Eileen R. Martin

she/her

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Academic Appointments

Assistant Professor, Virginia Tech, Blacksburg, VA — Aug. 2018 - present
- Department of Mathematics (primary appointment)
- Program in Computational Modeling and Data Analytics
- Department of Geosciences (affiliate faculty, Dec. 2019-present)

Affiliate, Lawrence Berkeley National Laboratory, Berkeley, CA — 2016-2020
- Earth and Environmental Sciences Area, Geophysics Department

Education

Ph.D. Computational and Mathematical Engineering, **Stanford University**
Dissertation: June 2018
Passive Imaging and Characterization of the Subsurface with Distributed Acoustic Sensing
Readers: Biondo Biondi (advisor), Jonathan Ajo-Franklin, George Papanicolaou

M.S. Geophysics **Stanford University**
Masters research presentation: June 2017
Stanford DAS Array: Ambient Noise and Earthquake Recordings
Committee: Biondo Biondi (advisor) and Greg Beroza

B.S. Dean's Scholars Honors Mathematics, **University of Texas at Austin**
Dean's Honored Graduate, graduated with high honors May 2012
Honors thesis: *Global Coordinate Systems: Continuously Moving Finite-Dimensional Unit Norm Tight Frames on Smooth Manifolds*
Advisor: Daniel Freeman (advisor)

B.S. Computational Physics **University of Texas at Austin**
Graduated with high honors May 2012

Honors, Awards, Fellowships

Luther and Alice Hamlett Junior Faculty Fellow 2019-present Fellowship in Virginia Tech's Academy of Integrated Science
Gene Golub Dissertation Award 2018
Top dissertation, Institute for Computational and Mathematical Engineering, Stanford
Best student poster paper at SEG Annual Meeting, co-author 2017
Awarded for Huot et al., *Automatic Noise Exploration in Urban Areas*
Schlumberger Innovation Fellowship 2016-2017
DOE Computational Science Graduate Fellowship 2012-2016
Stanford ICME Student Leadership Award 2014
NSF Graduate Research Fellowship Program award offered 2012
Dean's Honored Graduate, UT-Austin College of Natural Sciences 2012
Barry M. Goldwater Scholarship 2011-2012

External Funding

NSF 2034366, Signals in the Soil Program
Amount to Virginia Tech: $216,167
SitS: Collaborative Research: Understand and Forecast Long-term Variations of In-situ Geophysical and Geomechanical Characteristics of Degrading Permafrost in the Arctic
PI: M. Xiao (Penn State, Civil & Environmental Engineering), Co-PIs: E.R. Martin, D.

Nicolsky (University of Alaska Fairbanks, Geophysical Institute), T. Zhu (Penn State, Geosciences), A. Jensen (University of Alaska Fairbanks, Anthropology)
Period of performance: 1/1/21-12/31/23

DOE DE-FE0091786, Office of Fossil Energy
Amount: $1,874,999 total = $1,499,999 DOE + $375,000 non-DOE
Fully Distributed Acoustic and Magnetic Field Monitoring via a Single Fiber Line for Optimized Production of Unconventional Resource Plays
Lead PI: G. Pickrell (Virginia Tech, Materials Science and Engineering), PIs: L. Ma (Sentek Instrument LLC), E.R. Martin
Period of performance: 10/1/19-6/30/22

MAA Tensor Women and Mathematics Grant
Amount: $6,000
SURE: Speakers and Undergraduate Research Engagement
PI: G. Matthews (Virginia Tech, Math), Co-PI: E.R. Martin
Period of performance: 6/1/21-5/31/22

Subcontract 4000175567, UT-Batelle, LLC for Oak Ridge National Laboratory
Amount: $94,985
Fast Comparative Algorithms for Sensor Array Summaries
PI: E.R. Martin
Period of Performance: 11/11/19-8/15/21

NSF 1937984, Engineering for Civil Infrastructure program
Amount: $157,973
EAGER: Exploration of an Interdisciplinary Approach to Resolving a Critical Issue in Evaluating Liquefaction Hazard of Challenging Soil Sites
PI: E.R. Martin, Co-PIs: A. Yerro Colom and R. Green (both Virginia Tech Civil & Environmental Engineering)
Period of Performance: 8/1/19-7/31/21

