

TIMOTHY MARRINAN

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OBJECTIVE

My goal is to obtain a position as a postdoctoral research associate at a leading academic research institution. I am qualified for such a position because I maintain an active research career that has led to publications in top tier journals, while simultaneously excelling in classroom instruction. I have productively collaborated with computer scientists and electrical engineers in academia and at a federal research laboratory. I have exciting, achievable plans for my research in the coming years. My field of geometric data analysis is growing in theory, applications, and research funding.

RESEARCH INTERESTS

Computer Vision, **Geometric Data Analysis**, Hyperspectral Image Analysis, Linear Algebra, Manifold Learning, Optimization, Pattern Recognition, **Riemannian Geometry**, Semidefinite Programming

ACADEMIC HISTORY

DEGREE	Doctorate of Philosophy in Mathematics	2013 - 2016 (expected)
SCHOOL	Colorado State University	Ft. Collins, CO
ADVISERS	Professors Michael Kirby and Chris Peterson	
DISSERTATION	Grassmann, Flag, and Schubert Varieties in Applications	
DEGREE	Masters of Science in Mathematics	2010 - 2013
SCHOOL	Colorado State University	Ft. Collins, CO
ADVISERS	Professors Michael Kirby and Chris Peterson	
THESIS	The Flag of Best Fit as a Representative for a Collection of Linear Subspaces	
DEGREE	Bachelor of Arts in Applied Mathematics, Geology Minor	2004 - 2008
SCHOOL	Whitman College	Walla Walla, WA
ADVISERS	Professors Robert Fontenot and Barry Balof	
THESIS	Markov Chains: Roots, Theory, and Applications	

PUBLICATIONS

Flag-based Detection of Weak Gas Signatures in Long-Wave Infrared Hyperspectral Image Sequences.

T. Marrinan, J.R. Beveridge, B. Draper, M. Kirby and C. Peterson.

Proc. SPIE 9840: Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XXII. (2016); <http://dx.doi.org/10.1117/12.2224117>

Flag Manifolds for the Characterization of Geometric Structure in Large Data Sets.

T. Marrinan, J. R. Beveridge, B. Draper, M. Kirby, and C. Peterson.

Numerical Mathematics and Advanced Applications-ENUMATH 2013. 103 (2015): 457-465.

http://dx.doi.org/10.1007/978-3-319-10705-9_45

Finding the Subspace Mean or Median to Fit Your Need.

T. Marrinan, J. R. Beveridge, B. Draper, M. Kirby, and C. Peterson.

Computer Vision and Pattern Recognition (CVPR), IEEE Conference on. (2014): 1082-1089.

<http://dx.doi.org/10.1109/CVPR.2014.142>

A Flag Representation for Finite Collections of Subspaces of Mixed Dimensions.

B. Draper, M. Kirby, J. Marks, T. Marrinan, and C. Peterson.

Linear Algebra and its Applications. 451 (2014): 15-32.

<http://dx.doi.org/10.1016/j.laa.2014.03.022>

(To Appear) Adaptive Visual Sort and Summary of Micrographic Images of Nanoparticles for Forensic Analysis.

E. Jurrus, N. Hodas, N. Baker, T. Marrinan, and M. Hoover.

Technologies for Homeland Security (HST), IEEE Symposium on. (2016)

