APPROACH OF FOREIGN WORD PHONEMIZATION IN VIETNAMESE	6214
<i>Dang-Khoa Mac, Van-Huy Nguyen, Dinh-Nghi Nguyen, Kim-Anh Nguyen, Vingroup Big Data Institute, Vietnam</i>	
SPE-30.5: HOW SIMILAR OR DIFFERENT IS RAKUGO SPEECH SYNTHESIZER TO PROFESSIONAL PERFORMERS?	6219
<i>Shuhei Kato, Yusuke Yasuda, Xin Wang, Erica Cooper, Junichi Yamagishi, National Institute of Informatics, Japan</i>	
SPE-30.6: DNSMOS: A NON-INTRUSIVE PERCEPTUAL OBJECTIVE SPEECH QUALITY METRIC TO EVALUATE NOISE SUPPRESSORS	6224
<i>Chandan Karadagur Ananda Reddy, Vishak Gopal, Ross Cutler, Microsoft, United States</i>	
SPE-30.7: A CAUSAL DEEP LEARNING FRAMEWORK FOR CLASSIFYING PHONEMES IN COCHLEAR IMPLANTS	6229
<i>Kevin Chu, Leslie Collins, Boyla Mainsah, Duke University, United States</i>	

SPE-31: SPEECH RECOGNITION 11: NOVEL APPROACHES

SPE-31.1: MINIMUM BAYES RISK TRAINING FOR END-TO-END 7003 SPEAKER-ATTRIBUTED ASR

Naoyuki Kanda, Zhong Meng, Liang Lu, Yashesh Gaur, Xiaofei Wang, Zhuo Chen, Takuya Yoshioka, Microsoft, United States

SPE-31.2: MUTUALLY-CONSTRAINED MONOTONIC MULTIHEAD ATTENTION FOR 7008 ONLINE ASR

Jaeyun Song, Hajin Shim, Eunho Yang, Korea Advanced Institute of Science and Technology (KAIST), South Korea

SPE-31.3: THE USE OF VOICE SOURCE FEATURES FOR SUNG SPEECH 7013 RECOGNITION

Gerardo Roa Dabike, Jon Barker, University of Sheffield, United Kingdom

SPE-31.4: A PARALLELIZABLE LATTICE RESCORING STRATEGY WITH NEURAL 7018 LANGUAGE MODELS

Ke Li, Johns Hopkins University, United States; Daniel Povey, Xiaomi Corp., China; Sanjeev Khudanpur, Johns Hopkins University, United States

SPE-31.5: DECENTRALIZING FEATURE EXTRACTION WITH QUANTUM 7023 CONVOLUTIONAL NEURAL NETWORK FOR AUTOMATIC SPEECH RECOGNITION

Chao-Han Huck Yang, Jun Qi, Georgia Institute of Technology, United States; Pin-Yu Chen, IBM Research, United States; Yen-Chi Samuel Chen, Brookhaven National Laboratory, United States; Sabato Marco Siniscalchi, University of Enna, Italy; Xiaoli Ma, Brookhaven National Laboratory, United States; Chin-Hui Lee, Georgia Institute of Technology, United States

SPE-31.6: CIF-BASED COLLABORATIVE DECODING FOR END-TO-END 7028 CONTEXTUAL SPEECH RECOGNITION

Minglun Han, Linhao Dong, Shiyu Zhou, Bo Xu, Institute of Automation, Chinese Academy of Sciences, China

SPE-32: SPEECH RECOGNITION 12: SELF-SUPERVISED, SEMI-SUPERVISED, UNSUPERVISED TRAINING

SPE-32.1: HUBERT: HOW MUCH CAN A BAD TEACHER BENEFIT ASR 7033 PRE-TRAINING?

Wei-Ning Hsu, Facebook AI Research, United States; Yao-Hung Hubert Tsai, Carnegie Mellon University, United States; Benjamin Bolte, Facebook AI Research, United States; Ruslan Salakhutdinov, Carnegie Mellon University, United States; Abdelrahman Mohamed, Facebook AI Research, United States

SPE-32.2: A FURTHER STUDY OF UNSUPERVISED PRETRAINING FOR 7038 TRANSFORMER BASED SPEECH RECOGNITION

Dongwei Jiang, Wubo Li, Ruixiong Zhang, Miao Cao, Ne Luo, Yang Han, Wei Zou, Kun Han, Xiangang Li, Didi Chuxing, China

SPE-32.3: PRE-TRAINING TRANSFORMER DECODER FOR END-TO-END ASR 7043 MODEL WITH UNPAIRED TEXT DATA

Changfeng Gao, Gaofeng Cheng, Runyan Yang, Han Zhu, Pengyuan Zhang, Yonghong Yan, Key Laboratory of Speech Acoustics and Content Understanding, China

SPE-32.4: SEMI-SUPERVISED SPEECH RECOGNITION VIA GRAPH-BASED 7048 TEMPORAL CLASSIFICATION

Niko Moritz, Takaaki Hori, Jonathan Le Roux, Mitsubishi Electric Research Laboratories (MERL), United States

SPE-32.5: UNSUPERVISED DOMAIN ADAPTATION FOR SPEECH RECOGNITION VIA 7053 UNCERTAINTY DRIVEN SELF-TRAINING

Sameer Khurana, Massachusetts Institute of Technology, United States; Niko Moritz, Takaaki Hori, Jonathan Le Roux, Mitsubishi Electric Research Laboratories (MERL), United States

SPE-32.6: IMPROVING STREAMING AUTOMATIC SPEECH RECOGNITION WITH NON-STREAMING MODEL DISTILLATION ON UNSUPERVISED DATA	7058
<i>Thibault Doutré, Wei Han, Min Ma, Zhiyun Lu, Chung-Cheng Chiu, Ruoming Pang, Arun Narayanan, Ananya Misra, Yu Zhang, Liangliang Cao, Google Inc., United States</i>	
 SPE-33: SPEECH SYNTHESIS 5: PROSODY & STYLE	
SPE-33.1: SPEECH BERT EMBEDDING FOR IMPROVING PROSODY IN NEURAL TTS	5794
<i>Liping Chen, Yan Deng, Xi Wang, Frank K. Soong, Lei He, Microsoft, China</i>	
SPE-33.2: BI-LEVEL STYLE AND PROSODY DECOUPLING MODELING FOR PERSONALIZED END-TO-END SPEECH SYNTHESIS	5799
<i>Ruibo Fu, Jianhua Tao, Zhengqi Wen, Jiangyan Yi, Tao Wang, Chunyu Qiang, National Laboratory of Pattern Recognition, Institute of Automation, Chinese Academy of Sciences, China</i>	
SPE-33.3: PROSODIC REPRESENTATION LEARNING AND CONTEXTUAL SAMPLING FOR NEURAL TEXT-TO-SPEECH	5804
<i>Sri Karlapati, Ammar Abbas, Amazon, United Kingdom; Zack Hodari, University of Edinburgh, United Kingdom; Alexis Moinet, Arnaud Joly, Penny Karanasou, Thomas Drugman, Amazon, United Kingdom</i>	
SPE-33.4: CAMP: A TWO-STAGE APPROACH TO MODELLING PROSODY IN CONTEXT	5809
<i>Zack Hodari, University of Edinburgh, United Kingdom; Alexis Moinet, Sri Karlapati, Jaime Lorenzo-Trueba, Thomas Merritt, Arnaud Joly, Ammar Abbas, Penny Karanasou, Thomas Drugman, Amazon, United Kingdom</i>	
SPE-33.5: UNSUPERVISED LEARNING FOR MULTI-STYLE SPEECH SYNTHESIS WITH LIMITED DATA	5814
<i>Shuang Liang, Chenfeng Miao, Minchuan Chen, Jun Ma, Shaojun Wang, Jing Xiao, Ping An Technology, China</i>	
SPE-33.6: FASTPITCH: PARALLEL TEXT-TO-SPEECH WITH PITCH PREDICTION	5819
<i>Adrian Łańcucki, NVIDIA Corporation, Poland</i>	
 SPE-34: SPEECH SYNTHESIS 6: DATA AUGMENTATION & ADAPTATION	
SPE-34.1: LOW-RESOURCE EXPRESSIVE TEXT-TO-SPEECH USING DATA AUGMENTATION	5824
<i>Goeric Huybrechts, Thomas Merritt, Giulia Comini, Bartek Perz, Raahil Shah, Jaime Lorenzo-Trueba, Amazon, United Kingdom</i>	
SPE-34.2: TTS-BY-TTS: TTS-DRIVEN DATA AUGMENTATION FOR FAST AND HIGH-QUALITY SPEECH SYNTHESIS	5829
<i>Min-Jae Hwang, Search Solutions Inc., South Korea; Ryuichi Yamamoto, LINE Corporation, Japan; Eunwoo Song, Jae-Min Kim, Naver corporation, South Korea</i>	
SPE-34.3: A NEURAL TEXT-TO-SPEECH MODEL UTILIZING BROADCAST DATA MIXED WITH BACKGROUND MUSIC	5834
<i>Hanbin Bae, Jae-Sung Bae, Young-Sun Joo, Young-Ik Kim, Hoon-Young Cho, NCSoft, South Korea</i>	
SPE-34.4: DISENTANGLED SPEAKER AND LANGUAGE REPRESENTATIONS USING MUTUAL INFORMATION MINIMIZATION AND DOMAIN ADAPTATION FOR CROSS-LINGUAL TTS	5839
<i>Detai Xin, University of Tokyo, Japan; Tatsuya Komatsu, LINE Corporation, Japan; Shinnosuke Takamichi, Hiroshi Saruwatari, University of Tokyo, Japan</i>	

SPE-34.5: ADASPEECH 2: ADAPTIVE TEXT TO SPEECH WITH UNTRANSCRIBED DATA	5844
<i>Yuzi Yan, Tsinghua University, China; Xu Tan, Microsoft Research Asia, China; Bohan Li, Microsoft Azure Speech, China; Tao Qin, Microsoft Research Asia, China; Sheng Zhao, Microsoft Azure Speech, China; Yuan Shen, Tsinghua University, China; Tie-Yan Liu, Microsoft Research Asia, China</i>	
SPE-34.6: INVESTIGATION OF FAST AND EFFICIENT METHODS FOR MULTI-SPEAKER MODELING AND SPEAKER ADAPTATION	5849
<i>Yibin Zheng, Xinhui Li, Li Lu, Tencent Inc, China</i>	
SPE-35: SPEECH ENHANCEMENT 5: DNS CHALLENGE TASK	
SPE-35.1: ICASSP 2021 DEEP NOISE SUPPRESSION CHALLENGE	6594
<i>Chandan Karadagur Ananda Reddy, Harishchandra Dubey, Vishak Gopal, Ross Cutler, Sebastian Braun, Hannes Gamper, Robert Aichner, Sriram Srinivasan, Microsoft, United States</i>	
SPE-35.2: ICASSP 2021 DEEP NOISE SUPPRESSION CHALLENGE: DECOUPLING MAGNITUDE AND PHASE OPTIMIZATION WITH A TWO-STAGE DEEP NETWORK	6599
<i>Andong Li, Wenzhe Liu, Xiaoxue Luo, Chengshi Zheng, Xiaodong Li, Institute of Acoustics, Chinese Academy of Sciences, China</i>	
SPE-35.3: FULLSUBNET: A FULL-BAND AND SUB-BAND FUSION MODEL FOR REAL-TIME SINGLE-CHANNEL SPEECH ENHANCEMENT	6604
<i>Xiang Hao, Inner Mongolia University & Westlake University & Westlake Institute for Advanced Study, China; Xiangdong Su, Inner Mongolia University, China; Radu Horaud, Inria Grenoble, China; Xiaofei Li, Westlake University & Westlake Institute for Advanced Study, China</i>	
SPE-35.4: DENSELY CONNECTED MULTI-STAGE MODEL WITH CHANNEL WISE SUBBAND FEATURE FOR REAL-TIME SPEECH ENHANCEMENT	6609
<i>JingDong Li, Dawei Luo, Yun Liu, YuanYuan Zhu, Zhaoxia Li, Guohui Cui, Wenqi Tang, Wei Chen, Sogou, China</i>	
SPE-35.5: A MODULATION-DOMAIN LOSS FOR NEURAL-NETWORK-BASED REAL-TIME SPEECH ENHANCEMENT	6614
<i>Tyler Vuong, Yangyang Xia, Richard Stern, Carnegie Mellon University, United States</i>	
SPE-35.6: MONAURAL SPEECH ENHANCEMENT WITH COMPLEX CONVOLUTIONAL BLOCK ATTENTION MODULE AND JOINT TIME FREQUENCY LOSSES	6619
<i>Shengkui Zhao, Trung Hieu Nguyen, Bin Ma, Speech Lab, Alibaba Group, Singapore</i>	
SPE-36: SPEECH ENHANCEMENT 6: MULTI-MODAL PROCESSING	
SPE-36.1: AUDIO-VISUAL SPEECH INPAINTING WITH DEEP LEARNING	6624
<i>Giovanni Morrone, University of Modena and Reggio Emilia, Italy; Daniel Michelsanti, Zheng-Hua Tan, Jesper Jensen, Aalborg University, Denmark</i>	
SPE-36.2: VSET: A MULTIMODAL TRANSFORMER FOR VISUAL SPEECH ENHANCEMENT	6629
<i>Karthik Ramesh, Chao Xing, Wupeng Wang, Huawei, Canada; Dong Wang, Tsinghua University, China; Xiao Chen, Huawei, Hong Kong SAR China</i>	
SPE-36.3: SWITCHING VARIATIONAL AUTO-ENCODERS FOR NOISE-AGNOSTIC AUDIO-VISUAL SPEECH ENHANCEMENT	6634
<i>Mostafa Sadeghi, Xavier Alameda-Pineda, Inria, Grenoble Alpes, France</i>	
SPE-36.4: AUDIO-VISUAL SPEECH ENHANCEMENT METHOD CONDITIONED ON THE LIP MOTION AND SPEAKER-DISCRIMINATIVE EMBEDDINGS	6639
<i>Koichiro Ito, Masaaki Yamamoto, Kenji Nagamatsu, Hitachi, Ltd., Japan</i>	

SPE-36.5: AUDIO-VISUAL SPEECH SEPARATION USING CROSS-MODAL 6644
CORRESPONDENCE LOSS

Naoki Makishima, Mana Ihori, Akihiko Takashima, Tomohiro Tanaka, Shota Orihashi, Ryo Masumura, NTT Media Intelligence Laboratories, NTT Corporation, Japan

SPE-36.6: MUSE: MULTI-MODAL TARGET SPEAKER EXTRACTION WITH VISUAL 6649
CUES

Zexu Pan, Ruijie Tao, Chenglin Xu, Haizhou Li, National University of Singapore, Singapore

SPE-37: SPEAKER RECOGNITION 5: NEURAL EMBEDDING

SPE-37.1: AN EFFECTIVE DEEP EMBEDDING LEARNING METHOD BASED ON 6054
DENSE-RESIDUAL NETWORKS FOR SPEAKER VERIFICATION

Ying Liu, Yan Song, National Engineering Laboratory for Speech and Language Information Processing, University of Science and Technology of China, China; Ian McLoughlin, ICT Cluster, Singapore Institute of Technology, Sint Maarten; Lin Liu, iFLYTEK Research, iFLYTEK CO., LTD., China; Li-rong Dai, National Engineering Laboratory for Speech and Language Information Processing, University of Science and Technology of China, China

SPE-37.2: TIME-DOMAIN SPEAKER VERIFICATION USING TEMPORAL 6059
CONVOLUTIONAL NETWORKS

Sangwook Han, Jaeuk Byun, Jong Won Shin, Gwangju Institute of Science and Technology, South Korea

SPE-37.3: TOWARDS ROBUST SPEAKER VERIFICATION WITH TARGET SPEAKER 6064
ENHANCEMENT

Chunlei Zhang, Meng Yu, Chao Weng, Dong Yu, Tencent AI Lab, United States

SPE-37.4: A JOINT TRAINING FRAMEWORK OF MULTI-LOOK SEPARATOR AND 6069
SPEAKER EMBEDDING EXTRACTOR FOR OVERLAPPED SPEECH

Naijun Zheng, The Chinese University of Hong Kong, Hong Kong SAR China; Na Li, Bo Wu, Meng Yu, Tencent AI Lab, China; JianWei Yu, The Chinese University of Hong Kong, Hong Kong SAR China; Chao Weng, Dan Su, Tencent AI Lab, China; XunYing Liu, Helen Meng, The Chinese University of Hong Kong, Hong Kong SAR China

SPE-37.5: CAM: CONTEXT-AWARE MASKING FOR ROBUST SPEAKER VERIFICATION 6074

Ya-Qi Yu, Nanjing University, China; Siqi Zheng, Hongbin Suo, Yun Lei, Alibaba Group, China; Wu-Jun Li, Nanjing University, China

SPE-37.6: SHORT-TIME SPECTRAL AGGREGATION FOR SPEAKER EMBEDDING 6079

Youzhi Tu, Man-Wai Mak, The Hong Kong Polytechnic University, Hong Kong SAR China

SPE-38: SPEAKER RECOGNITION 6: SELF-SUPERVISED AND UNSUPERVISED LEARNING

SPE-38.1: CONTRASTIVE SELF-SUPERVISED LEARNING FOR 5914
TEXT-INDEPENDENT SPEAKER VERIFICATION

Haoran Zhang, Yuexian Zou, Helin Wang, Peking University, China

SPE-38.2: ADVERSARIAL DEFENSE FOR AUTOMATIC SPEAKER VERIFICATION BY 5919
CASCADED SELF-SUPERVISED LEARNING MODELS

Haibin Wu, National Taiwan University, Taiwan; Xu Li, The Chinese University of Hong Kong, Hong Kong SAR China; Andy Liu, National Taiwan university, Taiwan; Zhiyong Wu, Shenzhen International Graduate School, Tsinghua University, China; Helen Meng, The Chinese University of Hong Kong, Hong Kong SAR China; Hung-yi Lee, National Taiwan University, Taiwan

SPE-38.3: SELF-SUPERVISED TEXT-INDEPENDENT SPEAKER VERIFICATION 5924
USING PROTOTYPICAL MOMENTUM CONTRASTIVE LEARNING

Wei Xia, University of Texas at Dallas, United States; Chunlei Zhang, Chao Weng, Meng Yu, Dong Yu, Tencent AI Lab, United States