MAA Tensor Women and Mathematics Grant
Amount: $6,000
SURE: Speakers and Undergraduate Research Engagement
PI: G. Matthews (Virginia Tech Math), Co-PIs: E.R. Martin and L. Zietsman (Virginia Tech Math)
Period of performance: 6/1/19-5/31/20

DE-SC0019630, DOE Phase I STTR with Luna Innovations
Amount to Virginia Tech: $51,433
Advanced Computational Methods Towards High-Resolution Fiber Optic Distributed Acoustic Sensing
PI: D. Rountree (Luna Innovations), Co-PI: E.R. Martin
Period of performance: 2/19/19-11/18/19

Internal Funding

Luther and Alice Hamlett Undergraduate Research Support, AIS
Total amount: $4,000
Spring 2019: Data compression for next-generation seismic sensor networks
Spring 2020: Footstep removal to protect resident privacy in urban seismology data
PI: E.R. Martin
Period of performance: 1/14/19-5/23/23

Luther and Alice Hamlett Junior Faculty Fellowship, AIS

Amount varies annually depending on investment fund returns.
Period of performance: 8/19 - 7/22

Seed Grant from Penn State Institute of Energy and the Environment
Amount: $50,000 (at Penn State)
Lighting Up the Subsurface for Tomorrow's City: Initiating a Penn State DAS Array for Mapping Near-Surface Geology
PI: T. Zhu (Penn State Geosciences), Co-PIs: E.R. Martin, A. Nyblade (Penn State Geosciences), P. Fox (Penn State Civil & Env. Engineering)
Period of performance: 3/1/19-12/31/19

Articles Under Review

K. Yost, A. Yerro, R.A. Green, **E.R. Martin**, J. Cooper, 2021, *MPM Modeling of Cone Penetrometer Testing for Multiple Thin-Layer Effects in Complex Soil Stratigraphy*, under review.

J. Cooper, **E.R. Martin**, K.M. Yost, A. Yerro, R.A. Green, 2021, *Robust identification and characterization of thin soil layers in cone penetration data by piecewise layer optimization*, under review, code at https://github.com/jonc7/Soil-Layer-Optimization

J.Kump, **E.R. Martin**, 2020, *Multichannel Analysis of Surface Waves Accelerated (MASWAccelerated): Software for Efficient Surface Wave Inversion Using MPI and GPUs*, under review, preprint at https://arxiv.org/abs/2003.02256, code at https://github.com/jlk9/MASWA.

Journal Articles

K.M. Yost, R.A. Green, S. Upadhyaya, B.W. Maurerr, A. Yerro-Colom, **E.R. Martin**, J. Cooper, 2021, *Assessment of the Efficacies of Correction Procedures for Multiple Thin Layer Effects on Cone Penetration Tests,* Soil Dynamics and Earthquake Engineering, accepted, open preprint available through April 20, 2021 at https://authors.elsevier.com/a/1cfj4ytxOLk0X.

N.J. Lindsey, **E.R. Martin**, 2021, *Fiber-optic Seismology*, Annual Reviews of Earth and Planetary Sciences, accepted, preprint at https://vtechworks.lib.vt.edu/handle/10919/99469.

T. Zhu, J. Shen, **E.R. Martin**, 2020, *Sensing Earth and Environment Dynamics by Telecommunication Fiber-optic Sensors: An Urban Experiment in Pennsylvania USA*, Solid Earth, 12(1), pp. 219-235.

E.R. Martin, 2021, *A Linear Algorithm for Ambient Seismic Noise Double Beamforming Without Explicit Crosscorrelations,* Geophysics, 86(1), pp. IJF-V89.
Code available at https://github.com/eileenrmartin/doubleBeamforming.

G. Fang, Y.E. Li, Y. Zhao, **E.R. Martin**, 2020, *Urban Near-surface Seismic Monitoring using Distributed Acoustic Sensing*, Geophysical Research Letters, 47(6), e2019GL086115.

Z.J. Spica, M. Perton, **E.R. Martin**, G.C. Beroza, B.L. Biondi, 2020, *Urban Seismic Site Characterization by Fiber-Optic Seismology*, Journal of Geophysical Research: Solid Earth, 125(3), e2019JB018656.

