

Joanna A. Bieri

Economics
Program Director Data Science
Redlands, CA

Tel: (909) 748-8630
E-mail: joanna_bieri@redlands.edu

Research Interests

Applied Mathematics, Mathematical Modeling, Machine Learning, and Data Science. Combustion theory, chemically reacting flows, numerical models in combustion and partial differential equations. Resource and environmental modeling, developing metrics for use in managing migrating species. Machine learning and Data Science. Data mining techniques applied to Elliptic Curves.

Recent Projects

- Working Group for Continuous Response Surface Migration Modeling funded by the National Institute for Mathematical and Biological Synthesis, 2014-present
- Adjunct Researcher IDA - SCAMP program Center for Communications Research (CCR) La Jolla. (2019,2020,2021,2023,2024)
- Data Mining the L-functions and Modular Forms Database, Machine Learning and Elliptic Curves, 2023-present
- Machine Learning Applications to Bank Predictions, 2025-present

Education

PH.D IN ENGINEERING SCIENCE AND APPLIED MATHEMATICS

Northwestern University, Evanston, IL

July 2009

Thesis Adviser: Dr. Moshe Matalon

Thesis Topic: Numerical Modeling of an Edge Flame in a Narrow Channel

M.S. IN ENGINEERING SCIENCE AND APPLIED MATHEMATICS

Northwestern University, Evanston, IL

June 2006

B.S. IN PHYSICS AND MATHEMATICS

Northern Arizona University, Flagstaff, AZ

May 2002

Current Position

PROFESSOR - APPLIED MATHEMATICS

University of Redlands, Redlands, CA

Department of Economics Sept 2023 - present

Department of Mathematics Sep 2009 - May 2023

Teach differential equations, calculus, numerical analysis, nonlinear dynamics, machine learning, python programming, data science, and mathematical modeling to undergraduate students.

Work closely with students in both lecture and office hours to help them understand the course material. Work to incorporate writing into mathematics classes and to develop modeling based approach to learning mathematics. Prepare lectures, in class activities, and homework assignments. Grade student work and assign grades. Advise math students on senior research projects. Continue research in combustion, mathematical modeling, and machine learning.

Publications

Machine learning the vanishing order of rational L-functions, Joanna Bieri, Giorgi Butbaia, Edgar Costa, Alyson Deines, Kyu-Hwan Lee, David Lowry-Duda, Thomas Oliver, Yidi Qi, and Tamara Veenstra, *arXiv*, 2025 url=<https://arxiv.org/abs/2502.10360>

Learning Fricke signs from Maass form Coefficients, Joanna Bieri, Giorgi Butbaia, Edgar Costa, Alyson Deines, Kyu-Hwan Lee, David Lowry-Duda, Thomas Oliver, Yidi Qi, and Tamara Veenstra, *arXiv*, 2025 url=<https://arxiv.org/abs/2501.02105>

Judges' Commentary: Fungi **J. Bieri**, *The UMAP Journal*, 2021, 42(4), pp. 315-328

Judges' Commentary: Moving North **J. Bieri** and C. Sample, *The UMAP Journal*, 2020, 41(4), pp. 305-317

Quantifying the contribution of habitats and pathways to a spatially structured population facing environmental change. C. Sample, **J.A. Bieri**, B. Allen, Y. Dementieva, A. Carson, C. Higgins, S. Piatt, S. Qiu, S. Stafford (U of R Undergraduate), B.J. Mattsson, D.J. Semmens, J.E. Diffendorfer, W.E. Thogmartin. *American Naturalist* 2020 (Refereed Journal)

Quantifying source and sink habitats and pathways in spatially structured populations: a generalized modeling approach. C. Sample, **J.A. Bieri**, B. Allen, Y. Dementieva, A. Carson, C. Higgins, S. Piatt, S. Qiu, S. Stafford (U of R Undergraduate), B.J. Mattsson, D.J. Semmens, W.E. Thogmartin, J.E. Diffendorfer. *Ecological Modeling* 2019 (Refereed Journal) <https://doi.org/10.1016/j.ecolmodel.2019.06.003>.