SPE-38.4: AN ITERATIVE FRAMEWORK FOR SELF-SUPERVISED DEEP SPEAKER REPRESENTATION LEARNING	5929
<i>Danwei Cai, Weiqing Wang, Duke University, United States; Ming Li, Duke Kunshan University, China</i>	
SPE-38.5: IMPROVING RECONSTRUCTION LOSS BASED SPEAKER EMBEDDING IN UNSUPERVISED AND SEMI-SUPERVISED SCENARIOS	5934
<i>Jaejin Cho, Piotr Zelasko, Center for Language Speech Processing at Johns Hopkins University, United States; Jesús Villalba, Johns Hopkins University, United States; Najim Dehak, Center for Language Speech Processing at Johns Hopkins University, United States</i>	
SPE-39: SPEECH RECOGNITION 13: ACOUSTIC MODELING 1	
SPE-39.1: SPEECH ACOUSTIC MODELLING FROM RAW PHASE SPECTRUM	7063
<i>Erfan Loweimi, University of Edinburgh, United Kingdom; Zoran Cvetkovic, King's College London, United Kingdom; Peter Bell, Steve Renals, University of Edinburgh, United Kingdom</i>	
SPE-39.2: AN INVESTIGATION OF USING HYBRID MODELING UNITS FOR IMPROVING END-TO-END SPEECH RECOGNITION SYSTEM	7068
<i>Shunfei Chen, Xinhui Hu, Hithink RoyalFlush AI Research Institute, China; Sheng Li, National Institute of Information and Communications Technology, Japan; Xinkang Xu, Hithink RoyalFlush AI Research Institute, China</i>	
SPE-39.3: FEDERATED ACOUSTIC MODELING FOR AUTOMATIC SPEECH RECOGNITION	7073
<i>Xiaodong Cui, Songtao Lu, Brian Kingsbury, IBM T. J. Watson Research Center, United States</i>	
SPE-39.4: EAT: ENHANCED ASR-TTS FOR SELF-SUPERVISED SPEECH RECOGNITION	7078
<i>Murali Karthick Baskar, Lukáš Burget, Brno University of Technology, Czechia; Shinji Watanabe, Johns Hopkins University, United States; Ramon Astudillo, IBM T. J. Watson Research Center, United States; Jan “Honza” Cernocky, Brno University of Technology, Czechia</i>	
SPE-39.5: NEURAL ARCHITECTURE SEARCH FOR LF-MMI TRAINED TIME DELAY NEURAL NETWORKS	7083
<i>Shoukang Hu, Xurong Xie, Shansong Liu, Mingyu Cui, Mengzhe Geng, Xunying Liu, Helen Meng, The Chinese University of Hong Kong, Hong Kong SAR China</i>	
SPE-39.6: HYPOTHESIS STITCHER FOR END-TO-END SPEAKER-ATTRIBUTED ASR ON LONG-FORM MULTI-TALKER RECORDINGS	7088
<i>Xuankai Chang, Johns Hopkins University, United States; Naoyuki Kanda, Yashesh Gaur, Xiaofei Wang, Zhong Meng, Takuya Yoshioka, Microsoft Corporation, United States</i>	
SPE-40: SPEECH RECOGNITION 14: ACOUSTIC MODELING 2	
SPE-40.1: ENSEMBLE COMBINATION BETWEEN DIFFERENT TIME SEGMENTATIONS	7093
<i>Jeremy Heng Meng Wong, Dimitrios Dimitriadis, Kenichi Kumatani, Yashesh Gaur, George Polovets, Partha Parthasarathy, Eric Sun, Jinyu Li, Yifan Gong, Microsoft, United States</i>	
SPE-40.2: STREAMING END-TO-END SPEECH RECOGNITION WITH JOINTLY TRAINED NEURAL FEATURE ENHANCEMENT	7098
<i>Chanwoo Kim, Abhinav Garg, Dhananjaya Gowda, Seongkyu Mun, Changwoo Han, Samsung Research, South Korea</i>	
SPE-40.3: TRANSFORMER IN ACTION: A COMPARATIVE STUDY OF TRANSFORMER-BASED ACOUSTIC MODELS FOR LARGE SCALE SPEECH RECOGNITION APPLICATIONS	7103
<i>Yongqiang Wang, Yangyang Shi, Frank Zhang, Chunyang Wu, Julian Chan, Ching-Feng Yeh, Alex Xiao, Facebook, United States</i>	

SPE-40.4: EMFORMER: EFFICIENT MEMORY TRANSFORMER BASED ACOUSTIC MODEL FOR LOW LATENCY STREAMING SPEECH RECOGNITION	7108
<i>Yangyang Shi, Yongqiang Wang, Chunyang Wu, Ching-Feng Yeh, Julian Chan, Frank Zhang, Duc Le, Mike Seltzer, Facebook AI, United States</i>	
SPE-40.5: LEARNED TRANSFERABLE ARCHITECTURES CAN SURPASS HAND-DESIGNED ARCHITECTURES FOR LARGE SCALE SPEECH RECOGNITION	7113
<i>Liqiang He, Dan Su, Dong Yu, Tencent, China</i>	
SPE-40.6: MULTITASK LEARNING AND JOINT OPTIMIZATION FOR TRANSFORMER-RNN-TRANSDUCER SPEECH RECOGNITION	7118
<i>Jae-Jin Jeon, Euisung Kim, Kakaoenterprise, South Korea</i>	
SPE-41: VOICE ACTIVITY AND DISFLUENCY DETECTION	
SPE-41.1: SEP-28K: A DATASET FOR STUTTERING EVENT DETECTION FROM PODCASTS WITH PEOPLE WHO STUTTER	6439
<i>Colin Lea, Vikramjit Mitra, Aparna Joshi, Sachin Kajarekar, Jeffrey Bigham, Apple, United States</i>	
SPE-41.2: A HYBRID CNN-BILSTM VOICE ACTIVITY DETECTOR	6444
<i>Nicholas Wilkinson, Thomas Niesler, Stellenbosch University, South Africa</i>	
SPE-41.3: SELF-ATTENTIVE VAD: CONTEXT-AWARE DETECTION OF VOICE FROM NOISE	6449
<i>Yong Rae Jo, Voithru, South Korea; Young Ki Moon, Voithru, Inha University, South Korea; Won Ik Cho, Seoul National University, South Korea; Geun Sik Jo, Inha University, South Korea</i>	
SPE-41.4: PREVENTING EARLY ENDPOINTING FOR ONLINE AUTOMATIC SPEECH RECOGNITION	6454
<i>Yingzhu Zhao, Nanyang Technological University, Singapore; Chongjia Ni, Cheung-Chi Leung, Alibaba Group, Singapore; Shafiq Joty, Eng Siong Chng, Nanyang Technological University, Singapore; Bin Ma, Alibaba Group, Singapore</i>	
SPE-41.5: MARBLENET: DEEP 1D TIME-CHANNEL SEPARABLE CONVOLUTIONAL NEURAL NETWORK FOR VOICE ACTIVITY DETECTION	6459
<i>Fei Jia, Somshubra Majumdar, Boris Ginsburg, NVIDIA Corporation, United States</i>	
SPE-41.6: SPEECH ENHANCEMENT AIDED END-TO-END MULTI-TASK LEARNING FOR VOICE ACTIVITY DETECTION	6464
<i>Xu Tan, Xiao-Lei Zhang, Northwestern Polytechnical University, China</i>	
SPE-41.7: ROBUST VOICE ACTIVITY DETECTION USING A MASKED AUDITORY ENCODER BASED CONVOLUTIONAL NEURAL NETWORK	6469
<i>Nan Li, Longbiao Wang, Tianjin university, China; Masashi Unoki, Japan Advanced Institute of Science and Technology, Japan; Sheng Li, National Institute of Information and Communications Technology, Japan; Rui Wang, Japan Advanced Institute of Science and Technology, Japan; Meng Ge, Tianjin university, China; Jianwu Dang, Japan Advanced Institute of Science and Technology and Tianjin University, Japan</i>	
SPE-42: KEYWORD SPOTTING	
SPE-42.1: A STAGE MATCH FOR QUERY-BY-EXAMPLE SPOKEN TERM DETECTION BASED ON STRUCTURE INFORMATION OF QUERY	7243
<i>Junyao Zhan, Qianhua He, Jianbin Su, Yanxiong Li, South China University of Technology, China</i>	
SPE-42.2: KNOWLEDGE TRANSFER FOR EFFICIENT ON-DEVICE FALSE TRIGGER MITIGATION	7248
<i>Pranay Dighe, Erik Marchi, Srikanth Vishnubhotla, Sachin Kajarekar, Devang Naik, Apple, United States</i>	

SPE-42.3: PROGRESSIVE VOICE TRIGGER DETECTION: ACCURACY VS LATENCY	7253
<i>Siddharth Sigtia, John Bridle, Hywel Richards, Pascal Clark, Erik Marchi, Vineet Garg, Apple, United Kingdom</i>	
SPE-42.4: DYNAMIC CURRICULUM LEARNING VIA DATA PARAMETERS FOR NOISE	7258
ROBUST KEYWORD SPOTTING	
<i>Takuya Higuchi, Shreyas Saxena, Mehrez Souden, Tien Dung Tran, Masood Delfarah, Chandra Dhir, Apple, United States</i>	
SPE-42.5: CNN-BASED SPOKEN TERM DETECTION AND LOCALIZATION WITHOUT	7263
DYNAMIC PROGRAMMING	
<i>Tzeviya Sylvia Fuchs, Yael Segal, Joseph Keshet, Bar-Ilan University, Israel</i>	
SPE-42.6: QUERY-BY-EXAMPLE KEYWORD SPOTTING SYSTEM USING	7268
MULTI-HEAD ATTENTION AND SOFTTRIPLE LOSS	
<i>Jinmiao Huang, Waseem Gharbieh, Han Suk Shim, Eugene Kim, LG Electronics, Canada</i>	
 SPE-43: SPEECH RECOGNITION 15: ROBUST SPEECH RECOGNITION 1	
SPE-43.1: A CLOSER LOOK AT AUDIO-VISUAL MULTI-PERSON SPEECH	7123
RECOGNITION AND ACTIVE SPEAKER SELECTION	
<i>Otavio Braga, Olivier Siohan, Google, Inc., United States</i>	
SPE-43.2: GENERALIZED KNOWLEDGE DISTILLATION FROM AN ENSEMBLE OF	7128
SPECIALIZED TEACHERS LEVERAGING UNSUPERVISED NEURAL CLUSTERING	
<i>Takashi Fukuda, Gakuto Kurata, IBM Research AI, Japan</i>	
SPE-43.3: MULTISTREAM CNN FOR ROBUST ACOUSTIC MODELING	7133
<i>Kyu Han, Jing Pan, ASAPP, United States; Venkata Tadala, Sensory, United States; Tao Ma, ASAPP, United States; Dan Povey, Xiaomi, China</i>	
SPE-43.4: IMPROVED ROBUSTNESS TO DISFLUENCIES IN RNN-TRANSDUCER	7138
BASED SPEECH RECOGNITION	
<i>Valentin Mendeleev, Amazon, Germany; Tina Raissi, RWTH Aachen University, Germany; Guglielmo Camporese, University of Padova, Italy; Manuel Giollo, Amazon, Italy</i>	
SPE-43.5: REPRESENTATION LEARNING FOR SPEECH RECOGNITION USING	7143
FEEDBACK BASED RELEVANCE WEIGHTING	
<i>Purvi Agrawal, Sriram Ganapathy, Indian Institute of Science, India</i>	
SPE-43.6: TOWARDS DATA SELECTION ON TTS DATA FOR CHILDREN'S SPEECH	7148
RECOGNITION	
<i>Wei Wang, Zhikai Zhou, Yizhou Lu, Hongji Wang, Chenpeng Du, Yanmin Qian, Shanghai Jiao Tong University, China</i>	
 SPE-44: SPEECH RECOGNITION 16: ROBUST SPEECH RECOGNITION 2	
SPE-44.1: AN INVESTIGATION OF END-TO-END MODELS FOR ROBUST SPEECH	7153
RECOGNITION	
<i>Archiki Prasad, Preethi Jyothi, Rajbabu Velmurugan, Indian Institute of Technology, Bombay, India</i>	
SPE-44.2: END-TO-END DEREVERBERATION, BEAMFORMING, AND SPEECH	7158
RECOGNITION WITH IMPROVED NUMERICAL STABILITY AND ADVANCED FRONTEND	
<i>Wangyou Zhang, Shanghai Jiao Tong University, China; Christoph Boeddeker, Paderborn University, Germany; Shinji Watanabe, Johns Hopkins University, United States; Tomohiro Nakatani, Marc Delcroix, Keisuke Kinoshita, Tsubasa Ochiai, Naoyuki Kamo, NTT Corporation, Japan; Reinhold Haeb-Umbach, Paderborn University, Germany; Yanmin Qian, Shanghai Jiao Tong University, China</i>	
SPE-44.3: STREAMING MULTI-SPEAKER ASR WITH RNN-T	7163
<i>Ilya Sklyar, Anna Piunova, Yulan Liu, Amazon, Germany</i>	

**SPE-44.4: IMPROVING RNN TRANSDUCER WITH TARGET SPEAKER EXTRACTION 7168
AND NEURAL UNCERTAINTY ESTIMATION**

Jiatong Shi, The Johns Hopkins University, United States; Chunlei Zhang, Chao Weng, Tencent AI Lab, United States; Shinji Watanabe, The Johns Hopkins University, United States; Meng Yu, Dong Yu, Tencent AI Lab, United States

**SPE-44.5: A PROGRESSIVE LEARNING APPROACH TO ADAPTIVE NOISE AND SPEECH 7173
ESTIMATION FOR SPEECH ENHANCEMENT AND NOISY SPEECH RECOGNITION**

Zhaoxu Nian, Yan-Hui Tu, Jun Du, University of Science and Technology of China, China; Chin-Hui Lee, Georgia Institute of Technology, United States

**SPE-44.6: THE ACCENTED ENGLISH SPEECH RECOGNITION CHALLENGE 2020: 7178
OPEN DATASETS, TRACKS, BASELINES, RESULTS AND METHODS**

Xian Shi, Fan Yu, Audio, Speech and Language Processing Group (ASLP@NPU), School of Computer Science, Northwestern Polytechnical University, China; Yizhou Lu, SpeechLab, Department of Computer Science and Engineering, Shanghai Jiao Tong University, China; Yuhao Liang, Audio, Speech and Language Processing Group (ASLP@NPU), School of Computer Science, Northwestern Polytechnical University, China; Qiangze Feng, Daliang Wang, Datatang (Beijing) Technology Co., LTD, China; Yanmin Qian, SpeechLab, Department of Computer Science and Engineering, Shanghai Jiao Tong University, China; Lei Xie, Audio, Speech and Language Processing Group (ASLP@NPU), School of Computer Science, Northwestern Polytechnical University, China

SPE-45: SPEECH ANALYSIS

**SPE-45.1: COMPARATIVE STUDY OF DIFFERENT EPOCH EXTRACTION METHODS 6384
FOR SPEECH ASSOCIATED WITH VOICE DISORDERS**

Purva Barche, Krishna Gurugubelli, Anil Kumar Vuppala, International Institute of Information Technology, Hyderabad, India

**SPE-45.2: HAVE YOU MADE A DECISION? WHERE? A PILOT STUDY ON 6389
INTERPRETABILITY OF POLARITY ANALYSIS BASED ON ADVISING PROBLEM**

Tianda Li, Queen's University, Canada; Jia-Chen Gu, University of Science and Technology of China, China; Hui Liu, Queen's University, China; Quan Liu, iFLYTEK Research, China; Zhen-hua Ling, University of Science and Technology of China, China; Zhiming Su, iFLYTEK Research, China; Xiaodan Zhu, Queen's University, China

**SPE-45.3: TRANSFORMER BASED UNSUPERVISED PRE-TRAINING FOR ACOUSTIC 6394
REPRESENTATION LEARNING**

Ruixiong Zhang, Haiwei Wu, Wubo Li, Dongwei Jiang, Wei Zou, Xiangang Li, Didi Chuxing, China

**SPE-45.4: A COMPARISON OF CONVOLUTIONAL NEURAL NETWORKS FOR 6399
GLOTTAL CLOSURE INSTANT DETECTION FROM RAW SPEECH**

Jindrich Matousek, Daniel Tihelka, University of West Bohemia, Czechia

**SPE-45.5: ENCODER-DECODER BASED PITCH TRACKING AND JOINT MODEL 6404
TRAINING FOR MANDARIN TONE CLASSIFICATION**

Hao Huang, Kai Wang, Ying Hu, Xinjiang University, China; Sheng Li, National Institute of Information and Communications Technology, Japan

SPE-46: CORPORA AND OTHER RESOURCES

**SPE-46.1: CONSTRUCTION OF A LARGE-SCALE JAPANESE ASR CORPUS ON TV 7273
RECORDINGS**

Shintaro Ando, Hiromasa Fujihara, Laboro.AI, Inc., Japan

**SPE-46.2: NISP: A MULTI-LINGUAL MULTI-ACCENT DATASET FOR SPEAKER 7278
PROFILING**

Shareef Babu Kalluri, Deepu Vijayasenan, National Institute of Technology Karnataka Surathkal, India; Sriram Ganapathy, Indian Institute of Sciences, India; Ragesh Rajan M, National Institute of Technology Karnataka Surathkal, India; Prashant Krishnan, Indian Institute of Sciences, India

SPE-46.3: MULTILINGUAL PHONETIC DATASET FOR LOW RESOURCE SPEECH RECOGNITION	7283
<i>Xinjian Li, David Mortensen, Florian Metze, Alan Black, Carnegie Mellon University, United States</i>	
SPE-46.4: AGE-VOX-CELEB: MULTI-MODAL CORPUS FOR FACIAL AND SPEECH ESTIMATION	7288
<i>Naohiro Tawara, Atsunori Ogawa, Yuki Kitagishi, Hosana Kamiyama, NTT Corporation, Japan</i>	
SPE-46.5: DIDISPEECH: A LARGE SCALE MANDARIN SPEECH CORPUS	7293
<i>Tingwei Guo, Cheng Wen, Dongwei Jiang, Ne Luo, Ruixiong Zhang, Shuaijiang Zhao, Wubo Li, Cheng Gong, Wei Zou, Kun Han, Xiangang Li, DiDi Chuxing, China</i>	
SPE-46.6: THE IN-THE-WILD SPEECH MEDICAL CORPUS	7298
<i>Joana Correia, Carnegie Mellon University / U. Lisbon / INESC, United States; Francisco Teixeira, Catarina Botelho, Isabel Trancoso, U. Lisbon / INESC, Portugal; Bhiksha Raj, Carnegie Mellon University, United States</i>	
 SPE-47: SPEECH RECOGNITION 17: SPEECH ADAPTATION AND NORMALIZATION	
SPE-47.1: MULTIPLE-HYPOTHESIS CTC-BASED SEMI-SUPERVISED ADAPTATION OF END-TO-END SPEECH RECOGNITION	7183
<i>Cong-Thanh Do, Rama Doddipatla, Toshiba Europe Limited, United Kingdom; Thomas Hain, University of Sheffield, United Kingdom</i>	
SPE-47.2: VOWEL NON-VOWEL BASED SPECTRAL WARPING AND TIME SCALE MODIFICATION FOR IMPROVEMENT IN CHILDREN’S ASR	7188
<i>Hemant Kathania, Aalto University, Finland; Avinash Kumar, Nayional Institute of Technology Sikkim, India; Mikko Kurimo, Aalto University, Finland</i>	
SPE-47.3: EXTENDING PARROTRON: AN END-TO-END, SPEECH CONVERSION AND SPEECH RECOGNITION MODEL FOR ATYPICAL SPEECH	7193
<i>Rohan Doshi, Youzheng Chen, Liyang Jiang, Xia Zhang, Fadi Biadisy, Bhuvana Ramabhadran, Fang Chu, Andrew Rosenberg, Google, United States; Pedro J. Moreno, Google Inc., United States</i>	
SPE-47.4: FUNDAMENTAL FREQUENCY FEATURE NORMALIZATION AND DATA AUGMENTATION FOR CHILD SPEECH RECOGNITION	7198
<i>Gary Yeung, Ruchao Fan, Abeer Alwan, University of California, Los Angeles, United States</i>	
SPE-47.5: ANALYSIS OF X-VECTORS FOR LOW-RESOURCE SPEECH RECOGNITION	7203
<i>Martin Karafiat, Karel Vesely, Jan “Honza” Cernocky, Brno University of Technology, Czechia; Jan Profant, Jiri Nytra, Miroslav Hlavacek, Tomas Pavlicek, Phonexia.s.r.o., Czechia</i>	
SPE-47.6: REFINING AUTOMATIC SPEECH RECOGNITION SYSTEM FOR OLDER ADULTS	7208
<i>Liu Chen, Meysam Asgari, Oregon Health and Science University, United States</i>	
 SPE-48: SPEECH RECOGNITION 18: LOW RESOURCE ASR	
SPE-48.1: MIXSPEECH: DATA AUGMENTATION FOR LOW-RESOURCE AUTOMATIC SPEECH RECOGNITION	7213
<i>Linghui Meng, Institute of Automation, Chinese Academy of Sciences, China; Jin Xu, Institute for Interdisciplinary Information Sciences, Tsinghua University, China; Xu Tan, Jindong Wang, Tao Qin, Microsoft Research Asia, China; Bo Xu, Institute of Automation, Chinese Academy of Sciences, China</i>	
SPE-48.2: END-TO-END MULTILINGUAL AUTOMATIC SPEECH RECOGNITION FOR LESS-RESOURCED LANGUAGES: THE CASE OF FOUR ETHIOPIAN LANGUAGES	7218
<i>Solomon Teferra Abate, Martha Yifiru Tachbelie, Addis Ababa University, Ethiopia; Tanja Schultz, University of Bremen, Germany</i>	