E.R. Martin, F. Huot, Y. Ma, R. Cieplicki, S. Cole, M. Karrenbach, B.L. Biondi, 2018, *A Seismic Shift in Scalable Acquisition Demands New Processing: Fiber-Optic Seismic Signal Retrieval in Urban Areas with Unsupervized Learning for Coherent Noise Removal*, IEEE Signal Processing Magaine, **35**(2), pp. 31-40.

N.J. Lindsey, **E.R. Martin**, S. Cole, D. Dreger, S. James, B. Freifeld, B. Biondi, J. Ajo-

Franklin, 2017, *Fiber-Optic Network Observations of Earthquake Wavefields*, Geophysical Research Letters, **44**(23), pp. 11792-11799, (featured on cover of issue).

S. Dou, N. Lindsey, A. Wagner, T. Daley, B. Freifeld, M. Robertson, J. Peterson, C. Ulrich, **E.R. Martin**, J. Ajo-Franklin, 2017, *Distributed Acoustic Sensing for Seismic Monitoring of the Near Surface: A Traffic-Noise Interferometry Example*, Scientific Reports, 7, article 11620.

Y. Li, H. Yang, **E.R. Martin**, K.L. Ho, L. Ying, 2015, *Butterfly Factorization*, Multiscale Model. Simul., 13, pp. 714-732.

D. Freeman, R. Hotovy, **E.R. Martin** , 2014, *Moving Finite Unit Norm Tight Frames for* S^n, Illinois J. of Math, 58, pp. 311-322.

Professional Periodicals

S. Jakkampudi, J. Shen, W. Li, A. Dev, T. Zhu, **E.R. Martin**, 2020, *Footstep Detection in Urban Seismic Data with a Convolutional Neural Network*, The Leading Edge, 39(9), pp. 654-660.

E.R. Martin, 2020, *Research Committee Update: Shining a Light on Cities with Seismic Data*, The Leading Edge, 39(6), pp. 437-437.

E.R. Martin, C. Castillo, S. Cole, S. Sawasdee, S. Yuan, R. Clapp, M. Karrenbach, B. Biondi, 2017, *Seismic Monitoring Leveraging Existing Telecomm Infrastructure at the Stanford Distributed Acoustic Sensing Array: Active, Passive and Ambient Noise Analysis*, The Leading Edge, 36(12), pp. 1025-1031.

Book Chapters

E.R. Martin, N.J. Lindsey, B. Biondi, J.B. Ajo-Franklin, *Introduction to Interferometry of Fiber Optic Strain Measurements* accepted to AGU book on DAS. Preprint available at https://eartharxiv.org/sx9zt/.

B. Biondi, S. Yuan, **E.R. Martin**, F. Huot, R.G. Clapp, *Using telecommunication fiber infrastructure for earthquake monitoring and near-surface characterization*, accepted to upcoming AGU book on DAS.

Conference Papers

E.R. Martin, J. Kump, S. Morgan, T. Zhu, *Analyzing Massive, Passive DAS Data in Wavelet-compressed Form*, 2021, SEG — AGU Advances in Distributed Sensing for Geophysics Workshop, online, 8-9 Feb.

F. Huot, **E.R. Martin**, Z. Spica, B. Biondi, *Distributed Acoustic Sensing (DAS) for large-scale urban monitoring and geologic hazard mitigation using preexisting telecommunication infrastructure*, 2019, SEG/EAGE Workshop on Geophysical Aspects of Smart Cities, Singapore, 10-12 Dec.

T. Zhu, **E.R. Martin**, J. Shen, *New Signals in Massive Data Acquired by Fiber Optic Seismic Monitoring Under Pennsylvania State University*, 2019, SEG/EAGE Workshop on Geophysical Aspects of Smart Cities, Singapore, 10-12 Dec., preprint.

E.R. Martin, *Scalable Seismic Acquisition and Algorithms for Next-Generation Engineering Geophysics*, (invited) 2019, International Conference on Engineering Geophysics, Al Ain, United Arab Emirates, 9-12 Oct.