EXPERIENCE

JOB TITLE	Graduate Research Assistant	Spring 2011 – Present
EMPLOYER	Departments of Mathematics	Colorado State University
	<i>Contributed algebraic and geometric theory, tools, and algorithms to funded projects in the departments of mathematics and computer science at CSU. Contributed theoretical foundations and technical details for future grant proposals. Research activities have been supported by a variety of research grants including,</i>	
	DARPA: N66001-11-1-4184 “The Mind’s Eye Program”	
	<i>Visual Intelligence Through Latent Geometry and Selective Guidance</i>	
	NSF: DMS-1322508 “Algorithms for Threat Detection”	
	<i>Detection and Classification of Threats Using Subspace Manifold Geometry</i>	
	NSF: CDS&E-MSS-1228308	
	<i>Algebraic and Geometric Tools and Algorithms for the Analysis of Data Clouds and Large Data Arrays</i>	
	DOD-USAF: FA9550-12-1-0408 P00001	
	<i>Algorithms on Flag Manifolds for Knowledge Discovery in N-way data arrays</i>	
JOB TITLE	PhD Intern	Summer 2015
EMPLOYER	National Security Directorate	Pacific Northwest National Laboratory
	<i>Researched mathematical aspects of cyber security and visual analytics with staff computer scientists and mathematicians in the Computational and Statistical Analytics Division. A paper is in preparation as the result of our visual analytics research.</i>	
JOB TITLE	Graduate Teaching Assistant/Instructor	Fall 2011–Present
EMPLOYER	Department of Mathematics	Colorado State University
	<i>Prepared lesson plans and taught all lectures. Held office hours and review sessions. Assigned homework and labs. Wrote quizzes and in some cases developed exams. Graded all assignments. Aided student questions in computer software packages such as MATLAB, Maple, and Webwork. Sections ranged from 7 - 50 students.</i>	
	Calculus for Physical Scientists III	Spring 2015
	Calculus I for Physical Scientists	Fall 2011, Spring 2013
	Mathematical Algorithms in MATLAB/Maple	Spring 2014, Spring 2016

JOB TITLE **Graduate Teaching Assistant Mentor** 2014 - Present
 EMPLOYER **Departments of Mathematics** Colorado State University
Selected to mentor first year graduate assistants. Duties include developing and implementing teaching workshops, guiding mentees, and providing formal evaluations.

JOB TITLE **Tutor** 2004 – Present
Worked with a diverse range of undergraduate students in subjects ranging from Pre-Algebra to Calculus, Linear Programming, and higher Mathematics.

JOB TITLE **Web Production Associate** February 2010 – July 2010
 EMPLOYER **Sports Basement** San Francisco, CA
Managed content for Sports Basement’s online store, including photographing products and editing photos. Optimized website with respect to sales conversion and user experience.

JOB TITLE **Information Technology Intern** October 2008 – June 2009
 EMPLOYER **GoLite, LLC** Boulder, CO
Ran the help-desk for GoLite headquarters. Maintained point-of-sale computers for direct sales. Implemented a chat solution for GoLite’s online store. Supported software for 40 sales representatives in numerous countries. Maintained operations during a server crash.

JOB TITLE **Expedition Canoe Guide and Instructor** May 2006 – August 2008
 EMPLOYER **Les Voyageurs, Inc.** Sartell, MN
Led month-long whitewater canoe trips for high school aged participants in Manitoba and Ontario. Led staff training for other expedition guides including both hard and soft skills. Taught all necessary wilderness skills to participants.

AWARDS & TRAVEL GRANTS

TITLE **Travel Grant** July 2016
 DETAILS Awarded by the Park City Mathematics Institute to support attendance of the PCMI Summer Program on the Mathematics of Data Science.
 · *Provided registration fees, airfare, transportation costs, and support for local expenses.*

TITLE **Heidelberg Laureate Forum Participant** August 2015
 DETAILS The Heidelberg Laureate Forum Foundation selects 200 promising young researchers in mathematics and computer science to meet and interact with winners of the Abel prize, the Fields medal, the Turing award, and the Nevanlinna prize.
 · *Award included acceptance and funding for local expenses.*

TITLE **Travel Grant** August 2015
 DETAILS Awarded by the National Science Foundation and the Oak Ridge Association of Universities to support the American delegation to the Heidelberg Laureate Forum.
 · *Provided registration fees, airfare, and transportation costs.*

TITLE **Travel Grant** January 2015
 DETAILS Awarded by the Institute for Mathematics and its Applications to support American researchers in attending the Program on Statistics/Computational Interface to Big Data at Hong Kong University of Science and Technology.
 · *Provided registration fees, airfare, transportation costs, and support for local expenses.*