SPE-48.3: IMPROVED DATA SELECTION FOR DOMAIN ADAPTATION IN ASR	7223
<i>Shannon Wotherspoon, William Hartmann, Matthew Snover, Owen Kimball, Raytheon BBN, United States</i>	
SPE-48.4: BI-APC: BIDIRECTIONAL AUTOREGRESSIVE PREDICTIVE CODING FOR UNSUPERVISED PRE-TRAINING AND ITS APPLICATION TO CHILDREN'S ASR	7228
<i>Ruchao Fan, Amber Afshan, Abeer Alwan, University of California, Los Angeles, United States</i>	
SPE-48.5: META-ADAPTER: EFFICIENT CROSS-LINGUAL ADAPTATION WITH META-LEARNING	7233
<i>Wenxin Hou, Yidong Wang, Shengzhou Gao, Takahiro Shinozaki, Tokyo Institute of Technology, Japan</i>	
SPE-48.6: ERROR-DRIVEN FIXED-BUDGET ASR PERSONALIZATION FOR ACCENTED SPEAKERS	7238
<i>Abhijeet Awasthi, Aman Kansal, Sunita Sarawagi, Preethi Jyothi, IIT Bombay, India</i>	
 SPE-49: SPEECH SYNTHESIS 7: GENERAL TOPICS	
SPE-49.1: CONTEXT-AWARE PROSODY CORRECTION FOR TEXT-BASED SPEECH EDITING	5854
<i>Max Morrison, Northwestern University, United States; Lucas Rencker, University of Surrey, United Kingdom; Zeyu Jin, Nicholas J. Bryan, Juan-Pablo Caceres, Bryan Pardo, Adobe Research, United States</i>	
SPE-49.2: FAST DCTTS: EFFICIENT DEEP CONVOLUTIONAL TEXT-TO-SPEECH.....	5859
<i>Minsu Kang, Jihyun Lee, Simin Kim, Injung Kim, Handong Global University, South Korea</i>	
SPE-49.3: SPEECH PREDICTION IN SILENT VIDEOS USING VARIATIONAL AUTOENCODERS	5864
<i>Ravindra Yadav, Indian Institute of Technology, Kanpur, India; Ashish Sardana, NVIDIA, India; Vinay P Namboodiri, University of Bath, United Kingdom; Rajesh M Hegde, Indian Institute of Technology, Kanpur, India</i>	
SPE-49.4: LEARNING DISENTANGLED PHONE AND SPEAKER REPRESENTATIONS IN A SEMI-SUPERVISED VQ-VAE PARADIGM	5869
<i>Jennifer Williams, University of Edinburgh, United Kingdom; Zhao Yi, Erica Cooper, Junichi Yamagishi, National Institute for Informatics, Japan</i>	
SPE-49.5: HIGH-INTELLIGIBILITY SPEECH SYNTHESIS FOR DYSARTHIC SPEAKERS WITH LPCNET-BASED TTS AND CYCLEVAE-BASED VC	5874
<i>Keisuke Matsubara, Kobe University, Japan; Takuma Okamoto, National Institute of Information and Communications Technology, Japan; Ryoichi Takashima, Tetsuya Takiguchi, Kobe University, Japan; Tomoki Toda, Nagoya University, Japan; Yoshinori Shiga, Hisashi Kawai, National Institute of Information and Communications Technology, Japan</i>	
SPE-49.6: DENOISPEECH: DENOISING TEXT TO SPEECH WITH FRAME-LEVEL NOISE MODELING	5879
<i>Chen Zhang, Yi Ren, Zhejiang University, China; Xu Tan, Microsoft Research Asia, China; Jinglin Liu, Kejun Zhang, Zhejiang University, China; Tao Qin, Microsoft Research Asia, China; Sheng Zhao, Microsoft Azure Speech, China; Tie-Yan Liu, Microsoft Research Asia, China</i>	
 SPE-50: VOICE CONVERSION & SPEECH SYNTHESIS: SINGING VOICE & OTHER TOPICS	
SPE-50.1: NON-AUTOREGRESSIVE SEQUENCE-TO-SEQUENCE VOICE CONVERSION	5884
<i>Tomoki Hayashi, TARVO Inc., Japan; Wen-Chin Huang, Nagoya University, Japan; Kazuhiro Kobayashi, TARVO Inc., Japan; Tomoki Toda, Nagoya University, Japan</i>	
SPE-50.2: PPG-BASED SINGING VOICE CONVERSION WITH ADVERSARIAL REPRESENTATION LEARNING	5889
<i>Zhonghao Li, Benlai Tang, Xiang Yin, Yuan Wan, Ling Xu, Chen Shen, Zejun Ma, ByteDance AI Lab, China</i>	

SPE-50.3: LITESING: TOWARDS FAST, LIGHTWEIGHT AND EXPRESSIVE SINGING VOICE SYNTHESIS	5894
<i>Xiaobin Zhuang, Tao Jiang, Szu-Yu Chou, Bin Wu, Peng Hu, Simon Lui, Tencent Music Entertainment, China</i>	
SPE-50.4: SEMI-SUPERVISED LEARNING FOR SINGING SYNTHESIS TIMBRE	5899
<i>Jordi Bonada, Merlijn Blaauw, Universitat Pompeu Fabra, Spain</i>	
SPE-50.5: RECURRENT PHASE RECONSTRUCTION USING ESTIMATED PHASE DERIVATIVES FROM DEEP NEURAL NETWORKS	5904
<i>Lars Thieling, Daniel Wilhelm, Peter Jax, Institute of Communication Systems, RWTH Aachen University, Germany</i>	
SPE-50.6: STABLE CHECKPOINT SELECTION AND EVALUATION IN SEQUENCE TO SEQUENCE SPEECH SYNTHESIS	5909
<i>Slava Shechtman, David Haws, Raul Fernandez, IBM Research, Israel</i>	
 SPE-51: SPEECH ENHANCEMENT 7: SINGLE-CHANNEL PROCESSING	
SPE-51.1: TSTNN: TWO-STAGE TRANSFORMER BASED NEURAL NETWORK FOR SPEECH ENHANCEMENT IN THE TIME DOMAIN	6654
<i>Kai Wang, Bengbeng He, Wei-Ping Zhu, Concordia University, Canada</i>	
SPE-51.2: SELF-ATTENTION GENERATIVE ADVERSARIAL NETWORK FOR SPEECH ENHANCEMENT	6659
<i>Huy Phan, Queen Mary University of London, United Kingdom; Huy Le Nguyen, Ho Chi Minh City University of Technology, Vietnam; Oliver Chén, University of Oxford, United Kingdom; Philipp Koch, University of Lübeck, Germany; Ngoc Q. K. \ Duong, InterDigital R&D France, France; Ian McLoughlin, Singapore Institute of Technology, Singapore; Alfred Mertins, University of Lübeck, Germany</i>	
SPE-51.3: NEURAL KALMAN FILTERING FOR SPEECH ENHANCEMENT	6664
<i>Wei Xue, Gang Quan, Chao Zhang, Guohong Ding, Xiaodong He, Bowen Zhou, JD AI Research, China</i>	
SPE-51.4: NEURAL NOISE EMBEDDING FOR END-TO-END SPEECH ENHANCEMENT WITH CONDITIONAL LAYER NORMALIZATION	6669
<i>Zhihui Zhang, Xiaoqi Li, Yaxing Li, Yuanjie Dong, Dan Wang, Shengwu Xiong, Wuhan University of Technology, China</i>	
SPE-51.5: PERCEPTUAL LOSS BASED SPEECH DENOISING WITH AN ENSEMBLE OF AUDIO PATTERN RECOGNITION AND SELF-SUPERVISED MODELS	6674
<i>Saurabh Kataria, Jesús Villalba, Najim Dehak, Johns Hopkins University, United States</i>	
SPE-51.6: TOWARDS AN ASR APPROACH USING ACOUSTIC AND LANGUAGE MODELS FOR SPEECH ENHANCEMENT	6679
<i>Khandokar Md. Nayem, Donald S. Williamson, Indiana University, United States</i>	
 SPE-52: SPEECH ENHANCEMENT 8: ECHO CANCELLATION AND OTHER TASKS	
SPE-52.1: A NEURAL ACOUSTIC ECHO CANCELLER OPTIMIZED USING AN AUTOMATIC SPEECH RECOGNIZER AND LARGE SCALE SYNTHETIC DATA	6684
<i>Nathan Howard, Alex Park, Turaj Shabestary, Alexander Gruenstein, Rohit Prabhavalkar, Google, United States</i>	
SPE-52.2: LOW-COMPLEXITY, REAL-TIME JOINT NEURAL ECHO CONTROL AND SPEECH ENHANCEMENT BASED ON PERCEPNET	6689
<i>Jean-Marc Valin, Srikanth Tenneti, Karim Helwani, Umut Isik, Arvinth Krishnaswamy, Amazon, Canada</i>	
SPE-52.3: ACOUSTIC ECHO CANCELLATION WITH THE DUAL-SIGNAL TRANSFORMATION LSTM NETWORK	6694
<i>Nils L. Westhausen, Bernd T. Meyer, Carl von Ossietzky University, Germany</i>	

SPE-52.4: HIGH FIDELITY SPEECH REGENERATION WITH APPLICATION TO SPEECH ENHANCEMENT	6699
<i>Adam Polyak, Lior Wolf, Tel Aviv University; Facebook, Israel; Yossi Adi, Ori Kabeli, Yaniv Taigman, Facebook, Israel</i>	
SPE-52.5: A TIME-DOMAIN CONVOLUTIONAL RECURRENT NETWORK FOR PACKET LOSS CONCEALMENT	6704
<i>Ju Lin, Clemson University, United States; Yun Wang, Kaustubh Kalgaonkar, Gil Keren, Didi Zhang, Christian Fuegen, Facebook AI, United States</i>	
SPE-52.6: CASCADED TIME + TIME-FREQUENCY UNET FOR SPEECH ENHANCEMENT: JOINTLY ADDRESSING CLIPPING, CODEC DISTORTIONS, AND GAPS	6709
<i>Arun Asokan Nair, Johns Hopkins University, United States; Kazuhito Koishida, Microsoft Corporation, United States</i>	
 SPE-53: SPEAKER DIARIZATION	
SPE-53.1: HIDDEN MARKOV MODEL DIARISATION WITH SPEAKER LOCATION INFORMATION	6114
<i>Jeremy Heng Meng Wong, Xiong Xiao, Yifan Gong, Microsoft, United States</i>	
SPE-53.2: COMPOSITIONAL EMBEDDING MODELS FOR SPEAKER IDENTIFICATION AND DIARIZATION WITH SIMULTANEOUS SPEECH FROM 2+ SPEAKERS	6119
<i>Zeqian Li, Jacob Whitehill, Worcester Polytechnic Institute, United States</i>	
SPE-53.3: CONTENT-AWARE SPEAKER EMBEDDINGS FOR SPEAKER DIARISATION	6124
<i>Guangzhi Sun, Danyi Liu, Chao Zhang, Phil Woodland, University of Cambridge, United Kingdom</i>	
SPE-53.4: MULTI-SCALE SPEAKER DIARIZATION WITH NEURAL AFFINITY SCORE FUSION	6129
<i>Taejin Park, Manoj Kumar, Shrikanth Narayanan, University of Southern California, United States</i>	
SPE-53.5: A COMPARISON STUDY ON INFANT-PARENT VOICE DIARIZATION	6134
<i>Junzhe Zhu, Mark Hasegawa-Johnson, Nancy McElwain, University of Illinois at Urbana-Champaign, United States</i>	
 SPE-54: END-TO-END SPEAKER DIARIZATION AND RECOGNITION	
SPE-54.1: END-TO-END DIARIZATION FOR VARIABLE NUMBER OF SPEAKERS WITH LOCAL-GLOBAL NETWORKS AND DISCRIMINATIVE SPEAKER EMBEDDINGS	6139
<i>Soumi Maiti, CUNY, United States; Hakan Erdogan, Kevin Wilson, Scott Wisdom, Google, United States; Shinji Watanabe, Johns Hopkins University, United States; John R. Hershey, Google, United States</i>	
SPE-54.2: END-TO-END SPEAKER DIARIZATION AS POST-PROCESSING	6144
<i>Shota Horiguchi, Hitachi, Ltd., Japan; Paola Garcia, Johns Hopkins University, United States; Yusuke Fujita, Hitachi, Ltd., Japan; Shinji Watanabe, Johns Hopkins University, United States; Kenji Nagamatsu, Hitachi, Ltd., Japan</i>	
SPE-54.3: BW-EDA-EEND: STREAMING END-TO-END NEURAL SPEAKER DIARIZATION FOR A VARIABLE NUMBER OF SPEAKERS	6149
<i>Eunjung Han, Chul Lee, Andreas Stocke, Amazon, United States</i>	
SPE-54.4: INTEGRATING END-TO-END NEURAL AND CLUSTERING-BASED DIARIZATION: GETTING THE BEST OF BOTH WORLDS	6154
<i>Keisuke Kinoshita, Marc Delcroix, Naohiro Tawara, NTT Corporation, Japan</i>	
SPE-54.5: SIAMESE CAPSULE NETWORK FOR END-TO-END SPEAKER RECOGNITION IN THE WILD	6159
<i>Amirhossein Hajavi, Ali Etemad, Queen's University, Canada</i>	

SPE-54.6: A REAL-TIME SPEAKER DIARIZATION SYSTEM BASED ON SPATIAL SPECTRUM 6164

Siqi Zheng, Weilong Huang, Xianliang Wang, Hongbin Suo, Jinwei Feng, Zhijie Yan, Alibaba Group, China

SPE-55: LANGUAGE IDENTIFICATION AND LOW RESOURCE SPEECH RECOGNITION

SPE-55.1: UNSUPERVISED NEURAL ADAPTATION MODEL BASED ON OPTIMAL TRANSPORT FOR SPOKEN LANGUAGE IDENTIFICATION 7303

Xugang Lu, Peng Shen, National Institute of Information and Communications Technology, Japan; Yu Tsao, Academic Sinica, Taiwan; Hisashi Kawai, National Institute of Information and Communications Technology, Japan

SPE-55.2: JOINT ASR AND LANGUAGE IDENTIFICATION USING RNN-T: AN EFFICIENT APPROACH TO DYNAMIC LANGUAGE SWITCHING 7308

Surabhi Punjabi, Harish Arsikere, Zeynab Raeesy, Chander Chandak, Nikhil Bhawe, Ankish Bansal, Markus Muller, Sergio Murillo, Ariya Rastrow, Andreas Stolcke, Jasha Droppo, Sri Garimella, Roland Maas, Mat Hans, Athanasios Mouchtaris, Siegfried Kunzmann, Amazon, India

SPE-55.3: SPOKEN LANGUAGE IDENTIFICATION IN UNSEEN TARGET DOMAIN USING WITHIN-SAMPLE SIMILARITY LOSS 7313

Muralikrishna H, Indian Institute of Technology Mandi, India; Shantanu Kapoor, Manipal Institute of Technology Manipal, India; Dileep Aroor Dinesh, Padmanabhan Rajan, Indian Institute of Technology Mandi, India

SPE-55.4: EXPLORING THE USE OF COMMON LABEL SET TO IMPROVE SPEECH RECOGNITION OF LOW RESOURCE INDIAN LANGUAGES 7318

Vishwas M Shetty, Srinivasan Umesh, Indian Institute of Technology, Madras, India

SPE-55.5: PHONE DISTRIBUTION ESTIMATION FOR LOW RESOURCE LANGUAGES 7323

Xinjian Li, Juncheng Li, Jiali Yao, Alan Black, Florian Metze, Carnegie Mellon University, United States

SPE-55.6: HOW PHONOTACTICS AFFECT MULTILINGUAL AND ZERO-SHOT ASR PERFORMANCE 7328

Siyuan Feng, Delft University of Technology, Netherlands; Piotr Żelasko, Laureano Moro-Velázquez, Johns Hopkins University, United States; Ali Abavisani, Mark Hasegawa-Johnson, University of Illinois at Urbana-Champaign, United States; Odette Scharenborg, Delft University of Technology, Netherlands; Najim Dehak, Johns Hopkins University, United States

SPE-56: PARALINGUISTICS IN SPEECH

SPE-56.1: MODELLING PARALINGUISTIC PROPERTIES IN CONVERSATIONAL SPEECH TO DETECT BIPOLAR DISORDER AND BORDERLINE PERSONALITY DISORDER 6409

Bo Wang, Yue Wu, University of Oxford, United Kingdom; Nemanja Vaci, University of Sheffield, United Kingdom; Maria Liakata, Queen Mary University of London, United Kingdom; Terry Lyons, Kate Saunders, University of Oxford, United Kingdom

SPE-56.2: AN ATTENTION MODEL FOR HYPERNASALITY PREDICTION IN CHILDREN WITH CLEFT PALATE 6414

Vikram C Mathad, Nancy Scherer, Arizona State University, United States; Kathy Chapman, University of Utah, United States; Julie Liss, Visar Berisha, Arizona State University, United States

SPE-56.3: AN END-TO-END SPEECH ACCENT RECOGNITION METHOD BASED ON HYBRID CTC/ATTENTION TRANSFORMER ASR 6419

Qiang Gao, Haiwei Wu, Yanqing Sun, Yitao Duan, NetEase Youdao, China

SPE-56.4: MULTI-TASK ESTIMATION OF AGE AND COGNITIVE DECLINE FROM SPEECH 6424

Yilin Pan, University of Sheffield, United Kingdom; Venkata Srikanth Nallanthighal, Radboud University Nijmegen, Netherlands; Daniel Blackburn, Heidi Christensen, University of Sheffield, United Kingdom; Aki Harma, Philips Research, Netherlands