E.R. Martin, *A Scalable Algorithm for Cross-correlations of Compressed Ambient Seismic Noise*, 2019, 89th Ann. Internat. Mtg. SEG Expanded Abstracts. doi: 10.1190/segam2019-

3216637.1

E.R. Martin, B. Biondi, *Eighteen months of near-surface monitoring with ambient noise at the Stanford Fiber Optic Seismic Observatory*, 2018, 88th Ann. Internat. Mtg. SEG Expanded Abstracts. doi: 10.1190/segam2018-2997853.1

F. Huot, **E.R. Martin**, B. Biondi, *Automated ambient-noise processing applied to fiber-optic seismic acquisitions (DAS)*, 2018, 88th Ann. Internat. Mtg. SEG Expanded Abstracts. doi: 10.1190/segam2018-2997880.1

E.R. Martin and B.L. Biondi, *Ambient noise interferometry across two-dimensional DAS arrays*, 2017, 87th Ann. Internat. Mtg. SEG Expanded Abstracts. doi: 10.1190/segam2017-17677759.1

B. Biondi, **E.R. Martin**, S. Cole, M. Karrenbach, N. Lindsey, *Earthquakes analysis using data recorded by the Stanford DAS array*, 2017, 87th Ann. Internat. Mtg. SEG Expanded Abstracts. doi: 10.1190/segam2017-17745041.1

F. Huot, Y. Ma, R. Cieplicki, **E.R. Martin**, B. Biondi, *Automatic noise exploration in urban areas*, 2017, 87th Ann. Internat. Mtg. SEG Expanded Abstracts (awarded best student poster paper). doi: 10.1190/segam2017-17774369.1

J.B. Ajo-Franklin, S. Dou, N. Lindsey, T. Daley, B. Freifeld, **E.R. Martin**, C. Ulrich, T. Wood, I. Eckblaw, A. Wagner, M. Robertson, *Timelapse surface wave monitoring of permafrost thaw using distributed acoustic sensing and a permanent automated seismic source*, 2017, 87th Ann. Internat. Mtg. SEG Expanded Abstracts. doi: 10.1190/segam2017-17774027.1

E.R. Martin, B. Biondi, M. Karrenbach, S. Cole, *Ambient noise interferometry from DAS array in underground telecommunications conduits*, 2017, EAGE Annual Meeting Proceedings. doi: 10.1190/segam2017-17774027.1

E.R. Martin, B.L. Biondi, M. Karrenbach, S. Cole, *Continuous Subsurface Monitoring by Passive Seismic with Distributed Acoustic Sensors- The "Stanford Array" Experiment*, 2017, Extended Abstracts of the 1st EAGE Workshop on Practical Reservoir Monitoring. doi: 10.3997/2214-4609.201700017

E.R. Martin, P. Wills, D. Hohl, J.L. Lopez, *Using machine learning to predict production at a Peace River thermal EOR site*, Proceedings of the 2017 SPE Reservoir Simulation Conference. SPE-192696-MS. doi: 10.2118/182696-MS

E.R. Martin, N.J. Lindsey, S. Dou, J.B. Ajo-Franklin, A. Wagner, K. Bjella, T.M. Daley, B. Freifeld, M. Robertson, C. Ulrich, *Interferometry of a roadside DAS array in Fairbanks, AK*, 2016, 86th Ann. Internat. Mtg. SEG Expanded Abstracts. doi: 10.1190/segam2016-13963708.1

E.R. Martin, J. Ajo-Franklin, N. Lindsey, T.M. Daley, B. Freifeld, M. Robertson, C. Ulrich, S. Dou, A. Wagner, *Interferometry of ambient noise from a trenched distributed acoustic sensing array*, 2015, 85th Ann. Internat. Mtg. SEG Expanded Abstracts. doi: 10.1190/segam2015-5902207.1

J. Ajo-Franklin, N. Lindsey, T.M. Daley, B. Freifeld, **E.R. Martin**, M. Robertson, C. Ulrich, A. Wagner, *A field test of distributed acoustic sensing for ambient noise recording*, Expanded Abstracts of the 2015 SEG Ann. Internat. Mtg. doi: 10.1190/segam2015-

5926936.1

Technical Reports

E.R. Martin, *Eighteen months of continuous near-surface monitoring with DAS data collected under Stanford University*, SEP 172, 2018.

F. Huot, **E.R. Martin**, B. Biondi, *Automated ambient noise processing applied to fiber optic seismic acquisition*, SEP 172, 2018.

E.R. Martin, B. Biondi, G. Fabient-Ouellet, R.G. Clapp, *Sensitivity analysis of distributed acoustic sensing arrays*, SEP 170, 2017.