TITLE **SIAM Outstanding Service Award** 2013 - 2014
 DETAILS Presented by SIAM President Irene Fonseca and Executive Director James M. Crowley.
 · *In recognition of outstanding efforts and accomplishments on behalf of the SIAM Chapter at the Colorado State University.*

SERVICE AND OUTREACH

TITLE **Manuscript Referee** Spring 2016
 DETAILS SIAM Journal on Matrix Analysis and Applications
 · *Provided two rounds of peer-review for a research article submitted to SIMAX.*

TITLE **Judge** April 2015
 DETAILS Celebrate Undergraduate Research and Creativity Showcase at Colorado State University
 · *Judged and provided feedback on research presentations from undergraduate students in a variety of disciplines.*

TITLE **President** Fall 2013 - Spring 2014
 DETAILS Student Chapter of SIAM at Colorado State University
 · *Led chapter activities including lecture series, field trips, meetings, and workshops.*
 · *Performed financial accounting with treasurer.*
 · *Secured funds from national chapter, math department, private donors, & fundraisers.*
 · *Edited and co-wrote yearly chapter newsletter.*

TITLE **Session Chair** February 2014
 DETAILS 10th Annual Front Range Applied Math Conference
 · *Facilitated and hosted a session of SIAM's annual FRAM conference.*

TITLE **Liaison Officer** Fall 2012 - Spring 2013
 DETAILS Student Chapter of SIAM at Colorado State University
 · *Coordinated and facilitated chapter activities including lecture series, field trips, informational meetings, and workshops.*

TITLE **Volunteer for Math Day** Fall 2010, 2011, 2012, 2015
 DETAILS Colorado State University
 · *Math Day is designed to encourage Colorado high school students to study mathematics through scholarships based on performance in the PROBE (Problems Requiring Original and Brilliant Efforts) exam, as well as a team math competition.*
 · *Served as a proctor for the PROBE exam and a timer and reader in the team competition.*

SERVICE PRESENTATIONS

An Introduction to Geometric Data Analysis. May 2014
 SIAM Student Chapter Meetup With Colorado College, Colorado State University.

The CSU L^AT_EX Thesis Class. March 2014
 SIAM Student Chapter Technical Workshop Series, Colorado State University.

Academic/Professional Website Working Day. December 2013
 SIAM Student Chapter Technical Workshop Series, Colorado State University.

- An Introduction to MATLAB.** May 2013
SIAM Student Chapter Technical Workshop Series, Colorado State University.
- An Introduction to L^AT_EX** November 2012
SIAM Student Chapter Technical Workshop Series, Colorado State University.

SELECTED LECTURES

- Hyperspectral Signal Detection via Grassmannian Averaging.** July 2016
Park City Math Institute Research Program, Midway, UT.
- Flag-based Detection of Weak Gas Signatures in Long-Wave Infrared Hyperspectral Image Sequences.** April 2016
SPIE Defense + Security Conference, Baltimore, MD.
- Grassmann, flag, and Schubert varieties in applications.** February 2016
Greenslopes Seminar, Colorado State University.
- Geometric methods for adaptive visual sort and summary & Analysis of dynamic cyber graphs via subspace representations.** July 2015
National Security Directorate Symposium, Pacific Northwest National Lab.
- Detecting weak signals in hyperspectral images and videos by spanning variation.** July 2015
Algorithms for Threat Detection Workshop, National Science Foundation.
- Pattern Recognition via Linear Subspace Models and the Flag Mean.** September 2014
Applied Math Seminar, Whitman College.
- The Flag Mean: An Average Representation for Subspaces of Different Dimensions.** September 2014
Discrete Math and Combinatorics Seminar, Pacific Northwest National Lab.
- Pattern Recognition via Linear Subspace Models and the Flag Mean.** September 2014
Signature Discovery Initiative Seminar, Pacific Northwest National Lab.
- Chemical Signature Detection Using Flag Representations in Hyperspectral Images.** March 2014
Algorithms for Threat Detection Workshop, Boulder, CO.
- Detecting Weak Signals in Subspace Data Using the Flag Mean.** February 2014
10th Annual Front Range Applied Math Conference, University of Colorado Denver.
- Understanding Simplicial Nonlinear PCA.** September 2013
Pattern Analysis Seminar, Colorado State University.
- The Flag of Best Fit as a Representative for a Collection of Linear Subspaces of \mathbb{R}^n , Possibly of Varying Dimension.** July 2013
SIAM Annual Meeting 2013, San Diego, CA.