SPE-56.5: DEEPEMOCLUSTER: A SEMI-SUPERVISED FRAMEWORK FOR LATENT CLUSTER REPRESENTATION OF SPEECH EMOTIONS	6429
<i>Wei-Cheng Lin, Kusha Sridhar, Carlos Busso, University of Texas at Dallas, United States</i>	
SPE-56.6: THE ROLE OF TASK AND ACOUSTIC SIMILARITY IN AUDIO TRANSFER LEARNING: INSIGHTS FROM THE SPEECH EMOTION RECOGNITION CASE	6434
<i>Andreas Triantafyllopoulos, audEERING GmbH/University of Augsburg, Germany; Björn Schuller, University of Augsburg, Germany</i>	
SPE-57: SPEECH, DEPRESSION AND SLEEPINESS	
SPE-57.1: SPEECH-BASED DEPRESSION PREDICTION USING ENCODER-WEIGHT-ONLY TRANSFER LEARNING AND A LARGE CORPUS	6324
<i>Amir Harati, Elizabeth Shriberg, Tomasz Rutowski, Piotr Chlebek, Yang Lu, Ricardo Oliveira, Ellipsis Health inc, Canada</i>	
SPE-57.2: ESTIMATING SEVERITY OF DEPRESSION FROM ACOUSTIC FEATURES AND EMBEDDINGS OF NATURAL SPEECH	6329
<i>Sri Harsha Dumpala, Dalhousie University and Vector Institute, Canada; Sheri Rempel, Nova Scotia Health, Halifax, Canada; Katerina Dikaios, Dalhousie University and Nova Scotia Health, Canada; Mehri Sajjadian, Dalhousie University, Canada; Rudolf Uher, Dalhousie University and Nova Scotia Health, Canada; Sageev Oore, Dalhousie University and Vector Institute, Canada</i>	
SPE-57.3: AUTOMATIC ELICITATION COMPLIANCE FOR SHORT-DURATION SPEECH BASED DEPRESSION DETECTION	6334
<i>Brian Stasak, Zhaocheng Huang, University of New South Wales, Australia; Dale Joachim, Sonde Health, United States; Julien Epps, University of New South Wales, Australia</i>	
SPE-57.4: DEEP NEURAL NETWORK EMBEDDINGS FOR THE ESTIMATION OF THE DEGREE OF SLEEPINESS	6339
<i>José Vicente Egas-López, Gábor Gosztolya, University of Szeged, Hungary</i>	
SPE-57.5: PAUSE-ENCODED LANGUAGE MODELS FOR RECOGNITION OF ALZHEIMER'S DISEASE AND EMOTION	6344
<i>Jiahong Yuan, Xingyu Cai, Kenneth Church, Baidu Research, USA, United States</i>	
SPE-57.6: END-2-END MODELING OF SPEECH AND GAIT FROM PATIENTS WITH PARKINSON'S DISEASE: COMPARISON BETWEEN HIGH QUALITY VS. SMARTPHONE DATA	6349
<i>Juan Camilo Vásquez-Correa, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany; Tomás Arias-Vergara, Ludwig-Maximilians University, Germany; Philipp Klumpp, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany; Paula Andrea Perez-Toro, Juan Rafael Orozco-Arroyave, Universidad de Antioquia, Germany; Elmar Nöth, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany</i>	
SPE-58: DYSARTHIC SPEECH PROCESSING	
SPE-58.1: A SEQUENTIAL CONTRASTIVE LEARNING FRAMEWORK FOR ROBUST DYSARTHIC SPEECH RECOGNITION	6354
<i>Lidan Wu, Daoming Zong, Jing Zhao, Shiliang Sun, East China Normal University, China</i>	
SPE-58.2: AUTOMATIC AND PERCEPTUAL DISCRIMINATION BETWEEN DYSARTHRIA, APRAXIA OF SPEECH, AND NEUROTYPICAL SPEECH	6359
<i>Ina Kodrasi, Idiap Research Institute, Switzerland; Michaela Pernon, Geneva University Hospital, Switzerland; Marina Laganaro, University of Geneva, Switzerland; Hervé Boulard, Idiap Research Institute, Switzerland</i>	

SPE-58.3: EFFECT OF NOISE AND MODEL COMPLEXITY ON DETECTION OF AMYOTROPHIC LATERAL SCLEROSIS AND PARKINSON'S DISEASE USING PITCH AND MFCC	6364
<i>Tanuka Bhattacharjee, Jhansi Mallela, Indian Institute of Science, India; Yamini Belur, Nalini Atchayaram, Ravi Yadav, Pradeep Reddy, National Institute of Mental Health and Neurosciences, India; Dipanjan Gope, Prasanta Kumar Ghosh, Indian Institute of Science, India</i>	
SPE-58.4: MULTI-TASK TRANSFORMER WITH INPUT FEATURE RECONSTRUCTION FOR DYSARTHIC SPEECH RECOGNITION	6369
<i>Chaoyue Ding, Shiliang Sun, Jing Zhao, East China Normal University, China</i>	
SPE-58.5: DETECTING ALZHEIMER'S DISEASE FROM SPEECH USING NEURAL NETWORKS WITH BOTTLENECK FEATURES AND DATA AUGMENTATION	6374
<i>Zhaoci Liu, Zhiqiang Guo, Zhenhua Ling, University of Science and Technology of China, China; Yunxia Li, Shanghai Tongji Hospital, Tongji University School of Medicine, China</i>	
SPE-58.6: AUTOMATIC DYSARTHIC SPEECH DETECTION EXPLOITING PAIRWISE DISTANCE-BASED CONVOLUTIONAL NEURAL NETWORKS	6379
<i>Parvaneh Janbakhshi, Ina Kodrasi, Hervé Broulard, Idiap Research Institute, Switzerland</i>	
HLT-1: LANGUAGE MODELING 1: FUSION AND TRAINING FOR END-TO-END ASR	
HLT-1.1: IMPROVED NEURAL LANGUAGE MODEL FUSION FOR STREAMING RECURRENT NEURAL NETWORK TRANSDUCER	7358
<i>Suyoun Kim, Yuan Shanguan, Jay Mahadeokar, Antoine Bruguier, Christian Fuegen, Michael Seltzer, Duc Le, Facebook, United States</i>	
HLT-1.2: INTERNAL LANGUAGE MODEL TRAINING FOR DOMAIN-ADAPTIVE END-TO-END SPEECH RECOGNITION	7363
<i>Zhong Meng, Naoyuki Kanda, Yashesh Gaur, Sarangarajan Parthasarathy, Eric Sun, Liang Lu, Xie Chen, Jinyu Li, Yifan Gong, Microsoft Corporation, United States</i>	
HLT-1.3: SPEECH RECOGNITION BY SIMPLY FINE-TUNING BERT	7368
<i>Wen-Chin Huang, Nagoya University, Japan; Chia-Hua Wu, Shang-Bao Luo, Academia Sinica, Taiwan; Kuan-Yu Chen, National Taiwan University of Science and Technology, Taiwan; Hsin-Min Wang, Academia Sinica, Taiwan; Tomoki Toda, Nagoya University, Japan</i>	
HLT-1.4: PERSONALIZATION STRATEGIES FOR END-TO-END SPEECH RECOGNITION SYSTEMS	7373
<i>Aditya Gourav, Linda Liu, Ankur Gandhe, Yile Gu, Guitang Lan, Xiangyang Huang, Shashank Kalmane, Gautam Tiwari, Denis Filimonov, Ariya Rastrow, Andreas Stolcke, Ivan Bulyko, Amazon, United States</i>	
HLT-1.5: IMPROVING ENTITY RECALL IN AUTOMATIC SPEECH RECOGNITION WITH NEURAL EMBEDDINGS	7378
<i>Christopher Li, Pat Rondon, Diamantino Caseiro, Leonid Velikovich, Xavier Velez, Petar Aleksic, Google, United States</i>	
HLT-1.6: ADAPTABLE MULTI-DOMAIN LANGUAGE MODEL FOR TRANSFORMER ASR	7383
<i>Taewoo Lee, Min-Joong Lee, Tae Gyoong Kang, Seokyeoung Jung, Minseok Kwon, Yeona Hong, Jungin Lee, Kyoung-Gu Woo, Ho-Gyeong Kim, Jiseung Jeong, Jihyun Lee, Hosik Lee, Young Sang Choi, Samsung Electronics, South Korea</i>	
HLT-2: LANGUAGE MODELING 2: NEURAL LANGUAGE MODELS	
HLT-2.1: TRANSFORMER LANGUAGE MODELS WITH LSTM-BASED CROSS-UTTERANCE INFORMATION REPRESENTATION	7388
<i>Guangzhi Sun, Chao Zhang, Phil Woodland, University of Cambridge, United Kingdom</i>	
HLT-2.2: LARGE MARGIN TRAINING IMPROVES LANGUAGE MODELS FOR ASR	7393
<i>Jilin Wang, Boston University, United States; Jiaji Huang, Kenneth Church, Baidu Research, United States</i>	

HLT-2.3: DOMAIN-AWARE NEURAL LANGUAGE MODELS FOR SPEECH RECOGNITION	7398
<i>Linda Liu, Yile Gu, Aditya Gourav, Ankur Gandhe, Shashank Kalmene, Denis Filimonov, Ariya Rastrow, Ivan Bulyko, Amazon, United States</i>	
HLT-2.4: BAYESIAN TRANSFORMER LANGUAGE MODELS FOR SPEECH RECOGNITION	7403
<i>Boyang Xue, Jianwei Yu, Junhao Xu, Shansong Liu, Shoukang Hu, Zi Ye, Mengzhe Geng, Xunying Liu, Helen Meng, The Chinese University of Hong Kong, Hong Kong SAR China</i>	
HLT-2.5: MIXED PRECISION QUANTIZATION OF TRANSFORMER LANGUAGE MODELS FOR SPEECH RECOGNITION	7408
<i>Junhao Xu, Shoukang Hu, Jianwei Yu, Xunying Liu, Helen Mei-Ling Meng, The Chinese University of Hong Kong, China</i>	
HLT-2.6: FEDERATED MARGINAL PERSONALIZATION FOR ASR RESCORING	7413
<i>Zhe Liu, Fuchun Peng, Facebook Inc., United States</i>	
 HLT-3: DIALOGUE SYSTEMS 1: GENERAL TOPICS	
HLT-3.2: MULTI PATH TRAINING FRAMEWORK FOR DATA-DRIVEN OPEN-DOMAIN CONVERSATION SYSTEM	7593
<i>Sixing Wu, Dawei Zhang, Ying Li, Zhonghai Wu, Peking University, China</i>	
HLT-3.3: ACTION STATE UPDATE APPROACH TO DIALOGUE MANAGEMENT	7598
<i>Svetlana Stoyanchev, Simon Keizer, Rama Doddipatla, Toshiba Cambridge Research Laboratory, United Kingdom</i>	
HLT-3.4: GENERATING EMPATHETIC RESPONSES BY INJECTING ANTICIPATED EMOTION	7603
<i>Yuhan Liu, Jiachen Du, Xiang Li, Ruifeng Xu, Harbin Institute of Technology, Shenzhen, China</i>	
HLT-3.5: TOWARDS IMMEDIATE BACKCHANNEL GENERATION USING ATTENTION-BASED EARLY PREDICTION MODEL	7608
<i>Amalia Istiqlali Adiba, Takeshi Homma, Toshinori Miyoshi, Hitachi, Ltd., Japan</i>	
HLT-3.6: ERROR-DRIVEN PRUNING OF LANGUAGE MODELS FOR VIRTUAL ASSISTANTS	7613
<i>Sashank Gondala, Georgia Institute of Technology, United States; Lyan Verwimp, Ernest Pusateri, Manos Tsagkias, Christophe Van Gysel, Apple, United States</i>	
 HLT-4: DIALOGUE SYSTEMS 2: RESPONSE GENERATION	
HLT-4.1: PARAGRAPH LEVEL MULTI-PERSPECTIVE CONTEXT MODELING FOR QUESTION GENERATION	7618
<i>Jun Bai, Wenge Rong, Feiyu Xia, Beihang University, China; Yanmeng Wang, Ping An Technology, China; Yuanxin Ouyang, Zhang Xiong, Beihang University, China</i>	
HLT-4.2: IMPROVING DIALOGUE RESPONSE GENERATION VIA KNOWLEDGE GRAPH FILTER	7623
<i>Yanmeng Wang, Ye Wang, Xingyu Lou, Ping An Technology, China; Wenge Rong, Beihang University, China; Zhenghong Hao, Shaojun Wang, Ping An Technology, China</i>	
HLT-4.3: TOPIC-AWARE DIALOGUE GENERATION WITH TWO-HOP BASED GRAPH ATTENTION	7628
<i>Shijie Zhou, Wenge Rong, Jianfei Zhang, Beihang University, China; Yanmeng Wang, Ping An Technology, China; Libin Shi, Microsoft, China; Zhang Xiong, Beihang University, China</i>	

HLT-4.4: HSAN: A HIERARCHICAL SELF-ATTENTION NETWORK FOR MULTI-TURN DIALOGUE GENERATION	7633
<i>Yawei Kong, Lu Zhang, Can Ma, Cong Cao, Institute of Information Engineering, Chinese Academy of Sciences, Beijing, China</i>	
HLT-4.5: LEARNING TO SELECT CONTEXT IN A HIERARCHICAL AND GLOBAL PERSPECTIVE FOR OPEN-DOMAIN DIALOGUE GENERATION	7638
<i>Lei Shen, Institute of Computing Technology, Chinese Academy of Sciences, China; Haolan Zhan, Institute of Software, Chinese Academy of Sciences, China; Xin Shen, Australian National University, Australia; Yang Feng, Institute of Computing Technology, Chinese Academy of Sciences, China</i>	
HLT-4.6: TOWARDS EFFICIENTLY DIVERSIFYING DIALOGUE GENERATION VIA EMBEDDING AUGMENTATION	7643
<i>Yu Cao, Liang Ding, University of Sydney, Australia; Zhiliang Tian, The Hong Kong University of Science and Technology, Hong Kong SAR China; Meng Fang, Tencent Robotics X, China</i>	
HLT-5: LANGUAGE UNDERSTANDING 1: END-TO-END SPEECH UNDERSTANDING 1	
HLT-5.1: END2END ACOUSTIC TO SEMANTIC TRANSDUCTION	7418
<i>Valentin Pelloin, Nathalie Camelin, Antoine Laurent, LIUM - Le Mans Université, France; Renato De Mori, LIA - Université d'Avignon, France; Antoine Caubrière, LIUM - Le Mans Université, France; Yannick Estève, LIA - Université d'Avignon, France; Sylvain Meignier, LIUM - Le Mans Université, France</i>	
HLT-5.2: ACOUSTICS BASED INTENT RECOGNITION USING DISCOVERED PHONETIC UNITS FOR LOW RESOURCE LANGUAGES	7423
<i>Akshat Gupta, Xinjian Li, SaiKrishna Rallabandi, Alan Black, Carnegie Mellon University, United States</i>	
HLT-5.3: SPEECH-LANGUAGE PRE-TRAINING FOR END-TO-END SPOKEN LANGUAGE UNDERSTANDING	7428
<i>Yao Qian, Microsoft Cognitive Services Research Group, United States; Ximo Bian, Beijing Institute of Technology, United States; Yu Shi, Naoyuki Kanda, Leo Shen, Zhen Xiao, Michael Zeng, Microsoft Cognitive Services Research Group, United States</i>	
HLT-5.4: TWO-STAGE TEXTUAL KNOWLEDGE DISTILLATION FOR END-TO-END SPOKEN LANGUAGE UNDERSTANDING	7433
<i>Seongbin Kim, Inha University, South Korea; Gyuwan Kim, Seongjin Shin, NAVER Corp., South Korea; Sangmin Lee, Inha University, South Korea</i>	
HLT-5.5: SEMI-SUPERVISED SPOKEN LANGUAGE UNDERSTANDING VIA SELF-SUPERVISED SPEECH AND LANGUAGE MODEL PRETRAINING	7438
<i>Cheng-I Lai, Massachusetts Institute of Technology, United States; Yung-Sung Chuang, Hung-Yi Lee, National Taiwan University, Taiwan; Shang-Wen Li, Amazon Inc., United States; James Glass, Massachusetts Institute of Technology, United States</i>	
HLT-5.6: DO AS I MEAN, NOT AS I SAY: SEQUENCE LOSS TRAINING FOR SPOKEN LANGUAGE UNDERSTANDING	7443
<i>Milind Rao, Pranav Dheram, Gautam Tiwari, Anirudh Raju, Jasha Droppo, Ariya Rastrow, Andreas Stolcke, Amazon Alexa, United States</i>	
HLT-6: LANGUAGE UNDERSTANDING 2: END-TO-END SPEECH UNDERSTANDING 2	
HLT-6.1: ST-BERT: CROSS-MODAL LANGUAGE MODEL PRE-TRAINING FOR END-TO-END SPOKEN LANGUAGE UNDERSTANDING	7448
<i>Minjeong Kim, Gyuwan Kim, NAVER CLOVA, South Korea; Sang-Woo Lee, Jung-Woo Ha, NAVER CLOVA, NAVER AI LAB, South Korea</i>	

HLT-6.2: END-TO-END SPOKEN LANGUAGE UNDERSTANDING USING TRANSFORMER NETWORKS AND SELF-SUPERVISED PRE-TRAINED FEATURES	7453
<i>Edmilson Morais, Hong Kwang J Kuo, Samuel Thomas, IBM, Brazil</i>	
HLT-6.3: SENTIMENT INJECTED ITERATIVELY CO-INTERACTIVE NETWORK FOR SPOKEN LANGUAGE UNDERSTANDING	7458
<i>Zhiqi Huang, Fenglin Liu, Peilin Zhou, Yuexian Zou, Peking University, China</i>	
HLT-6.4: RNN TRANSDUCER MODELS FOR SPOKEN LANGUAGE UNDERSTANDING	7463
<i>Samuel Thomas, Hong-Kwang Kuo, George Saon, Zoltan Tuske, Brian Kingsbury, Gakuto Kurata, Zvi Kons, Ron Hoory, IBM Research AI, United States</i>	
HLT-6.5: LEVERAGING ACOUSTIC AND LINGUISTIC EMBEDDINGS FROM PRETRAINED SPEECH AND LANGUAGE MODELS FOR INTENT CLASSIFICATION	7468
<i>Bidisha Sharma, Maulik Madhavi, Haizhou Li, National University of Singapore, Singapore</i>	
 HLT-7: SPEECH TRANSLATION 1: MODELS	
HLT-7.1: ORTHROS: NON-AUTOREGRESSIVE END-TO-END SPEECH TRANSLATION WITH DUAL-DECODER	7648
<i>Hirofumi Inaguma, Kyoto University, Japan; Yosuke Higuchi, Waseda University, Japan; Kevin Duh, Johns Hopkins University, United States; Tatsuya Kawahara, Kyoto University, Japan; Shinji Watanabe, Johns Hopkins University, United States</i>	
HLT-7.2: CASCADED MODELS WITH CYCLIC FEEDBACK FOR DIRECT SPEECH TRANSLATION	7653
<i>Tsz Kin Lam, Shigehiko Schamoni, Stefan Riezler, Heidelberg University, Germany</i>	
HLT-7.3: JOINTLY TRAINED TRANSFORMERS MODELS FOR SPOKEN LANGUAGE TRANSLATION	7658
<i>Hari Krishna Vydana, BUT, Czechia; Martin Karafiat, Katerina Zmolikova, Lukáš Burget, Jan “Honza” Cernocky, Brno University of Technology, Czechia</i>	
HLT-7.4: EFFICIENT USE OF END-TO-END DATA IN SPOKEN LANGUAGE PROCESSING	7663
<i>Yiting Lu, University of Cambridge, United Kingdom; Yu Wang, Shanghai Jiao Tong University, China; Mark J. F. Gales, Cambridge University, United Kingdom</i>	
HLT-7.5: STREAMING SIMULTANEOUS SPEECH TRANSLATION WITH AUGMENTED MEMORY TRANSFORMER	7668
<i>Xutai Ma, Johns Hopkins University, United States; Yongqiang Wang, Mohammad Dousti, Facebook, United States; Philipp Koehn, Johns Hopkins University, United States; Juan Pino, Facebook, United States</i>	
HLT-7.6: AN EMPIRICAL STUDY OF END-TO-END SIMULTANEOUS SPEECH TRANSLATION DECODING STRATEGIES	7673
<i>Ha Nguyen, Université Grenoble Alpes, France; Yannick Estève, Avignon Université, France; Laurent Besacier, Université Grenoble Alpes, France</i>	
 HLT-8: SPEECH TRANSLATION 2: ASPECTS	
HLT-8.1: MODELING HOMOPHONE NOISE FOR ROBUST NEURAL MACHINE TRANSLATION	7678
<i>Wenjie Qin, Soochow University, China; Xiang Li, Yuhui Sun, Xiaomi AI Lab, China; Deyi Xiong, Tianjin University, China; Jianwei Cui, Bin Wang, Xiaomi AI Lab, China</i>	