E.R. Martin, B. Biondi, *Time-lapse changes in ambient noise interferometry and dispersion analysis at the Stanford DAS Array*, SEP 170, 2017.

R. Clapp, S. Farris, T. Dahlke, **E.R. Martin**, *C++11 non-linear solver*, SEP 170, 2017.

E.R. Martin, B. Biondi, S. Cole, M. Karrenbach, *Overview of the Stanford DAS Array-1 (SDASA-1)*, SEP 168, 2017.

B. Biondi, **E.R. Martin**, S. Cole, M. Karrenbach, *Earthquakes analysis using data recorded by the Stanford DAS Array*, SEP 168, 2017.

E.R. Martin, B. Biondi, *Ambient noise interferometry on two-dimensional DAS arrays*, SEP 168, 2017.

F. Huot, Y. Ma, R. Cieplicki,**E.R. Martin**, B. Biondi, *Automatic noise exploration in urban areas*, SEP 168, 2017.

E. Williams, **E.R. Martin**, *Detection and removal of coherent anthropogenic noise from passive seismic data*, SEP 165, 2016.

E.R. Martin, N. Lindsey, S. Dou, J. Ajo-Franklin, A. Wagner, K. Bjella, T. Daley, B. Freifeld, M. Robertson, C. Ulrich, *Interferometry of a roadside DAS array in Fairbanks, AK*, SEP 163, 2016.

E.R. Martin, J. Ajo-Franklin, N. Lindsey, T. Daley, B. Freifeld, M. Robertson, C. Ulrich, S. Dou, A. Wagner, *Applying interferometry to ambient seismic noise recorded by a trenched distributed acoustic sensing array*, SEP 158, 2015.

E.R. Martin, *Compression for effective memory bandwidth use in forward modeling*, SEP 152, 2014.

E.R. Martin, R. Clapp, H. Le, C. Leader, D. Nichols, *SEPVector: a C++ inversion library*, SEP 152, 2014.

M. Denolle, S. de Ridder, J. Chang, **E.R. Martin**, T. Dahlke, H. Arevalo-Lopez, Sr., S. Levin, *Scholte-wave excitation*, SEP 150, 2013.

Selected Talks

(Upcoming) Compressing the computing requirements of fiber optic seismic monitoring, GAGE/SAGE Virtual Workshop Aug. 2021

(Upcoming) Scalable algorithms for ambient noise seismology, Caltech Seismo Lab Seminar remote, audience in Pasadena, CA, Apr. 2021

Why we love arrays for data science, Women in Data Science Worldwide Workshops remote, global audience, Mar. 2021

The growth of fiber optic sensing in seismology, IRIS Board of Directors Meeting remote, audience across US, Feb. 2021

Overcoming Computational Hurdles in Large-scale Passive Seismology, Colorado School of Mines Heiland Lecture remote, audience in Golden, CO, Feb. 2021

Understanding sensitivity of distributed acoustic sensing integrated with velocity data, AGU Fall Meeting session on Observation of Rotation, Strain and Translation in Seismology - Applications, Instrumentation and Theory (invited) remote, original location San Francisco, CA, Dec. 2020

Scalable algorithms to pull signals from noise recorded by large sensor networks, Scientific Computing and Numerics Seminar at Cornell University remote, audience in Ithaca, NY, Nov. 2020

Passive Seismic Processing with Artificial Intelligence and Scalable Algorithms, Applied Geophysics Research Seminar at ExxonMobil Upstream Research Company

remote, audience in Spring, TX, Aug. 2020

Scalable algorithms for signal processing and imaging with vibration data, Mathematics and Computer Science Division at Argonne National Laboratory
remote, audience in Lemont, IL, July 2020

New Methods in Engineering Geophysics: Distributed Acoustic Sensing and Machine Learning, US Geological Survey Earthquake Science Center Seminar
remote, audience in Menlo Park, CA, July 2020

Urban Seismology with Fiber Optics, Institute of Geophysics seminar at University of Hamburg remote, audience in Hamburg, Germany, June 2020

What changes when we use ambient noise recorded by fiber optics?, EGU General Assembly session: Ambient noise seismology: Topics, targets, tools & techniques (invited)
remote, original location Vienna, Austria, May 2020