Capture the Flag. Greenslopes Seminar, Colorado State University.	April 2013
The Flag of Best Fit as a Representative for a Collection of Linear Subspaces. 9th Annual Front Range Applied Math Conference, University of Colorado Denver.	March 2013
The Flag Mean. Pattern Analysis Seminar, Colorado State University.	November 2012
Cluster Purity and the 2-Flag Mean. DARPA Mind's Eye Project Yearly Evaluation, Colorado State University.	May 2012

POSTER PRESENTATIONS

Detecting Weak Signals in Linear Subspace Data 2nd Annual Signature Discovery Workshop, University of Washington.	November 2014
Finding the Subspace Mean or Median to Fit Your Need IEEE Conference on Computer Vision and Pattern Recognition, Columbus, OH.	June 2014

WORKSHOPS AND CONFERENCES

Park City Math Institute Graduate Summer School Midway, UT.	July 2016
SPIE Defense + Security Conference Baltimore, MD.	April 2016
3rd Annual Heidelberg Laureate Forum Heidelberg University, Heidelberg, Germany	August 2015
Algorithms for Threat Detection Workshop National Science Foundation, Washington, D.C.	July 2015
10th International Conference on Energy Minimization Methods in Computer Vision and Pattern Recognition Hong Kong University of Science and Technology, Hong Kong, China	January 2015
IMA/IAS Program on Statistics/Computational Interface to Big Data Hong Kong University of Science and Technology, Hong Kong, China	January 2015
2nd Annual Signature Discovery Workshop University of Washington, Seattle, WA.	November 2014
IEEE Conference on Computer Vision and Pattern Recognition Columbus, OH	June 2014
Algorithms for Threat Detection Workshop Boulder, CO.	March 2014

10th Annual Front Range Applied Math Conference University of Colorado Denver, Denver, CO.	February 2014
SIAM Conference on Applied Algebraic Geometry Colorado State University, Fort Collins, CO.	August 2013
SIAM Annual Meeting/Conference on Control and Its Applications San Diego, CA.	July 2013
9th Annual Front Range Applied Math Conference University of Colorado Denver, Denver, CO.	March 2013
Western Algebraic Geometry Symposium Colorado State University, Fort Collins, CO.	October 2011
L_1 Norm Minimization and Sparsity Workshop Colorado State University, Fort Collins, CO.	Fall 2010

SKILLS

LANGUAGES MATLAB, Python, C++, L^AT_EX

TOOLS SVN, Maple, GIMP, Webwork, Blackboard, Inkscape

MEMBERSHIPS

American Mathematical Society (AMS)	Student Member
Institute of Electrical and Electronics Engineers (IEEE)	Student Member
Society for Industrial and Applied Mathematics (SIAM)	Student Member

REFERENCES

Research:

Dr. Michael Kirby
Professor of Mathematics
(970) 491-6850
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Dr. Chris Peterson
Professor of Mathematics
(970) 491-5153
peterson@math.colostate.edu

Dr. Louis Scharf
Professor of Electrical and Computer Engineering
(970) 491-6792
scharf@enr.colostate.edu

Dr. Bruce Draper
Professor of Computer Science
(970) 491-7873
draper@cs.colostate.edu

Teaching:

Dr. Dan Bates
Professor of Mathematics
(970) 491-1037
bates@math.colostate.edu