HLT-8.2: MACHINE TRANSLATION VERBOSITY CONTROL FOR AUTOMATIC DUBBING	7683
<i>Surafel Melaku Lakew, Marcello Federico, Yue Wang, Cuong Hoang, Yogesh Virkar, Roberto Barra-Chicote, Robert Enyedi, Amazon, Italy</i>	
HLT-8.3: IMPROVEMENTS TO PROSODIC ALIGNMENT FOR AUTOMATIC DUBBING	7688
<i>Yogesh Virkar, Marcello Federico, Robert Enyedi, Roberto Barra-Chicote, Amazon, United States</i>	
HLT-8.4: IMAGE-ASSISTED TRANSFORMER IN ZERO-RESOURCE MULTI-MODAL TRANSLATION	7693
<i>Ping Huang, Shiliang Sun, East China Normal University, China; Hao Yang, Huawei Technologies CO., LTD, China</i>	
HLT-8.5: SENTENCE BOUNDARY AUGMENTATION FOR NEURAL MACHINE TRANSLATION ROBUSTNESS	7698
<i>Daniel Li, Columbia University, United States; Te I, Naveen Arivazhagan, Colin Cherry, Dirk Padfield, Google, United States</i>	
HLT-8.6: AN EMPIRICAL STUDY ON TASK-ORIENTED DIALOGUE TRANSLATION	7703
<i>Siyu Liu, Macao Polytechnic Institute, Macau SAR China</i>	
 HLT-9: STYLE AND TEXT NORMALIZATION	
HLT-9.1: MAPGN: MASKED POINTER-GENERATOR NETWORK FOR SEQUENCE-TO-SEQUENCE PRE-TRAINING	7333
<i>Mana Ithori, Naoki Makishima, Tomohiro Tanaka, Akihiko Takashima, Shota Orihashi, Ryo Masumura, NTT Corporation, Japan</i>	
HLT-9.2: ALIGNING THE TRAINING AND EVALUATION OF UNSUPERVISED TEXT STYLE TRANSFER	7338
<i>Wanhui Qian, Fuqing Zhu, Jinzhu Yang, Jizhong Han, Songlin Hu, Institute of Information Engineering, Chinese Academy of Sciences, China</i>	
HLT-9.3: NEURAL INVERSE TEXT NORMALIZATION	7343
<i>Monica Sunkara, Chaitanya Shivade, Sravan Bodapati, Katrin Kirchhoff, Amazon, United States</i>	
HLT-9.4: GENERATING HUMAN READABLE TRANSCRIPT FOR AUTOMATIC SPEECH RECOGNITION WITH PRE-TRAINED LANGUAGE MODEL	7348
<i>Junwei Liao, University of Electronic Science and Technology of China, China; Yu Shi, Microsoft Cognitive Services Research Group, United States; Ming Gong, Linjun Shou, Microsoft STCA NLP Group, China; Sefik Eskimez, Liyang Lu, Microsoft Cognitive Services Research Group, United States; Hong Qu, University of Electronic Science and Technology of China, China; Michael Zeng, Microsoft Cognitive Services Research Group, United States</i>	
HLT-9.5: IMPROVING NEURAL TEXT NORMALIZATION WITH PARTIAL PARAMETER GENERATOR AND POINTER-GENERATOR NETWORK	7353
<i>Weiwei Jiang, Columbia University, China; Junjie Li, Minchuan Chen, Jun Ma, Shaojun Wang, Jing Xiao, Ping An Technology, China</i>	
 HLT-10: MULTI-MODALITY IN LANGUAGE	
HLT-10.1: INCORPORATING SYNTACTIC AND PHONETIC INFORMATION INTO MULTIMODAL WORD EMBEDDINGS USING GRAPH CONVOLUTIONAL NETWORKS	7768
<i>Wenhao Zhu, Shuang Liu, Chaoming Liu, Shanghai University, China</i>	
HLT-10.2: LIFI: TOWARDS LINGUISTICALLY INFORMED FRAME INTERPOLATION	7773
<i>Aradhya Mathur, IIT Delhi, India; Devansh Batra, IIT-D, India; Yaman Kumar Singla, IIT-D; Adobe; State University of New York at Buffalo, India; Rajiv Ratn Shah, IIT Delhi, India; Changyou Chen, State University of New York at Buffalo, United States; Roger Zimmermann, NUS, Singapore</i>	

HLT-10.3: TRIPLE SEQUENCE GENERATIVE ADVERSARIAL NETS FOR UNSUPERVISED IMAGE CAPTIONING 7778
Yucheng Zhou, Wei Tao, Wenqiang Zhang, Fudan University, China

HLT-10.4: ALIGN OR ATTEND? TOWARD MORE EFFICIENT AND ACCURATE SPOKEN WORD DISCOVERY USING SPEECH-TO-IMAGE RETRIEVAL 7783
Liming Wang, University of Illinois, Urbana-Champaign, United States; Xinsheng Wang, Delft University of Technology, Netherlands; Mark Hasegawa-Johnson, University of Illinois, Urbana-Champaign, United States; Odette Scharenborg, Delft University of Technology, Netherlands; Najim Dehak, Johns Hopkins University, Netherlands

HLT-10.5: TOWARDS PRACTICAL LIPREADING WITH DISTILLED AND EFFICIENT MODELS 7788
Pingchuan Ma, Imperial College London, United Kingdom; Brais Martinez, Samsung AI Research Center, United Kingdom; Stavros Petridis, Maja Pantic, Imperial College London, United Kingdom

HLT-10.6: END-TO-END AUDIO-VISUAL SPEECH RECOGNITION WITH CONFORMERS 7793
Pingchuan Ma, Stavros Petridis, Maja Pantic, Imperial College London, United Kingdom

HLT-11: LANGUAGE UNDERSTANDING 3: SPEECH UNDERSTANDING - GENERAL TOPICS

HLT-11.1: ASR N-BEST FUSION NETS..... 7473
Xinyue Liu, Mingda Li, Luoxin Chen, Prashan Wanigasekara, Weitong Ruan, Haidar Khan, Wael Hamza, Chengwei Su, Amazon, United States

HLT-11.2: BOOSTING LOW-RESOURCE INTENT DETECTION WITH IN-SCOPE PROTOTYPICAL NETWORKS 7478
Hongzhan Lin, Yuanmeng Yan, Guang Chen, Beijing University of Posts and Telecommunications, China

HLT-11.3: CONVERSATIONAL QUERY REWRITING WITH SELF-SUPERVISED LEARNING 7483
Hang Liu, Meng Chen, Youzheng Wu, Xiaodong He, Bowen Zhou, JD AI, China

HLT-11.4: HANDLING CLASS IMBALANCE IN LOW-RESOURCE DIALOGUE SYSTEMS BY COMBINING FEW-SHOT CLASSIFICATION AND INTERPOLATION 7488
Vishal Sunder, Eric Fosler-Lussier, The Ohio State University, United States

HLT-11.5: IMPROVING CROSS-DOMAIN SLOT FILLING WITH COMMON SYNTACTIC STRUCTURE 7493
Luchen Liu, Xixun Lin, Peng Zhang, Chinese Academy of Sciences, China; Bin Wang, Xiaomi Inc., China

HLT-11.6: JOINT INTENT DETECTION AND SLOT FILLING BASED ON CONTINUAL LEARNING MODEL 7498
Yanfei Hui, Jianzong Wang, Ning Cheng, Fengying Yu, Tianbo Wu, Jing Xiao, Ping An Technology (Shenzhen) Co., Ltd., China

HLT-12: LANGUAGE UNDERSTANDING 4: SEMANTIC UNDERSTANDING

HLT-12.1: KNOWLEDGE-BASED CHAT DETECTION WITH FALSE MENTION DISCRIMINATION 7503
Wei Liu, Peijie Huang, Dongzhu Liang, Zihao Zhou, South China Agricultural University, China

HLT-12.2: REPLACING HUMAN AUDIO WITH SYNTHETIC AUDIO FOR ON-DEVICE UNSPOKEN PUNCTUATION PREDICTION 7508
Daria Soboleva, Ondrej Skopek, Mária Šajgalík, Victor Cărbune, Felix Weissenberger, Julia Proskurnia, Bogdan Prisacari, Daniel Valcarce, Justin Lu, Rohit Prabhavalkar, Balint Miklos, Google, Switzerland

HLT-12.3: ADVERSARIAL GENERATIVE DISTANCE-BASED CLASSIFIER FOR ROBUST OUT-OF-DOMAIN DETECTION 7513

Zhiyuan Zeng, Hong Xu, Keqing He, Yuanmeng Yan, Sihong Liu, Zijun Liu, Weiran Xu, Beijing University of Posts and Telecommunications, China

HLT-12.4: GAN-BASED OUT-OF-DOMAIN DETECTION USING BOTH IN-DOMAIN AND OUT-OF-DOMAIN SAMPLES 7518

Chaojie Liang, Peijie Huang, Wenbin Lai, Ziheng Ruan, South China Agricultural University, China

HLT-12.5: PROGRESSIVE DIALOGUE STATE TRACKING FOR MULTI-DOMAIN DIALOGUE SYSTEMS 7523

Jiahao Wang, Sun Yat-sen University, China; Minqian Liu, South China University of Technology, China; Xiaojun Quan, Sun Yat-sen University, China

HLT-12.6: MULTI-STEP SPOKEN LANGUAGE UNDERSTANDING SYSTEM BASED ON ADVERSARIAL LEARNING 7528

Yu Wang, Yilin Shen, Hongxia Jin, Samsung Research America, United States

HLT-13: INFORMATION EXTRACTION

HLT-13.1: MULTI-ENTITY COLLABORATIVE RELATION EXTRACTION 7738

Haozhuang Liu, Ziran Li, Dongming Sheng, Hai-Tao Zheng, Tsinghua University, China; Ying Shen, Sun Yat-Sen University, China

HLT-13.2: MULTI-GRANULARITY HETEROGENEOUS GRAPH FOR DOCUMENT-LEVEL RELATION EXTRACTION 7743

Hengzhu Tang, Yanan Cao, Zhenyu Zhang, Ruipeng Jia, Fang Fang, Institute of Information Engineering, Chinese Academy of Sciences, China; Shi Wang, Institute of Computing Technology, Chinese Academy of Sciences, China

HLT-13.3: IMPROVING EVENT DETECTION BY EXPLOITING LABEL HIERARCHY 7748

Xiangyu Xi, Meituan Group, China; Wei Ye, Tong Zhang, National Engineering Research Center for Software Engineering, Peking University, China; Quanxiu Wang, RICH AI, China; Shikun Zhang, National Engineering Research Center for Software Engineering, Peking University, China; Huixing Jiang, Wei Wu, Meituan Group, China

HLT-13.4: IMPROVING NER IN SOCIAL MEDIA VIA ENTITY TYPE-COMPATIBLE UNKNOWN WORD SUBSTITUTION 7753

Jian Xie, Kai Zhang, Lin Sun, Zhejiang University City College, China; Yindu Su, Zhejiang University, China; Chenxiang Xu, Zhejiang University City College, China

HLT-13.5: MORE: A METRIC LEARNING BASED FRAMEWORK FOR OPEN-DOMAIN RELATION EXTRACTION 7758

Yutong Wang, Tsinghua Shenzhen International Graduate School, Tsinghua University, China; Renze Lou, Department of Computer Science, Zhejiang University City College, China; Kai Zhang, Department of Computer Science and Technology, Tsinghua University, China; Mao Yan Chen, Yujiu Yang, Tsinghua Shenzhen International Graduate School, Tsinghua University, Canada

HLT-13.6: “YOU SHOULD PROBABLY READ THIS”: HEDGE DETECTION IN TEXT..... 7763

Denys Katerenchuk, The Graduate Center, CUNY, United States; Rivka Levitan, Brooklyn College, CUNY, United States

HLT-14: LANGUAGE REPRESENTATIONS

HLT-14.1: ENHANCING MODEL ROBUSTNESS BY INCORPORATING ADVERSARIAL KNOWLEDGE INTO SEMANTIC REPRESENTATION 7798

Jinfeng Li, Alibaba Group, China; Tianyu Du, Zhejiang University, China; Xiangyu Liu, Rong Zhang, Hui Xue, Alibaba Group, China; Shouling Ji, Zhejiang University, China

HLT-14.2: ELBERT: FAST ALBERT WITH CONFIDENCE-WINDOW BASED EARLY EXIT	7803
<i>Keli Xie, Siyuan Lu, Meiqi Wang, Zhongfeng Wang, Nanjing University, China</i>	
HLT-14.3: DUALFORMER: A UNIFIED BIDIRECTIONAL SEQUENCE-TO-SEQUENCE LEARNING	7808
<i>Jen-Tzung Chien, Wei-Hsiang Chang, National Chiao Tung University, Taiwan</i>	
HLT-14.4: TASK AWARE MULTI-TASK LEARNING FOR SPEECH TO TEXT TASKS	7813
<i>Sathish Indurthi, Mohd Abbas Zaidi, Nikhil Kumar Lakumarapu, Beomseok Lee, Hyojung Han, Seokchan Ahn, Sangha Kim, Chanwoo Kim, Inchul Hwang, Samsung Electronics, South Korea</i>	
HLT-14.5: LABEL-AWARE TEXT REPRESENTATION FOR MULTI-LABEL TEXT CLASSIFICATION	7818
<i>Hao Guo, Xiangyang Li, Lei Zhang, Jia Liu, Wei Chen, Alibaba Group, China</i>	
HLT-14.6: MIXUP REGULARIZED ADVERSARIAL NETWORKS FOR MULTI-DOMAIN TEXT CLASSIFICATION	7823
<i>Yuan Wu, Carleton University, Canada; Diana Inkpen, University of Ottawa, Canada; Ahmed El-Roby, Carleton University, Canada</i>	
 HLT-15: LANGUAGE ASSESSMENT	
HLT-15.1: MISPRONUNCIATION DETECTION IN NON-NATIVE (L2) ENGLISH WITH UNCERTAINTY MODELING	7708
<i>Daniel Korzekwa, Jaime Lorenzo-Trueba, Amazon, Poland; Szymon Zaporowski, Gdansk University of Technology, Poland; Shira Calamaro, Thomas Drugman, Amazon, United States; Bozena Kostek, Gdansk University of Technology, Poland</i>	
HLT-15.2: ATTENTION-BASED MULTI-ENCODER AUTOMATIC PRONUNCIATION ASSESSMENT	7713
<i>Binghuai Lin, Liyuan Wang, Tencent Technology Co., Ltd, China</i>	
HLT-15.3: IMPROVING PRONUNCIATION ASSESSMENT VIA ORDINAL REGRESSION WITH ANCHORED REFERENCE SAMPLES	7718
<i>Bin Su, Tsinghua University, China; Shaoguang Mao, Frank K. Soong, Yan Xia, Jonathan Tien, Microsoft Research Asia, China; Zhiyong Wu, Tsinghua University, China</i>	
HLT-15.4: ANALYSING BIAS IN SPOKEN LANGUAGE ASSESSMENT USING CONCEPT ACTIVATION VECTORS	7723
<i>Xizi Wei, University of Birmingham, United Kingdom; Mark J. F. Gales, Kate M. Knill, Cambridge University, United Kingdom</i>	
HLT-15.5: SENONE-AWARE ADVERSARIAL MULTI-TASK TRAINING FOR UNSUPERVISED CHILD TO ADULT SPEECH ADAPTATION	7728
<i>Richeng Duan, Nancy Chen, Agency for Science, Technology and Research (A*STAR), Singapore</i>	
HLT-15.6: CLASSIFYING SPEECH INTELLIGIBILITY LEVELS OF CHILDREN IN TWO CONTINUOUS SPEECH STYLES	7733
<i>Yeh-Sheng Lin, Shu-Chuan Tseng, Institute of Linguistics, Academia Sinica, Taiwan</i>	
 HLT-16: APPLICATIONS IN NATURAL LANGUAGE	
HLT-16.1: RECENT ADVANCES IN ARABIC SYNTACTIC DIACRITICS RESTORATION	7828
<i>Yasser Hifny, University of Helwan, Egypt</i>	

HLT-16.2: MAKING PUNCTUATION RESTORATION ROBUST AND FAST WITH MULTI-TASK LEARNING AND KNOWLEDGE DISTILLATION	7833
<i>Michael Hentschel, Emiru Tsunoo, Takao Okuda, Sony Corporation, Japan</i>	
HLT-16.3: VARIATIONAL DIALOGUE GENERATION WITH NORMALIZING FLOWS	7838
<i>Tien-Ching Luo, Jen-Tzung Chien, National Chiao Tung University, Taiwan</i>	
HLT-16.4: NN-KOG2P: A NOVEL GRAPHEME-TO-PHONEME MODEL FOR KOREAN LANGUAGE	7843
<i>Hwa-Yeon Kim, Jong-Hwan Kim, Jae-Min Kim, Naver Corporation, South Korea</i>	
HLT-16.5: JOINT ALIGNMENT LEARNING-ATTENTION BASED MODEL FOR GRAPHEME-TO-PHONEME CONVERSION	7848
<i>Yonghe Wang, Feilong Bao, Hui Zhang, Guanglai Gao, Inner Mongolia University, China</i>	
 HLT-17: LANGUAGE UNDERSTANDING 5: QUESTION ANSWERING AND READING COMPREHENSION	
HLT-17.1: KNOWLEDGE DISTILLATION FOR IMPROVED ACCURACY IN SPOKEN QUESTION ANSWERING	7533
<i>Chenyu You, Yale University, United States; Nuo Chen, Yuexian Zou, Peking University, China</i>	
HLT-17.2: COARSE-TO-CAREFUL: SEEKING SEMANTIC-RELATED KNOWLEDGE FOR OPEN-DOMAIN COMMONSENSE QUESTION ANSWERING	7538
<i>Luxi Xing, Yue Hu, Jing Yu, Yuqiang Xie, Wei Peng, Institute of Information Engineering, Chinese Academy of Sciences, China</i>	
HLT-17.3: LANGUAGE MODEL IS ALL YOU NEED: NATURAL LANGUAGE UNDERSTANDING AS QUESTION ANSWERING	7543
<i>Mahdi Namazifar, Alexandros Papangelis, Gokhan Tur, Dilek Hakkani-Tur, Amazon, United States</i>	
HLT-17.4: INTEGRATING SUBGRAPH-AWARE RELATION AND DIRECTION REASONING FOR QUESTION ANSWERING	7548
<i>Xu Wang, Shuai Zhao, Bo Cheng, Jiale Han, Yingting Li, Beijing University of Posts and Telecommunications, China; Hao Yang, Huawei, China; Ivan Sekulic, University of Lugano, Switzerland; Guoshun Nan, Singapore University of Technology and Design, Singapore</i>	
HLT-17.5: ROLE AWARE MULTI-PARTY DIALOGUE QUESTION ANSWERING	7553
<i>Jui-Heng Hsu, Po-Wei Shen, Hung-Ting Su, Chen-Hsi Chang, Jia-Fong Yeh, Winston H. Hsu, National Taiwan University, Taiwan</i>	
HLT-17.6: MCR-NET: A MULTI-STEP CO-INTERACTIVE RELATION NETWORK FOR UNANSWERABLE QUESTIONS ON MACHINE READING COMPREHENSION	7558
<i>Wei Peng, Yu Hu, Jing Yu, Luxi Xing, Yuqiang Xie, Zihao Zhu, Yajing Sun, Institute of Information Engineering, Chinese Academy of Sciences, China</i>	
 HLT-18: LANGUAGE UNDERSTANDING 6: SUMMARIZATION AND COMPREHENSION	
HLT-18.1: HIERARCHICAL SPEAKER-AWARE SEQUENCE-TO-SEQUENCE MODEL FOR DIALOGUE SUMMARIZATION	7563
<i>Yuejie Lei, Yuanmeng Yan, Zhiyuan Zeng, Keqing He, Ximing Zhang, Weiran Xu, Beijing University of Posts and Telecommunications, China</i>	
HLT-18.2: A LARGE-SCALE CHINESE LONG-TEXT EXTRACTIVE SUMMARIZATION CORPUS	7568
<i>Kai Chen, Guanyu Fu, Qingcai Chen, Baotian Hu, Harbin Institute of Technology, Shenzhen, China</i>	