New Signals in Massive Data Acquired by Fiber Optic Seismic Monitoring Under Pennsylvania State University, SEG/EAGE Workshop on Geophysical Aspects of Smart Cities Singapore, Dec. 2019

High-throughput seismology: new sensors, new signals, new algorithms, Women in Data Science at Stanford Earth (invited) Stanford, CA, Nov. 2019

Scalable Seismic Acquisition and Algorithms for Next-Generation Engineering Geophysics, International Conference on Engineering Geophysics (invited) Al Ain, UAE, Oct. 2019

Seismology at Unprecedented Scale, BiSEPPS Seminar at Harvard University
Cambridge, MA, May 2019

Fast Algorithms for Ultra-high-resolution Ambient Noise Interferometry, Solid Earth Brownbag Seminar at Princeton University Princeton, NJ, May 2019

An Introduction to Seismology with Distributed Acoustic Sensing (tutorial talk) AGU Fall Meeting, video of material on YouTube Washington, DC, Dec. 2018

Beyond cosine squared: understanding trends in passive DAS data, SEG Annual Meeting Workshop on DAS Anaheim, CA, Oct. 2018

Pushing for Continuous, Dense, Urban Seismic Monitoring at the Stanford Fiber Optic Seismic Observatory (plenary talk) IRIS Workshop: Foundations, Frontiers and Future Facilities for Seismology Albuquerque, NM, Jun. 2018

Scalable seismic monitoring with fiber optics beneath our feet, Heiland Lecture at Colorado School of Mines Golden, CO, Jan. 2018

Active and passive recording at the Stanford DAS Array, SEG Annual Meeting Workshop: DAS, a vision of the future? Houston, TX, 2017

DAS in existing telecommunications conduits on the Stanford campus, SPE Workshop on Distributed Fiber-Optic Sensing Denver, CO, 2017

Urban ambient noise: from dense nodes to DAS, EAGE Annual Meeting: Workshop on linking active and passive seismics Paris, France, 2017

Repurposing our Telecommunications Infrastructure for Seismology, Lawrence Livermore National Laboratory Seismology Seminar Livermore, CA, 2017

Dirt Cheap Surveys: near surface monitoring with ambient seismic noise collected by DAS, EAGE Annual Meeting: workshop on reservoir monitoring with distributed fibre-optic sensing Vienna, Austria, 2016

Near-surface monitoring using DAS + ambient noise, SEG Annual Meeting: distributed acoustic sensing workshop New Orleans, LA, 2015

Research Advising

Graduate Students Supervised

Joseph Kump, Mathematics M.S. student VT, May 2019 - present

Sarah Morgan, Mathematics M.S. student VT, Aug. 2020 - present

Julius Grimm (coadvised), Applied Geophysics M.S. student
Joint program: TU Delft, ETH Zurich, RWTH Aachen, Nov. 2020 - present

Undergraduate Students Supervised

Samantha Paulus, CMDA and Nanoscience major VT, Spring 2021-present

Firaol Woldemariam, CMDA major — VT, Spring 2021-present
Tony Artis, CMDA major — VT, Spring 2020-present
Anu Trivedi, Mathematics major — VT, Fall 2019-present
Srikanth Jakkampudi, Mathematics and CMDA major — VT, Fall 2019-Spring 2020
Sarah Morgan, Mathematics major — VT, Fall 2019-Spring 2020
Tarun Nadipalli, CMDA major — VT, Spring 2019
Ethan Williams (coadvised, B. Biondi) Geophysics & Music major, Stanford, Summer 2016

Thesis Committee Member
Junzhu Shen, Ph.D. student of T. Zhu in Geosciences — Penn State, degree in progress
Nhat Nguyen, Ph.D. student of L. Massa in AOE — VT, degree in progress
Zachary Hileman, Ph.D. student of G. Pickrell in MSE — VT, degree in progress
ThaoVy Nguyen, M.S. student of R. Hewett in Mathematics — VT, degree in progress
Kaleigh Yost, Ph.D. student of R. Green in CEE — VT, degree in progress
Amin Baghbadorani, Ph.D. student of J. Hole in Geosciences — VT, degree in progress
Taewon Cho, Ph.D. student of J. Chung in Mathematics — VT, degree in progress

Teaching

Instructor, BEPUR: Broadening Engagement and Participation in Undergraduate Research (VT, MATH 2984) — Spring 2021
Instructor, CS Foundations for CMDA (VT, CMDA 3634) — 2 sections, Fall 2020
Instructor, CS Foundations for CMDA (VT, CMDA 3634) — Spring 2020
Instructor, Extreme-Scale Inverse Problems (VT, MATH 5984) — Fall 2019
Instructor, Integrated Quantitative Science I (VT, CMDA 2005) — Fall 2019
Project Mentor, Capstone Project (VT, CMDA 4864) — Fall 2019
Senior team project on removing footstep signals from urban seismic data
Instructor, CS Foundations for CMDA (VT, CMDA 3634) — Spring 2019
Instructor, Integrated Quantitative Science I (VT, CMDA 2005) — Fall 2018
ICME Teaching Fellow 2016-2018, status to recognize student teaching experience
Course assistant, Intro. to Scientific Computing (Stanford, CME 108) — Winter 2016
Project Mentor, Projects in App. & Comp. Math (Stanford, CME 181) — Spring 2015
Undergrad project on statistical analysis of bicycle sharing network data
Instructor, Introduction to Scientific Python (Stanford, CME 193) — Winter 2015
Instructor, Short course on Python at SIAM Conference on Geosciences, — June 2015
Project Mentor, Projects in App. & Comp. Math (Stanford, CME 181) — Winter 2014
Undergrad project on tsunami modeling using Hawaiian bathymetry
STEM Tutor, Longhorn Center for Academic Excellence — Aug. 2011-May 2012
UT-Austin Division of Diversity and Community Engagement
Tutored students in introductory math, statistics, physics, and chemistry courses
Documented tutoring and workshops for grant application materials

Professional Service, Outreach

Associate editor, *Computers & Geosciences* — Nov. 2018-present
Faculty sponsor/organizer, 3rd Women in Data Science Blacksburg at Virginia Tech conference — Nov. 2020-present
Member, SEG Equity in Process Task Force — Aug. 2020-present
Committee member, SEG Research Committee — Oct. 2018-present
Member, Virginia Tech Math Department Colloquium Committee — Aug. 2020 - present
Advisor, Undergraduate Mathematics Majors, Traditional Option — Aug. 2020 - present
Member, CMDA Computing Curriculum Committee — Aug. 2018 - present
Steering Committee Member, NSF DAS Research Coordination Network
Co-leader of Machine Learning Working Group — Feb. 2020-present
Co-leader of RCN-affiliated virtual workshop
Co-organizer, Speakers and Undergraduate Research Engagement — Feb. 2019 - present
Program to guide female undergrad math students through first research projects, and

bring diverse women mathematicians for research talks and career path discussions

Reviewer: *Seismological Research Letters, American Geophysical Union Books, Geophysical Journal International, Geophysics, Computers & Geosciences, Marine Geophysical Research, Journal of Computational Science, Journal of Environmental and Engineering Geophysics, Interpretation, Journal of Open Source Software, PASC Conference, Geophysical Research Letters, Bulletin of the Seismological Society of America, SEG Annual Meeting Technical Program, The Leading Edge*

Panelist, Virginia Tech Assoc. for Women in Computing research panel Mar. 2021

Member, DOE CSGF Screening Committee 2020, 2021

Session Co-Chair, AGU Fall Meeting session on Data Science and Machine Learning for Natural Hazard Sciences Dec. 2020

Peer Reviewer, Virginia Tech Department of Mining and Minerals Engineering Academic Program Review Feb.-Dec. 2020

Panelist, discussion on women in geosciences for Diversity and Inclusion in Geoscience course at University of Wyoming Oct. 2020

Co-Organizer, SEG Annual International Meeting Post-convention Workshop on DAS: Advances in Fiber Optic Sensing Over the Last Decade Oct. 2020

Speaker, UT-Austin Dean's Scholars Honors Program Friday Lunch Talk Sep. 2020

Co-Lead, DAS Virtual Workshop and Tutorial Aug. 2020
Three-afternoon virtual workshop and tutorial supported by DAS RCN and IRIS; 8 speaker presentations with extensive discussion, and 150-250 participants/day; Developed new Jupyter notebooks for hands-on coding with public DAS data; Managed Slack channel for participants to network/discuss with 10 Workshop Guides.