HLT-18.3: ADAPTIVE BI-DIRECTIONAL ATTENTION: EXPLORING MULTI-GRANULARITY REPRESENTATIONS FOR MACHINE READING COMPREHENSION 7573
Nuo Chen, Fenglin Liu, Peking University, China; Chenyu You, Yale University, China; Peilin Zhou, Yuexian Zou, Peking University, China

HLT-18.4: GRAPH ATTENTION AND INTERACTION NETWORK WITH MULTI-TASK LEARNING FOR FACT VERIFICATION 7578
Rui Yang, Runze Wang, Zhen-Hua Ling, National Engineering Laboratory for Speech and Language Information Processing, University of Science and Technology of China, China

HLT-18.5: ENHANCING DEEP PARAPHRASE IDENTIFICATION VIA LEVERAGING WORD ALIGNMENT INFORMATION 7583
Boxin Li, Tingwen Liu, Institute of Information Engineering, Chinese Academy of Sciences, China; Bin Wang, Xiaomi AI Lab, China; Lihong Wang, National Computer Network Emergency Response Technical Team Coordination Center of China, China

HLT-18.6: AN END-TO-END ACTOR-CRITIC-BASED NEURAL COREFERENCE RESOLUTION SYSTEM 7588
Yu Wang, Yilin Shen, Hongxia Jin, Samsung Research America, United States

ASPS-1: ARCHITECTURES

ASPS-1.1: REDUCED-COMPLEXITY MODULAR POLYNOMIAL MULTIPLICATION FOR R-LWE CRYPTOSYSTEMS 7853
Xinmiao Zhang, The Ohio State University, United States; Keshab K. Parhi, University of Minnesota, United States

ASPS-1.2: SEIZURE DETECTION USING POWER SPECTRAL DENSITY VIA HYPERDIMENSIONAL COMPUTING 7858
Lulu Ge, Keshab K. Parhi, University of Minnesota, United States

ASPS-1.3: FPGA HARDWARE DESIGN FOR PLENOPTIC 3D IMAGE PROCESSING ALGORITHM TARGETING A MOBILE APPLICATION 7863
Faraz Bhatti, Thomas Greiner, Pforzheim University, Germany

ASPS-1.4: SLAP: A SPLIT LATENCY ADAPTIVE VLIW PIPELINE ARCHITECTURE WHICH ENABLES ON-THE-FLY VARIABLE SIMD VECTOR-LENGTH 7868
Ashish Shrivastava, Futurewei Technology Inc., United States; Alan Gatherer, Cirrus360 Corp, United States; Tong Sun, BirenTechnology Inc., United States; Sushma Wokhlu, Apple Inc., United States; Alex Chandra, JMA Wireless, United States

ASPS-1.5: UNSUPERVISED CLUSTERING OF TIME SERIES SIGNALS USING NEUROMORPHIC ENERGY-EFFICIENT TEMPORAL NEURAL NETWORKS 7873
Shreyas Chaudhari, Harideep Nair, Jose Moura, John Shen, Carnegie Mellon University, United States

ASPS-1.6: ANGLE-OF-ARRIVAL (AOA) FACTORIZATION IN MULTIPATH CHANNELS 7878
Yu-Lin Wei, Romit Roy Choudhury, University of Illinois at Urbana-Champaign, United States

ASPS-2: ALGORITHM/ARCHITECTURE CO-DESIGN

ASPS-2.1: SCALED FAST NESTED KEY EQUATION SOLVER FOR GENERALIZED INTEGRATED INTERLEAVED BCH DECODERS 7883
Zhenhan Xie, Xinmiao Zhang, The Ohio State University, United States

ASPS-2.2: JOINT OPTIMIZATION FOR FULL-DUPLEX CELLULAR COMMUNICATIONS VIA INTELLIGENT REFLECTING SURFACE 7888
Zhangjie Peng, Shanghai Normal University, China; Cunhua Pan, Queen Mary University of London, United Kingdom; Zhenkun Zhang, Xianzhe Chen, Li Li, Shanghai Normal University, China; A. Lee Swindlehurst, University of California, Irvine, United States

ASPS-2.3: A COLOR DOPPLER PROCESSING ENGINE WITH AN ADAPTIVE CLUTTER FILTER FOR PORTABLE ULTRASOUND IMAGING DEVICES	7893
<i>Yi-Lin Lo, Chia-Hsiang Yang, National Taiwan University, Taiwan</i>	
ASPS-2.4: CONVOLUTIONAL NEURAL NETWORK-AIDED BIT-FLIPPING FOR BELIEF PROPAGATION DECODING OF POLAR CODES	7898
<i>Chieh-Fang Teng, Andrew Kuan-Shiuan Ho, Chen-Hsi Wu, Sin-Sheng Wong, An-Yeu (Andy) Wu, National Taiwan University, Taiwan</i>	
ASPS-2.5: TAMING VOTING ALGORITHMS ON GPUS FOR AN EFFICIENT CONNECTED COMPONENT ANALYSIS ALGORITHM	7903
<i>Florian Lemaitre, Arthur Hennequin, Lionel Lacassagne, Sorbonne Université, France</i>	
ASPS-2.6: POSITNN: TRAINING DEEP NEURAL NETWORKS WITH MIXED LOW-PRECISION POSIT	7908
<i>Gonçalo Raposo, Pedro Tomás, Nuno Roma, INESC-ID, Instituto Superior Técnico, Universidade de Lisboa, Portugal</i>	
 ASPS-3: IOT	
ASPS-3.1: BLUETOOTH LOW ENERGY AND CNN-BASED ANGLE OF ARRIVAL LOCALIZATION IN PRESENCE OF RAYLEIGH FADING	7913
<i>Zohreh HajiAkhondi-Meybodi, Mohammad Salimibeni, Arash Mohammadi, Concordia University, Canada; Konstantinos N. Plataniotis, University of Toronto, Canada</i>	
ASPS-3.2: ROBUST DEVICE-FREE PROXIMITY DETECTION USING WIFI	7918
<i>Yuqian Hu, Muhammed Zahid Ozturk, Feng Zhang, Beibei Wang, K. J. Ray Liu, University of Maryland, United States</i>	
ASPS-3.3: ONLINE DYNAMIC WINDOW (ODW) ASSISTED 2-STAGE LSTM INDOOR LOCALIZATION FOR SMART PHONES	7923
<i>Mohammadamin Atashi, Arash Mohammadi, Concordia University, Canada</i>	
ASPS-3.4: OPTIMAL TOA LOCALIZATION FOR MOVING SENSOR IN ASYMMETRIC NETWORK	7928
<i>Sihao Zhao, Xiao-Ping Zhang, Ryerson University, Canada; Xiaowei Cui, Mingquan Lu, Tsinghua University, China</i>	
ASPS-3.5: LOW COMPLEXITY SLM FOR OFDMA SYSTEM WITH IMPLICIT SIDE INFORMATION	7933
<i>Shicheng Hu, Miao Yang, ShanghaiTech University, China; Kai Kang, Hua Qian, Shanghai Advanced Research Institute, China</i>	
ASPS-3.6: REDUCED-COMPLEXITY CHANNEL ESTIMATION BY HIERARCHICAL INTERPOLATION EXPLOITING SPARSITY FOR MASSIVE MIMO SYSTEMS WITH UNIFORM RECTANGULAR ARRAY	7938
<i>Chi-Shiang Wang, Pei-Yun Tsai, National Central University, Taiwan</i>	
 ASPS-4: AUTONOMOUS SYSTEMS	
ASPS-4.1: TRAFFIC SPEED FORECASTING VIA SPATIO-TEMPORAL ATTENTIVE GRAPH ISOMORPHISM NETWORK	7943
<i>Qing Yang, Ting Zhong, Fan Zhou, University of Electronic Science and Technology of China, China</i>	
ASPS-4.2: INFERRING HIGH-RESOLUTIONAL URBAN FLOW WITH INTERNET OF MOBILE THINGS	7948
<i>Fan Zhou, Xin Jing, Liang Li, Ting Zhong, University of Electronic Science and Technology of China, China</i>	
ASPS-4.3: TRANSFER LEARNING FOR INPUT ESTIMATION OF VEHICLE SYSTEMS	7953
<i>Liam Cronin, Soheil Sadeghi Eshkevari, Debarshi Sen, Shamim Pakzad, Lehigh University, United States</i>	

ASPS-4.4: IDENTIFICATION OF DEEP BREATH WHILE MOVING FORWARD BASED ON MULTIPLE BODY REGIONS AND GRAPH SIGNAL ANALYSIS	7958
<i>Yunlu Wang, East China Normal University, China; Cheng Yang, Key Laboratory of Artificial Intelligence, Ministry of Education, China; Menghan Hu, Jian Zhang, Qingli Li, East China Normal University, China; Guangtao Zhai, Key Laboratory of Artificial Intelligence, Ministry of Education, China; Xiao-Ping Zhang, Ryerson University, Canada</i>	
ASPS-4.5: MULTI-OBJECT TRACKING USING POISSON MULTI-BERNOULLI MIXTURE FILTERING FOR AUTONOMOUS VEHICLES	7963
<i>Su Pang, Hayder Radha, Michigan State University, United States</i>	
ASPS-4.6: ADAPTIVE RF FINGERPRINT DECOMPOSITION IN MICRO UAV DETECTION BASED ON MACHINE LEARNING	7968
<i>Chengtao Xu, Fengyu He, Bowen Chen, Yushan Jiang, Houbing Song, Embry-Riddle Aeronautical University, United States</i>	
 ASPS-5: AUDIO & IMAGES	
ASPS-5.1: DEPRESSION DETECTION BY ANALYSING EYE MOVEMENTS ON EMOTIONAL IMAGES	7973
<i>Ruizhe Shen, Qi Zhan, Yu Wang, Tsinghua University, China; Huimin Ma, University of Science and Technology Beijing, China</i>	
ASPS-5.2: WEAKLY SUPERVISED PATCH LABEL INFERENCE NETWORK WITH IMAGE PYRAMID FOR PAVEMENT DISEASES RECOGNITION IN THE WILD	7978
<i>Guixin Huang, Sheng Huang, Chongqing University, China; Luwen Huangfu, San Diego State University, United States; Dan Yang, Chongqing University, China</i>	
ASPS-5.3: A WIRELESS REFERENCE ACTIVE NOISE CONTROL HEADPHONE USING COHERENCE BASED SELECTION TECHNIQUE	7983
<i>Xiaoyi Shen, Dongyuan Shi, Woon-Seng Gan, Nanyang Technological University, Singapore</i>	
ASPS-5.4: HOW TO USE TIME INFORMATION EFFECTIVELY? COMBINING WITH TIME SHIFT MODULE FOR LIPREADING	7988
<i>Mingfeng Hao, Mutallip Mamut, Nurbiya Yadikar, Alimjan Aysa, Kurban Ubul, Xinjiang University, China</i>	
ASPS-5.5: EXPLORING THE APPLICATION OF SYNTHETIC AUDIO IN TRAINING KEYWORD SPOTTERS	7993
<i>Andrew Werchniak, Roberto Barra-Chicote, Yuriy Mishchenko, Jasha Droppo, Peng Liu, Jeff Condal, Anish Shah, Amazon, United States</i>	
ASPS-5.6: GRAPH ENHANCED QUERY REWRITING FOR SPOKEN LANGUAGE UNDERSTANDING SYSTEM	7997
<i>Siyang Yuan, Duke University, United States; Saurabh Gupta, Xing Fan, Derek Liu, Yang Liu, Chenlei Guo, Amazon.com, Inc., United States</i>	
 ASPS-6: SENSING & SENSOR PROCESSING	
ASPS-6.1: DEEP NEURAL NETWORK BASED COUGH DETECTION USING BED-MOUNTED ACCELEROMETER MEASUREMENTS	8002
<i>Madhurananda Pahar, Igor Miranda, University of Stellenbosch, South Africa; Andreas Diacon, TASK Applied Science, South Africa; Thomas Niesler, University of Stellenbosch, South Africa</i>	
ASPS-6.2: RADIO FREQUENCY BASED HEART RATE VARIABILITY MONITORING	8007
<i>Fengyu Wang, Xiaolu Zeng, Chenshu Wu, Beibei Wang, K. J. Ray Liu, University of Maryland, College Park, United States</i>	

ASPS-6.3: DISCRETE COSINE TRANSFORM BASED CAUSAL CONVOLUTIONAL NEURAL NETWORK FOR DRIFT COMPENSATION IN CHEMICAL SENSORS	8012
<i>Diaa Badawi, University of Illinois at Chicago, United States; Agamyrat Agambayev, Sule Ozev, Arizona State University, United States; Ahmet Enis Cetin, University of Illinois at Chicago, United States</i>	
ASPS-6.4: WIFI-BASED DEVICE-FREE GESTURE RECOGNITION THROUGH-THE-WALL	8017
<i>Sai Deepika Regani, Beibei Wang, K.J. Ray Liu, University of Maryland, College Park, United States</i>	
ASPS-6.5: SOUND RECOVERY FROM RADIO SIGNALS	8022
<i>Muhammed Zahid Ozturk, Chenshu Wu, Beibei Wang, K.J. Ray Liu, University of Maryland, College Park, United States</i>	
ASPS-6.6: FULLY-NEURAL APPROACH TO VEHICLE WEIGHING AND STRAIN PREDICTION ON BRIDGES USING WIRELESS ACCELEROMETERS	8027
<i>Takaya Kawakatsu, Kenro Aihara, Atsuhiko Takasu, Jun Adachi, National Institute of Informatics, Japan; Haoqi Wang, Tomonori Nagayama, University of Tokyo, Japan</i>	
 ASPS-7: DATA SCIENCE & MACHINE LEARNING	
ASPS-7.1: END TO END LEARNING FOR CONVOLUTIVE MULTI-CHANNEL WIENER FILTERING	8032
<i>Masahito Togami, LINE Corporation, Japan</i>	
ASPS-7.2: MAKF-SR: MULTI-AGENT ADAPTIVE KALMAN FILTERING-BASED SUCCESSOR REPRESENTATIONS	8037
<i>Mohammad Salimibeni, Concordia University, Canada; Parvin Malekzadeh, University of Toronto, Canada; Arash Mohammadi, Concordia University, Canada; Petros Spachos, University of Guelph, Canada; Konstantinos N. Plataniotis, University of Toronto, Canada</i>	
ASPS-7.3: VARIATION-STABLE FUSION FOR PPG-BASED BIOMETRIC SYSTEM	8042
<i>Dae Yon Hwang, Bilal Taha, Dimitrios Hatzinakos, University of Toronto, Canada</i>	
ASPS-7.4: IMPROVING STABILITY OF ADVERSARIAL LI-ION CELL USAGE DATA GENERATION USING GENERATIVE LATENT SPACE MODELLING	8047
<i>Subhankar Chattoraj, Universite Jean Monnet, Saint-Etienne, Univ. Lyon, India; Sawon Pratiher, Indian Institute of Technology, Kharagpur, India; Souvik Pratiher, Mu Sigma Business Solutions Private Limited, Bangalore, India; Hubert Konik, Universite Jean Monnet, Saint-Etienne, Univ. Lyon, France</i>	
ASPS-7.5: SQWA: STOCHASTIC QUANTIZED WEIGHT AVERAGING FOR IMPROVING THE GENERALIZATION CAPABILITY OF LOW-PRECISION DEEP NEURAL NETWORKS	8052
<i>Sungho Shin, Yoonho Boo, Wonyong Sung, Seoul National University, South Korea</i>	
ASPS-7.6: A QUANTITATIVE ANALYSIS OF THE ROBUSTNESS OF NEURAL NETWORKS FOR TABULAR DATA	8057
<i>Kavya Gupta, CentraleSupélec, France; Beatrice Pesquet-Popescu, Fateh Kaakai, Thales LAS, France; Jean-Christophe Pesquet, CentraleSupélec, France</i>	
 SS-1: BEAMFORMING FOR INTELLIGENT SURFACES	
SS-1.1: SPATIAL EQUALIZATION BEFORE RECEPTION: RECONFIGURABLE INTELLIGENT SURFACES FOR MULTI-PATH MITIGATION	8062
<i>Hongliang Zhang, Princeton University, United States; Lingyang Song, Peking University, China; Zhu Han, University of Houston, United States; H. Vincent Poor, Princeton University, United States</i>	
SS-1.2: INTERFERENCE ANALYSIS IN RECONFIGURABLE INTELLIGENT SURFACE-ASSISTED MULTIPLE-INPUT MULTIPLE-OUTPUT SYSTEMS	8067
<i>Jiang Liu, Xuewen Qian, Marco Di Renzo, CNRS & Paris-Saclay University, France</i>	

SS-1.3: CODEBOOK DESIGN FOR DUAL-POLARIZED ULTRA-MASSIVE MIMO COMMUNICATIONS AT MILLIMETER WAVE AND TERAHERTZ BANDS	8072
<i>Shuai Nie, Ian Akyildiz, Georgia Institute of Technology, United States</i>	
SS-1.4: PERFORMANCE ANALYSIS OF SPATIAL AND FREQUENCY DOMAIN INDEX-MODULATED RECONFIGURABLE INTELLIGENT METASURFACES	8077
<i>John Hodge, Virginia Tech, United States; Kumar Vijay Mishra, Brian M. Sadler, Amir Zaghloul, CCDC Army Research Lab, United States</i>	
SS-1.5: META-LEARNING FOR 6G COMMUNICATION NETWORKS WITH RECONFIGURABLE INTELLIGENT SURFACES	8082
<i>Minchae Jung, Soonchunhyang University, South Korea; Walid Saad, Virginia Tech, United States</i>	
 SS-2: DEEP LEARNING METHODS FOR SOLVING LINEAR INVERSE PROBLEMS	
SS-2.1: MODEL-INSPIRED DEEP LEARNING FOR LIGHT-FIELD MICROSCOPY WITH APPLICATION TO NEURON LOCALIZATION	8147
<i>Pingfan Song, Herman Verinaz Jadan, Carmel Howe, Peter Quicke, Amanda Foust, Pier Luigi Dragotti, Imperial College London, United Kingdom</i>	
SS-2.2: TIME-VARYING GRAPH SIGNAL INPAINTING VIA UNROLLING NETWORKS	8152
<i>Siheng Chen, Mitsubishi Electric Research Laboratories (MERL), United States; Yonina C. Eldar, Weizmann Institute of Science, Israel</i>	
SS-2.3: DEEP LEARNING FOR LINEAR INVERSE PROBLEMS USING THE PLUG-AND-PLAY PRIORS FRAMEWORK	8158
<i>Wei Chen, Beijing Jiaotong University, China; David Wipf, Amazon AI Research Lab, China; Miguel R.D. Rodrigues, University College London, United Kingdom</i>	
SS-2.4: A PLUG-AND-PLAY DEEP IMAGE PRIOR	8163
<i>Zhaodong Sun, Fabian Latorre, Thomas Sanchez, Volkan Cevher, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
SS-2.5: MRI IMAGE RECOVERY USING DAMPED DENOISING VECTOR AMP	8168
<i>Subrata Sarkar, Rizwan Ahmad, Philip Schniter, Ohio State, United States</i>	
SS-2.6: OVERCOMING MEASUREMENT INCONSISTENCY IN DEEP LEARNING FOR LINEAR INVERSE PROBLEMS: APPLICATIONS IN MEDICAL IMAGING	8173
<i>Marija Vella, João F. C. Mota, Heriot-Watt University, United Kingdom</i>	
 SS-3: MACHINE LEARNING IN WIRELESS NETWORKS	
SS-3.1: SCALABLE REINFORCEMENT LEARNING FOR ROUTING IN AD-HOC NETWORKS BASED ON PHYSICAL-LAYER ATTRIBUTES	8268
<i>Wei Cui, Wei Yu, University of Toronto, Canada</i>	
SS-3.2: BLIND CARBON COPY ON DIRTY PAPER: SEAMLESS SPECTRUM UNDERLAY VIA CANONICAL CORRELATION ANALYSIS	8273
<i>Mohamed Salah Ibrahim, Nicholas D. Sidiropoulos, University of Virginia, United States</i>	
SS-3.3: AN ACTOR-CRITIC REINFORCEMENT LEARNING APPROACH TO MINIMUM AGE OF INFORMATION SCHEDULING IN ENERGY HARVESTING NETWORKS	8278
<i>Shiyang Leng, The Pennsylvania State University, United States; Aylin Yener, The Ohio State University, United States</i>	

SS-3.4: MOVING OBJECT CLASSIFICATION WITH A SUB-6 GHZ MASSIVE MIMO ARRAY USING REAL DATA	8283
<i>Manoj B. R., Linköping University, Sweden; Guoda Tian, Sara Gunnarsson, Fredrik Tufvesson, Lund University, Sweden; Erik Larsson, Linköping University, Sweden</i>	
SS-3.5: OPTIMIZING COVERAGE AND CAPACITY IN CELLULAR NETWORKS USING MACHINE LEARNING	8288
<i>Ryan Dreifuerst, University of Texas at Austin, United States; Samuel Daulton, Yuchen Qian, Paul Varkey, Maximilian Balandat, Sanjay Kasturia, Anoop Tomar, Ali Yazdan, Vish Ponnampalam, Facebook, United States; Robert Heath, North Carolina State University, United States</i>	
SS-3.6: UNSUPERVISED LEARNING FOR ASYNCHRONOUS RESOURCE ALLOCATION IN AD-HOC WIRELESS NETWORKS	8293
<i>Zhiyang Wang, University of Pennsylvania, United States; Mark Eisen, Intel Labs, United States; Alejandro Ribeiro, University of Pennsylvania, United States</i>	
SS-4: DATA SCIENCE METHODS FOR COVID-19	
SS-4.1: TWO-STAGE ADAPTIVE POOLING WITH RT-QPCR FOR COVID-19 SCREENING	8117
<i>Anoosheh Heidarzadeh, Krishna Narayanan, Texas A&M University, United States</i>	
SS-4.2: POINT OF CARE IMAGE ANALYSIS FOR COVID-19.....	8122
<i>Daniel Yaron, Weizmann Institute of Science, Israel; Daphna Keidar, ETH Zurich, Switzerland; Elisha Goldstein, Weizmann Institute of Science, Israel; Yair Shachar, Eyeway Vision Ltd, Israel; Ayelet Blass, Oz Frank, Weizmann Institute of Science, Israel; Nir Schipper, The Hebrew University of Jerusalem, Israel; Nogah Shabshin, HaEmek Medical Center, Israel; Ahuva Grubstein, Dror Suhami, Sackler school of medicine Tel Aviv University, Rabin Medical Center, Israel; Naama R. Bogot, Chedva Weiss, Shaare Zedek Medical Cener, Israel; Eyal Sela, Amiel A. Dror, Galilee Medical Center, Azrieli Faculty of Medicine, Bar-Ilan University, Israel; Mordehay Vaturi, Sackler school of medicine Tel Aviv University, Rabin Medical Center, Israel; Federico Mento, University of Trento, Italy; Elena Torri, Bresciamed, Italy; Riccardo Inchingolo, Andrea Smargiassi, Fondazione Policlinico Universitario A. Gemelli IRCCS, Italy; Gino Soldati, Valle del Serchio General Hospital, Italy; Tiziano Perrone, Fondazione IRCCS Policlinico San Matteo di Pavia, Italy; Libertario Demi, University of Trento, Italy; Meirav Galun, Shai Bagon, Weizmann Institute of Science, Israel; Yishai M. Elyada, Mobileye Vision Technologies Ltd, Israel; Yonina C. Eldar, Weizmann Institute of Science, Israel</i>	
SS-4.3: AN IMPROVED DATA DRIVEN DYNAMIC SIRD MODEL FOR PREDICTIVE MONITORING OF COVID-19	8127
<i>Pushpendra Singh, National Institute of Technology Hamirpur, India; Amit Singhal, Bennett University, India; Binish Fatimah, CMR Institute of Technology, India; Anubha Gupta, Indraprastha Institute of Information Technology, India</i>	
SS-4.4: LEVERAGING A MULTIPLE-STRAIN MODEL WITH MUTATIONS IN ANALYZING THE SPREAD OF COVID-19	8132
<i>Anirudh Sridhar, Princeton University, United States; Osman Yagan, Carnegie Mellon University, United States; Rashad Eleteby, Walmart Labs, United States; Simon Levin, Princeton University, United States; Joshua Plotkin, University of Pennsylvania, United States; H. Vincent Poor, Princeton University, United States</i>	
SS-4.5: CONTACT TRACING ENHANCES THE EFFICIENCY OF COVID-19 GROUP TESTING	8137
<i>Ritesh Goenka, IIT Bombay, India; Shu-Jie Cao, ShanghaiTech University, China; Chau-Wai Wong, North Carolina State University, United States; Ajit Rajwade, IIT Bombay, India; Dror Baron, North Carolina State University, United States</i>	
SS-4.6: OPTIMAL QUESTIONNAIRES FOR SCREENING OF STRATEGIC AGENTS.....	8142
<i>Anuj Vora, Ankur Kulkarni, Indian Institute of Technology, Bombay, India</i>	

SS-5: DOMAIN ADAPTATION FOR MULTIMEDIA SIGNAL PROCESSING

SS-5.1: EXPLORING VISUAL-AUDIO COMPOSITION ALIGNMENT NETWORK FOR 8178 QUALITY FASHION RETRIEVAL IN VIDEO

Yanhao Zhang, Jianmin Wu, Xiong Xiong, Dangwei Li, Chenwei Xie, Yun Zheng, Pan Pan, Yinghui Xu, Alibaba group, China

SS-5.2: A SECURE SEARCHABLE IMAGE RETRIEVAL SCHEME WITH CORRECT 8183 RETRIEVAL IDENTITY

Liejun Wang, Haitao Yu, Xinjiang University, China

SS-5.3: INJECTING WORD INFORMATION WITH MULTI-LEVEL WORD ADAPTER 8188 FOR CHINESE SPOKEN LANGUAGE UNDERSTANDING

Dechuan Teng, Libo Qin, Wanxiang Che, Sendong Zhao, Ting Liu, Harbin Institute of Technology, China

SS-5.4: A CO-INTERACTIVE TRANSFORMER FOR JOINT SLOT FILLING AND 8193 INTENT DETECTION

Libo Qin, Tailu Liu, Wanxiang Che, Bingbing Kang, Sendong Zhao, Ting Liu, Harbin Institute of Technology, China

SS-5.5: DUAL METRIC DISCRIMINATOR FOR OPEN SET VIDEO DOMAIN 8198 ADAPTATION

Yatian Wang, Didi Chuxing, China; Xiaolin Song, Tianjin University, China; Yezhen Wang, Pengfei Xu, Runbo Hu, Hua Chai, Didi Chuxing, China

SS-5.6: CROSS-DOMAIN SENTIMENT CLASSIFICATION WITH CONTRASTIVE 8203 LEARNING AND MUTUAL INFORMATION MAXIMIZATION

Tian Li, Xiang Chen, Peking University, China; Shanghang Zhang, Zhen Dong, Kurt Keutzer, University of California, Berkeley, United States

SS-6: INTELLIGENT SENSING AND COMMUNICATIONS FOR EMERGING APPLICATIONS

SS-6.1: LOW-COMPLEXITY PARAMETER LEARNING FOR OTFS MODULATION 8238 BASED AUTOMOTIVE RADAR

Chenwen Liu, Shengheng Liu, Zihuan Mao, Yongming Huang, Haiming Wang, Southeast University, China

SS-6.2: FEDERATED DROPOUT LEARNING FOR HYBRID BEAMFORMING WITH 8243 SPATIAL PATH INDEX MODULATION IN MULTI-USER MMWAVE-MIMO SYSTEMS

Ahmet M Elbir, Sinem Coleri, Koc University, Turkey; Kumar Vijay Mishra, United States Army Research Laboratory, United States

SS-6.3: INFORMATION DECODING AND SDR IMPLEMENTATION OF DFRC 8248 SYSTEMS WITHOUT TRAINING SIGNALS

Daniel Wong, Batu Chalise, New York Institute of Technology, United States; Justin Metcalf, University of Oklahoma, United States; Moeness G. Amin, Villanova University, United States

SS-6.4: A LOW-COMPLEXITY MIMO DUAL FUNCTION RADAR COMMUNICATION 8253 SYSTEM VIA ONE-BIT SAMPLING

Siyu Zhu, Feng Xi, Shengyao Chen, Nanjing University of Science and Technology, China; Arye Nehorai, Washington University in St. Louis, United States

SS-6.5: LEARNING TO SELECT FOR MIMO RADAR BASED ON HYBRID 8258 ANALOG-DIGITAL BEAMFORMING

Zhaoyi Xu, Rutgers, the State University of New Jersey, United States; Fan Liu, University College London, United Kingdom; Konstantinos Diamantaras, International Hellenic University, Greece; Christos Masouros, University College London, United Kingdom; Athina Petropulu, Rutgers, the State University of New Jersey, United States

**SS-6.6: WORD-LEVEL ASL RECOGNITION AND TRIGGER SIGN DETECTION WITH 8263
RF SENSORS**

Mohammed Rahman, Emre Kurtoglu, University of Alabama, United States; Robiulhossain Mdrafi, Ali Gurbuz, Mississippi State University, United States; Evie Malaia, Chris Crawford, Darrin Griffin, Sevgi Gurbuz, University of Alabama, United States

**SS-7: MULTI-FUNCTION RADIO FREQUENCY SYSTEM: RADAR, COMMUNICATION,
POSITIONING AND BEYOND**

**SS-7.1: HYBRID BEAMFORMING FOR WIDEBAND OFDM DUAL FUNCTION RADAR 8298
COMMUNICATIONS**

Ziyang Cheng, Jinyang He, Shengnan Shi, Zishu He, University of Electronic Science and Technology of China, China; Bin Liao, Shenzhen University, China

**SS-7.2: BIT CONSTRAINED COMMUNICATION RECEIVERS IN JOINT RADAR 8303
COMMUNICATIONS SYSTEMS**

Dingyou Ma, Tsinghua University, China; Nir Shlezinger, Ben-Gurion University, Israel; Tianyao Huang, Yimin Liu, Tsinghua University, China; Yonina C. Eldar, Weizmann Institute of Science, Israel

**SS-7.3: ICI-AWARE PARAMETER ESTIMATION FOR MIMO-OFDM RADAR VIA APES 8308
SPATIAL FILTERING**

Musa Furkan Keskin, Henk Wymeersch, Chalmers University of Technology, Sweden; Visa Koivunen, Aalto University, Finland

**SS-7.4: JOINT COMMUNICATIONS WITH FH-MIMO RADAR SYSTEMS: AN 8313
EXTENDED SIGNALING STRATEGY**

Xiangrong Wang, Jing Xu, School of Electronic and Information Engineering; Beihang University, China; Abounasr Hassanien, Wright State University, United States; Elias Aboutanios, School of Electrical Engineering, University of New South Wales, Australia

**SS-7.5: FULL-DUPLEX MULTIFUNCTION TRANSCEIVER WITH JOINT CONSTANT 8318
ENVELOPE TRANSMISSION AND WIDEBAND RECEPTION**

Jaakko Marin, Micael Bernhardt, Taneli Riihonen, Tampere University, Finland

**SS-7.6: WAVEFORM DESIGN FOR THE JOINT MIMO RADAR AND 8323
COMMUNICATIONS WITH LOW INTEGRATED SIDELobe LEVELS AND ACCURATE
INFORMATION EMBEDDING**

Yongzhe Li, Xinyu Wu, Ran Tao, Beijing Institute of Technology, China

**SS-8: NEAR-ML DECODING OF ERROR-CORRECTING CODES: ALGORITHMS AND
IMPLEMENTATION**

**SS-8.1: ORDERED RELIABILITY BITS GUESSING RANDOM ADDITIVE NOISE 8328
DECODING**

Ken Duffy, Maynooth University, Ireland

SS-8.2: LEARNED DECIMATION FOR NEURAL BELIEF PROPAGATION DECODERS..... 8333

Andreas Buchberger, Christian Häger, Chalmers University of Technology, Sweden; Henry D. Pfister, Duke University, United States; Laurent Schmalen, Karlsruhe Institute of Technology, Germany; Alexandre Graell i Amat, Chalmers University of Technology, Sweden

SS-8.3: ADMM-BASED ML DECODING: FROM THEORY TO PRACTICE 8338

Kira Kraft, Norbert Wehn, Technische Universität Kaiserslautern, Germany

SS-8.4: TOWARDS PRACTICAL NEAR-MAXIMUM-LIKELIHOOD DECODING OF ERROR-CORRECTING CODES: AN OVERVIEW	8343
<i>Thibaud Tonnellier, McGill University, Canada; Marzieh Hashemipour-Nazari, Eindhoven University of Technology, Netherlands; Nghia Doan, Warren Gross, McGill University, Canada; Alexios Balatsoukas-Stimming, Eindhoven University of Technology, Netherlands</i>	
SS-8.5: HIGH-THROUGHPUT VLSI ARCHITECTURE FOR SOFT-DECISION DECODING WITH ORBGRAND	8348
<i>Syed Mohsin Abbas, Thibaud Tonnellier, Furkan Ercan, Marwan Jalaleddine, Warren Gross, McGill University, Canada</i>	
SS-8.6: HARDWARE IMPLEMENTATION OF ITERATIVE PROJECTION-AGGREGATION DECODING OF REED-MULLER CODES	8353
<i>Marzieh Hashemipour-Nazari, Kees Goossens, Alexios Balatsoukas-Stimming, Eindhoven University of Technology, Netherlands</i>	
SS-9: CONTACTLESS AND WIRELESS SENSING FOR SMART ENVIRONMENTS	
SS-9.1: M-ACTIVITY: ACCURATE AND REAL-TIME HUMAN ACTIVITY RECOGNITION VIA MILLIMETER WAVE RADAR	8087
<i>Yuheng Wang, Haipeng Liu, Kening Cui, Anfu Zhou, Wensheng Li, Huadong Ma, Beijing University of Posts and Telecommunications, China</i>	
SS-9.2: PUSHING THE LIMIT OF PHASE OFFSET FOR CONTACTLESS SENSING USING COMMODITY WIFI	8092
<i>Dongheng Zhang, Xiong Li, University of Electronic Science and Technology of China, China; Yan Chen, University of Science and Technology of China, China</i>	
SS-9.3: NONCONTACT HEARTBEAT DETECTION BY VITERBI ALGORITHM WITH FUSION OF BEAT-BEAT INTERVAL AND DEEP LEARNING-DRIVEN BRANCH METRICS	8097
<i>Kohei Yamamoto, Tomoaki Ohtsuki, Keio University, Japan</i>	
SS-9.4: TYPINGWRISTBAND: A HUMAN SLIGHT MOTION SENSING SYSTEM BASED ON VIBRATION DETECTION	8102
<i>Siyao Cheng, Jialiang Yan, Jianzhong Li, Jie Liu, Harbin Institute of Technology, China</i>	
SS-9.5: MOVEMENT DETECTION USING A RECIPROCAL RECEIVED SIGNAL STRENGTH MODEL	8107
<i>Ossi Kaltiokallio, Tampere University, Finland; Huseyin Yigitler, Aalto University, Finland</i>	
SS-9.6: DEEP CONVOLUTIONAL GAUSSIAN PROCESSES FOR MMWAVE OUTDOOR LOCALIZATION	8112
<i>Xuyu Wang, Mohini Patil, California State University, Sacramento, United States; Chao Yang, Shiwen Mao, Auburn University, United States; Palak Anilkumar Patel, California State University, Sacramento, United States</i>	
SS-10: COMPUTER AUDITION FOR HEALTHCARE (CA4H)	
SS-10.1: EXPLORING AUTOMATIC COVID-19 DIAGNOSIS VIA VOICE AND SYMPTOMS FROM CROWDSOURCED DATA	8208
<i>Jing Han, Chloe Brown, Jagmohan Chauhan, Andreas Grammenos, Apinan Hasthanasombat, Dimitris Spathis, Tong Xia, Pietro Cicuta, Cecilia Mascolo, University of Cambridge, United Kingdom</i>	
SS-10.2: COUGHWATCH: REAL-WORLD COUGH DETECTION USING SMARTWATCHES	8213
<i>Daniyal Liaqat, Salaar Liaqat, Jun Lin Chen, Tina Sedaghat, Moshe Gabel, Frank Rudzicz, Eyal de Lara, University of Toronto, Canada</i>	