Member, Virginia Tech Math Dept. Technology Committee Aug. 2018 - Aug. 2020

Judge, Virginia Tech Socially Determined COVID-19 Social Data Project Apr. 2020

Faculty sponsor/organizer, 2nd Women in Data Science Apr. 2020
Blacksburg at Virginia Tech conference (converted to online event with 3 speakers)

Panelist, Virginia Tech Assoc. for Women in Mathematics internship panel Feb. 2020

Session co-chair, SEG/EAGE Workshop on Geophysical Aspects of Smart Cities, session on Fiber-based Distributed Acoustic Sensing Dec. 2019

Co-Organizer, SEG Annual International Meeting Post-convention Workshop on Real-time Processing for Large-Scale Streaming Seismic Data, agenda Sep. 2019

Chair, Session on 'Distributed Acoustic Sensing: VSP, Modeling and Imaging Approaches' at SEG Annual International Meeting Sep. 2019

Mentor, DOE CSGF High Performance Computing Workshop Jul. 2019

Panelist, Early Career Panel, DOE CSGF Annual Program Review Jul. 2019

Mentor, Student mentoring program run by Virginia Tech Sep. 2018 - May 2019
chapter of American Women in Mathematics

Co-Organizer, Session on 'Photonic and Nonintertial Seismology' at Seismological Society of America Annual Meeting Apr. 2019

Speaker, Virginia Tech Undergraduate Math Club Apr. 2019

Volunteer, ASA DataFest at Virginia Tech Apr. 2019

Faculty sponsor/organizer, 1st Women in Data Science conference at VT Feb. 2019

Organizer, Session on 'Computational Advances for Large-Scale Geophysical Data' at SIAM CS&E Feb. 2019

Judge, CMDA Fall Data Competition at Virginia Tech Nov. 2018

Panelist, UT-Austin Association for Women in Mathematics career panel Nov. 2018

Speaker, UT-Austin Undergraduate Math Club Nov. 2018

Special section associate editor, *Interpretation* 2018
Special issue on 'Distributed Acoustic Sensing and its Oil Field Potential'

Mentor, ICME first-year mentoring program Sep. 2017-Jun. 2018

Co-organizer, Stanford Computational Geosciences Seminar Jan.-Mar. 2018
Brought in 9 speakers from outside Stanford, organized 1 hr. course EARTH 310

Co-chair, Session on 'Earth Model Building Strategies and Inputs' at SEG Annual

International Meeting Sep. 2017
Co-organizer, SEG Data Analytics Post-Convention Workshop Sep. 2017
Invited early-career speakers and moderated panel on data science education
Student panel Stanford Aeronautics & Astronautics faculty search Spring 2017
Mentor, Stanford Women in Math Mentoring Oct. 2016-Jun. 2017
President, Stanford SEG student chapter 2014-2015

Skills

Preferred programming languages: C/C++ and Python
HPC tools: MPI, openMP, CUDA, TBB
Profiling tools: Tau, HPM, NVCC, Vampir
Scientific tools: MATLAB, Mathematica, COMSOL, IDL
Environment and development tools: Docker, Singularity, Doxygen, Git, Jupyter Notebooks, Google Cloud Compute Engine, Amazon Web Services

Industry Experience

High Performance Computing Internship Summer 2016
Schlumberger, Menlo Park, CA
Mentored by A. Lichnewsky and R.G. Clapp, and supervised by C. Boneti
Benchmarked, co-developed, and tested compression scheme for HPC applications

Areal Monitoring Internship Summer 2015
Shell Projects & Technology, Houston, TX
Mentored by J. Lopez and supervised by P. Wills
Applied machine learning techniques to analyze data and predict production at steam-driven bitumen field in Peace River
Regularly consulted with reservoir engineer to develop useful products

DOE CSGF Practicum in Weapons & Complex Integration Summer 2014
Lawrence Livermore National Laboratory, Livermore, CA
Supervised by S. Langer
Improved memory performance of pf3D laser-plasma code by combining physics operators
Evaluated hardware compression needs

Computational Physics Internship 2010-2011
Nanohmics, Inc. Austin, TX
Project funded through U.S. Department of Defense, PI B. Zollars
Implemented unstructured adaptive mesh methods for finite element code to model liquid erosion of coated lenses