SS-10.3: ACOUSTIC AND LINGUISTIC ANALYSES TO ASSESS EARLY-ONSET AND GENETIC ALZHEIMER'S DISEASE	8218
<i>Paula Andrea Pérez-Toro, University of Erlangen-Nuremberg, Germany; Juan Camilo Vásquez-Correa, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany; Tomás Arias-Vergara, Ludwig-Maximilians University, Germany; Philipp Klumpp, University of Erlangen-Nuremberg, Germany; Melissa Sierra-Castrillón, Mildred Estefania Roldán-López, David Aguillón, Liliana Hincapié-Henao, Carlos Andrés Tobón-Quintero, University of Antioquia, Colombia; Tobias Bocklet, Technische Hochschule Nürnberg, Germany; Maria Schuster, Ludwig-Maximilians University, Germany; Juan Rafael Orozco-Arroyave, University of Antioquia, Colombia; Elmar Nöth, University of Erlangen-Nuremberg, Germany</i>	
SS-10.4: A NOISE-ROBUST SIGNAL PROCESSING STRATEGY FOR COCHLEAR IMPLANTS USING NEURAL NETWORKS	8223
<i>Nengheng Zheng, Shenzhen University, China; Yupeng Shi, Tencent Media Lab, China; Yuyong Kang, Shenzhen University, China; Qinglin Meng, South China University of Technology, China</i>	
SS-10.5: CONTEXT-AWARE SPEECH STRESS DETECTION IN HOSPITAL WORKERS USING BI-LSTM CLASSIFIERS	8228
<i>Amr Gaballah, Abhishek Tiwari, Institut national de la recherche scientifique, Canada; Shrikanth Narayanan, University of Southern California, United States; Tiago Falk, Institut national de la recherche scientifique, Canada</i>	
SS-10.6: UNSUPERVISED HEART ABNORMALITY DETECTION BASED ON PHONOCARDIOGRAM ANALYSIS WITH BETA VARIATIONAL AUTO-ENCODERS	8233
<i>Shengchen Li, Ke Tian, Rui Wang, Beijing University of Posts and Telecommunications, China</i>	
 SS-11: ON-DEVICE AI FOR AUDIO AND SPEECH APPLICATIONS	
SS-11.1: COMPRESSING DEEP NEURAL NETWORKS FOR EFFICIENT SPEECH ENHANCEMENT	8358
<i>Ke Tan, DeLiang Wang, The Ohio State University, United States</i>	
SS-11.2: IMPROVED MASK-CTC FOR NON-AUTOREGRESSIVE END-TO-END ASR	8363
<i>Yosuke Higuchi, Waseda University, Japan; Hirofumi Inaguma, Kyoto University, Japan; Shinji Watanabe, Johns Hopkins University, United States; Tetsuji Ogawa, Tetsunori Kobayashi, Waseda University, Japan</i>	
SS-11.3: MEMORY-EFFICIENT SPEECH RECOGNITION ON SMART DEVICES	8368
<i>Ganesh Venkatesh, Alagappan Valliappan, Jay Mahadeokar, Yuan Shangguan, Christian Fuegen, Mike Seltzer, Vikas Chandra, Facebook, United States</i>	
SS-11.4: EXPEDITING DISCOVERY IN NEURAL ARCHITECTURE SEARCH BY COMBINING LEARNING WITH PLANNING	8373
<i>Farzaneh S. Fard, Vikrant Tomar, Fluent.ai, Canada</i>	
SS-11.5: SPECIALIZED EMBEDDING APPROXIMATION FOR EDGE INTELLIGENCE: A CASE STUDY IN URBAN SOUND CLASSIFICATION	8378
<i>Sangeeta Srivastava, Dhrubojyoti Roy, The Ohio State University, United States; Mark Cartwright, Juan Pablo Bello, New York University, United States; Anish Arora, The Ohio State University, United States</i>	
SS-11.6: LIGHT-TTS: LIGHTWEIGHT MULTI-SPEAKER MULTI-LINGUAL TEXT-TO-SPEECH	8383
<i>Song Li, Beibei Ouyang, Lin Li, Qingyang Hong, Xiamen University, China</i>	
 SS-12: RECENT ADVANCES IN MMWAVE RADAR SENSING FOR AUTONOMOUS VEHICLES	
SS-12.1: EFFICIENT LONG PERIODIC BINARY SEQUENCE DESIGNS FOR AUTOMOTIVE RADAR	8388
<i>Yutao Chen, Ronghao Lin, University of Science and Technology of China, China; Jian Li, University of Florida, United States</i>	

SS-12.2: JOINT LOCALIZATION AND PREDICTIVE BEAMFORMING IN VEHICULAR NETWORKS: POWER ALLOCATION BEYOND WATER-FILLING	8393
<i>Fan Liu, Christos Masouros, University College London, United Kingdom</i>	
SS-12.3: A NEW AUTOMOTIVE RADAR 4D POINT CLOUDS DETECTOR BY USING DEEP LEARNING	8398
<i>Yuwei Cheng, Tsinghua University, China; Jingran Su, Northwestern Polytechnical University, China; Hongyu Chen, Yimin Liu, Tsinghua University, China</i>	
SS-12.4: ENHANCED AUTOMOTIVE TARGET DETECTION THROUGH RADAR AND COMMUNICATIONS SENSOR FUSION	8403
<i>Sayed Hossein Dokhanchi, Bhavani Shankar Mysore R., Kumar Vijay Mishra, Bjorn Ottersten, University of Luxembourg, Luxembourg</i>	
SS-12.5: EXTENDED OBJECT TRACKING WITH AUTOMOTIVE RADAR USING B-SPLINE CHAINED ELLIPSES MODEL	8408
<i>Gang Yao, University of Connecticut, United States; Pu Wang, Karl Berntorp, Hassan Mansour, Petros Boufounos, Philip Orlik, Mitsubishi Electric Research Laboratories (MERL), United States</i>	
SS-12.6: FOUR-DIMENSIONAL HIGH-RESOLUTION AUTOMOTIVE RADAR IMAGING EXPLOITING JOINT SPARSE-FREQUENCY AND SPARSE-ARRAY DESIGN	8413
<i>Shunqiao Sun, University of Alabama, United States; Yimin Zhang, Temple University, United States</i>	
 SS-13: RECENT ADVANCES IN MULTICHANNEL AND MULTIMODAL MACHINE LEARNING FOR SPEECH APPLICATIONS	
SS-13.1: AN EMPIRICAL STUDY OF VISUAL FEATURES FOR DNN BASED AUDIO-VISUAL SPEECH ENHANCEMENT IN MULTI-TALKER ENVIRONMENTS	8418
<i>Shrishti Saha Shetu, Soumitro Chakrabarty, Emanuël Habets, Fraunhofer IIS, Germany</i>	
SS-13.2: ON THE ROLE OF VISUAL CUES IN AUDIOVISUAL SPEECH ENHANCEMENT	8423
<i>Zakaria Aldeneh, University of Michigan, United States; Anushree Prasanna Kumar, Barry-John Theobald, Erik Marchi, Sachin Kajarekar, Devang Naik, Ahmed Hussen Abdelaziz, Apple, United States</i>	
SS-13.3: CONVOLUTIVE TRANSFER FUNCTION INVARIANT SDR TRAINING CRITERIA FOR MULTI-CHANNEL REVERBERANT SPEECH SEPARATION	8428
<i>Christoph Boeddeker, Paderborn University, Germany; Wangyou Zhang, Shanghai Jiao Tong University, China; Tomohiro Nakatani, Keisuke Kinoshita, Tsubasa Ochiai, Marc Delcroix, Naoyuki Kamo, NTT Corporation, Japan; Yanmin Qian, Shanghai Jiao Tong University, China; Reinhold Haeb-Umbach, Paderborn University, Germany</i>	
SS-13.4: DIRECTIONAL ASR: A NEW PARADIGM FOR E2E MULTI-SPEAKER SPEECH RECOGNITION WITH SOURCE LOCALIZATION	8433
<i>Aswin Shanmugam Subramanian, Johns Hopkins University, United States; Chao Weng, Tencent AI Lab, China; Shinji Watanabe, Johns Hopkins University, United States; Meng Yu, Yong Xu, Shi-Xiong Zhang, Dong Yu, Tencent AI Lab, United States</i>	
SS-13.5: COMMUNICATION-COST AWARE MICROPHONE SELECTION FOR NEURAL SPEECH ENHANCEMENT WITH AD-HOC MICROPHONE ARRAYS	8438
<i>Jonah Casebeer, Jamshed Kaikous, Paris Smaragdis, University of Illinois at Urbana-Champaign, United States</i>	
SS-13.6: DEEP MULTI-FRAME MVDR FILTERING FOR SINGLE-MICROPHONE SPEECH ENHANCEMENT	8443
<i>Marvin Tammen, Simon Doclo, University of Oldenburg, Germany</i>	

SS-14: ROBUST SENSING AND DETECTION IN CONGESTED SPECTRUM

SS-14.1: COMPRESSIVE WIDEBAND SPECTRUM SENSING AND CARRIER 8448 FREQUENCY ESTIMATION WITH UNKNOWN MIMO CHANNELS

Hongwei Wang, Jilin Wang, Jun Fang, University of Electronic Science and Technology of China, China; Hongbin Li, Stevens Institute of Technology, United States

SS-14.2: JOINT OPTIMIZATION OF SPECTRALLY CO-EXISTING MULTI-CARRIER 8453 RADAR AND COMMUNICATION SYSTEMS IN CLUTTERED ENVIRONMENTS

Fangzhou Wang, Hongbin Li, Stevens Institute of Technology, United States; Braham Himed, AFRL/RYSMD, United States

SS-14.3: TARGET DETECTION IN FREQUENCY HOPPING MIMO DUAL-FUNCTION 8458 RADAR-COMMUNICATION SYSTEMS

Indu Priya Eedara, Moeness G. Amin, Villanova University, United States; Giuseppe A. Fabrizio, DST Group, Australia

SS-14.4: ASYMPTOTIC DISTRIBUTION OF GENERALIZED LIKELIHOOD RATIO 8463 TEST UNDER MODEL MISSPECIFICATION WITH APPLICATION TO COOPERATIVE RADAR- COMMUNICATIONS

Akshay Bondre, Christ Richmond, Arizona State University, United States

SS-14.5: ONLINE ANTENNA SELECTION FOR ENHANCED DOA ESTIMATION 8468

Elias Aboutanios, University of New South Wales, Australia; Hamed Nosrati, CSIRO Australia, Australia; Xiangrong Wang, Beihang University, China

SS-14.6: DESIGNING RANDOM FM RADAR WAVEFORMS WITH COMPACT 8473 SPECTRUM

Charles Mohr, Shannon Blunt, University of Kansas, United States

SS-15: SIGNAL PROCESSING FOR COLLABORATIVE INTELLIGENCE

SS-15.1: COLLABORATIVE INFERENCE VIA ENSEMBLES ON THE EDGE 8478

Nir Shlezinger, Ben-Gurion University of the Negev, Israel; Erez Farhan, Hai Morgenstern, BeyondMinds, Israel; Yonina C. Eldar, Weizmann Institute of Science, Israel

SS-15.2: ALLOCATING DNN LAYERS COMPUTATION BETWEEN FRONT-END 8483 DEVICES AND THE CLOUD SERVER FOR VIDEO BIG DATA PROCESSING

Peiyin Xing, Xiaofei Liu, Peixi Peng, Tiejun Huang, Yonghong Tian, Peking University, China

SS-15.3: BRANCHY-GNN: A DEVICE-EDGE CO-INFERENCE FRAMEWORK FOR 8488 EFFICIENT POINT CLOUD PROCESSING

Jiawei Shao, The Hong Kong Polytechnic University, Hong Kong SAR China; Haowei Zhang, The Hong Kong University of Science and Technology, Hong Kong SAR China; Yuyi Mao, Jun Zhang, The Hong Kong Polytechnic University, Hong Kong SAR China

SS-15.4: COLLABORATIVE INTELLIGENCE: CHALLENGES AND OPPORTUNITIES 8493

Ivan Bajic, Simon Fraser University, Canada; Weisi Lin, Nanyang Technological University, Singapore; Yonghong Tian, Peking University, China

SS-15.5: LATENT SPACE MOTION ANALYSIS FOR COLLABORATIVE INTELLIGENCE 8498

Mateen Ulhaq, Ivan Bajic, Simon Fraser University, Canada

SS-15.6: TEACHER-STUDENT LEARNING WITH MULTI-GRANULARITY 8503 CONSTRAINT TOWARDS COMPACT FACIAL FEATURE REPRESENTATION

Shurun Wang, Shiqi Wang, Wenhan Yang, City University of Hong Kong, China; Xinfeng Zhang, University of Chinese Academy of Sciences, China; Shanshe Wang, Siwei Ma, Peking University, China

SS-16: THEORETICAL FOUNDATIONS OF GRAPH NEURAL NETWORKS

SS-16.1: DISCRIMINABILITY OF SINGLE-LAYER GRAPH NEURAL NETWORKS..... 8508
Samuel Pfrommer, University of Pennsylvania, United States; Fernando Gama, University of California, Berkeley, United States; Alejandro Ribeiro, University of Pennsylvania, United States

SS-16.2: ON THE STABILITY OF GRAPH CONVOLUTIONAL NEURAL NETWORKS 8513
UNDER EDGE REWIRING
Henry Kenlay, University of Oxford, United Kingdom; Dorina Thanou, Swiss Data Science Center, Switzerland; Xiaowen Dong, University of Oxford, United Kingdom

SS-16.3: GEOMETRIC SCATTERING ATTENTION NETWORKS 8518
Yimeng Min, Frederik Wenkel, Guy Wolf, Université de Montréal; Mila - Quebec AI Institute, Canada

SS-16.4: EGO-GNNS: EXPLOITING EGO STRUCTURES IN GRAPH NEURAL 8523
NETWORKS
Dylan Sandfelder, Priyesh Vijayan, William Hamilton, McGill University, Canada

SS-16.5: LEARNING THE RELEVANT SUBSTRUCTURES FOR TASKS ON GRAPH 8528
DATA
Lei Chen, Zhengdao Chen, Joan Bruna, New York University, United States

SS-16.6: A SHORT TUTORIAL ON THE WEISFEILER-LEHMAN TEST AND ITS 8533
VARIANTS
Ningyuan (Teresa) Huang, Soledad Villar, Johns Hopkins University, United States

CHLG-2: ZYELL - NCTUNETWORK ANOMALY DETECTION CHALLENGE

CHLG-2.1: HYBRID MODEL FOR NETWORK ANOMALY DETECTION WITH 8538
GRADIENT BOOSTING DECISION TREES AND TABTRANSFORMER
Xinyue Xu, Australian National University, Australia; Xiaolu Zheng, Beihang University, China

CHLG-2.2: VOTING-BASED ENSEMBLE MODEL FOR NETWORK ANOMALY 8543
DETECTION
Tzu-Hsin Yang, Yu-Tai Lin, Chao-Lun Wu, Chih-Yu Wang, Academia Sinica, Taiwan

CHLG-2.3: AN ACCURACY NETWORK ANOMALY DETECTION METHOD BASED ON 8548
ENSEMBLE MODEL
Fengrui Liu, Xuefei Li, Wei Xiong, Haiyang Jiang, Institute of Computing Technology, Chinese Academy of Sciences; University of Chinese Academy of Sciences, China; Gaogang Xie, Computer Network Information Center, Chinese Academy of Sciences; University of Chinese Academy of Sciences, China

CHLG-2.4: FDEN: MINING EFFECTIVE INFORMATION OF FEATURES IN 8553
DETECTING NETWORK ANOMALIES
Bin Li, Yijie Wang, Mingyu Liu, Kele Xu, Zhongyang Wang, Li Cheng, Yizhou Li, National University of Defense Technology, China

CHLG-3: COVID-19 DIAGNOSIS

CHLG-3.1: MULTI-SCALE RESIDUAL NETWORK FOR COVID-19 DIAGNOSIS USING 8558
CT-SCANS
Pratyush Garg, Rishabh Ranjan, Kamini Upadhyay, Monika Agrawal, Indian Institute of Technology, Delhi, India; Desh Deepak, Dr. Ram Manohar Lohia Hospital, Delhi, India

CHLG-3.2: DIAGNOSING COVID-19 FROM CT IMAGES BASED ON AN ENSEMBLE 8563
LEARNING FRAMEWORK
Bingyang Li, Qi Zhang, Yinan Song, Zhicheng Zhao, Zhu Meng, Fei Su, Beijing University of Posts and Telecommunications, China

CHLG-3.3: CNR-IEMN: A DEEP LEARNING BASED APPROACH TO RECOGNISE COVID-19 FROM CT-SCAN	8568
<i>Fares Bougourzi, Riccardo Contino, Cosimo Distante, CNR, Italy; Abdelmalik Taleb-Ahmed, Univ. Polytechnique Hauts-de-France, Univ. Lille, France</i>	
CHLG-3.4: COVID-19 DIAGNOSTIC USING 3D DEEP TRANSFER LEARNING FOR CLASSIFICATION OF VOLUMETRIC COMPUTERISED TOMOGRAPHY CHEST SCANS	8573
<i>Shuohan Xue, Charith Abhayaratne, University of Sheffield, United Kingdom</i>	
CHLG-3.5: A MULTI-STAGE PROGRESSIVE LEARNING STRATEGY FOR COVID-19 DIAGNOSIS USING CHEST COMPUTED TOMOGRAPHY WITH IMBALANCED DATA	8578
<i>Zaifeng Yang, Institute of High Performance Computing, A*STAR, Singapore; Yubo Hou, Zhenghua Chen, Le Zhang, Institute for Infocomm Research, A*STAR, Singapore; Jie Chen, Hong Kong Baptist University, Hong Kong SAR China</i>	
CHLG-3.6: DETECTING COVID-19 AND COMMUNITY ACQUIRED PNEUMONIA USING CHEST CT SCAN IMAGES WITH DEEP LEARNING	8583
<i>Shubham Chaudhary, Sadbhawna Thakur, Vinit Jakhetiya, Badri N Subudhi, IIT Jammu, India; Ujjwal Baid, Sharath Chandra Guntuku, University of Pennsylvania, United States</i>	
 CHLG-1: MULTI-SPEAKER MULTI-STYLE VOICE CLONING CHALLENGE (M2VOC)	
CHLG-1.1: INVESTIGATING ON INCORPORATING PRETRAINED AND LEARNABLE SPEAKER REPRESENTATIONS FOR MULTI-SPEAKER MULTI-STYLE TEXT-TO-SPEECH	8588
<i>Chung-Ming Chien, Jheng-Hao Lin, Chien-yu Huang, Po-chun Hsu, Hung-yi Lee, National Taiwan University, Taiwan</i>	
CHLG-1.2: THE THINKIT SYSTEM FOR ICASSP2021 M2VOC CHALLENGE	8593
<i>Zengqiang Shang, Haozhe Zhang, Ziyi Chen, Bolin Zhou, Pengyuan Zhang, University of Chinese Academy of Sciences, China</i>	
CHLG-1.3: DIAN: DURATION INFORMED AUTO-REGRESSIVE NETWORK FOR VOICE CLONING	8598
<i>Wei Song, Xin Yuan, Zhengchen Zhang, Chao Zhang, Youzheng Wu, Xiaodong He, Bowen Zhou, JD Technology Group, China</i>	
CHLG-1.4: PROSODY AND VOICE FACTORIZATION FOR FEW-SHOT SPEAKER ADAPTATION IN THE CHALLENGE M2VOC 2021	8603
<i>Tao Wang, Ruibo Fu, Jiangyan Yi, Jianhua Tao, Zhengqi Wen, Chunyu Qiang, Shiming Wang, Institute of Automation, Chinese Academy of Sciences, China</i>	
CHLG-1.5: THE HUYA MULTI-SPEAKER AND MULTI-STYLE SPEECH SYNTHESIS SYSTEM FOR M2VOC CHALLENGE 2020	8608
<i>Jie Wang, Tsinghua University, China; Yuren You, Feng Liu, Deyi Tuo, Shiyin Kang, Huya Inc, China; Zhiyong Wu, Tsinghua University, China; Helen Meng, The Chinese University of Hong Kong, China</i>	
CHLG-1.6: THE MULTI-SPEAKER MULTI-STYLE VOICE CLONING CHALLENGE 2021	8613
<i>Qicong Xie, Northwestern Polytechnical University, China; Xiaohai Tian, National University of Singapore, Singapore; Guanghou Liu, Kun Song, Lei Xie, Northwestern Polytechnical University, China; Zhiyong Wu, Tsinghua University, China; Hai Li, Song Shi, iQIYI Inc, China; Haizhou Li, National University of Singapore, Singapore; Fen Hong, Originbeat Inc, China; Hui Bu, Xin Xu, Beijing Shell Shell Technology Co., Ltd, China</i>	