Judges' Commentary: Game of Ecology **J. Bieri** and K. Black, *The UMAP Journal*, 2019, 40(4) pp. 325-334

Ecosystem service flows from a migratory species: Spatial subsidies of the northern pintail. K. J. Bagstad, D.J. Semmens, J.E. Diffendorfer, B.J. Mattsson, J. Dubovsky, W.E. Thogmartin, R. Wiederholt, J. Loomis, **J.A. Bieri**, C. Sample, J. Goldstein, L. Lopez-Hoffman. *Ambio* 2018 (Refereed Journal) <https://doi.org/10.5066/F7Q23ZFC>.

A guide to calculating habitat-quality metrics to inform conservation of highly mobile species **J.A. Bieri**, C. Sample, W.E. Thogmartin, J.E. Diffendorfer, J.E. Earl, R.A. Erikson, P. Federico, DTT Flockhart, S. Nicol, D. Semmens, T. Skraber, R. Wiederholt, B.J. Mattsson. *Natural Resource Modeling* 2018 (Refereed Journal) <https://doi.org/10.1111/nrm.12156>.

Judges' Commentary: Multi-Hop HF Radio Propagation **J. Bieri** and K. Black, *The UMAP Journal* 2018, 39(3) pp. 285-292

A General Modeling Framework for Describing Spatio-temporal Population Dynamics C. Sample, J. Fryxell, **J.A. Bieri**, P. Federico, J. Earl, R. Wiederhold, B. Mattsson, T. Flockhart, S. Nicol, J. Diffendorfer, W. Thogmartin, R. Erickson, R. Norris. *Ecology and Evolution* 2017 (Refereed Journal) <https://doi.org/10.1002/ece3.3685>.

Defining and Classifying Migratory Habitats as Sources and Sinks: The Migratory Pathway Approach, R.A. Erikson, J.E. Diffendorfer, D.R. Norris, **J.A. Bieri**, J.E. Earl, P. Federico, J.M. Fryxell, K.R. Long, B.J. Mattsson, C. S. Sample, R. Wiederholt, W.E. Thogmartin. *Journal of Applied Ecology*, 2017. (Refereed Journal) <https://doi.org/10.1111/1365-2664.12952>.

Edge Flames Stabilized in a Nonpremixed Microcombustor, **J.A. Bieri** and M. Matalon, *Combustion Theory and Modeling*, 2011. (Refereed Journal)

The Effect of Gas Expansion on Edge Flames Stabilized in Narrow Channels, **J.A. Bieri**, V.N. Kurdyumov, and M. Matalon, *Proceedings of the 33rd International Symposium on Combustion*, 2010. (Conference Proceedings)

Characteristics of Edge Flames in Microgravity, **J.A. Bieri** NASA Final Report, Grant

NNG05GM20H, 2010. (Report)

Edge Flames in Confined Mixing Layers, **J.A. Bieri** and M. Matalon, *Proceedings of the 48th AIAA Aerospace Sciences Meeting*, 2009 (Conference Proceedings).

The Stabilization of an Edge Flame in a Narrow Channel, **J.A. Bieri** and M. Matalon, *Proceedings of the Combustion Institute - USA Eastern States*, 2009 (Conference Proceedings).

Impacts of Low Flow Rates on Recreational Rafting Traffic on the Colorado River in Grand Canyon National Park, C. A. Roberts and **J.A. Bieri**, *Synopsis of Studies Completed in Association with the Low Steady Summer Flow Experimental Release from Glen Canyon Dam in WY2000*, ed. B. E. Ralston and G. L. Waring, U.S. Department of Interior and U.S. Geological Survey, 2008, pp. 58 - 61. (Report)

Modeling Complex Human-Environment Interactions: The Grand Canyon River Trip Simulator, C. A. Roberts, D. Stallman and **J.A. Bieri**, *J. Ecological Modeling*, Vol. 153, Issue 2, 2002, pp. 181-196. (Refereed Journal)

Impacts of Low Flow Rates on Recreational Rafting Traffic on the Colorado River in Grand Canyon National Park, C. A. Roberts and **J.A. Bieri**, Bureau of Reclamation, Grand Canyon Monitoring and Research Center, Final Report. May 15, 2001, 18pp. (Report)

Intelligent Agent Modeling for Simulating and Evaluating River Trip Scheduling Scenarios for the Grand Canyon National Park, H. R. Gimblett, C. A. Roberts, T. Daniel, M. Mitner, S. Cherry, D. Kilbourne, M. Ratliff, D. Stallman, R. Bogle, R. Alred, **J.A. Bieri**, *Integrating GIS and Agent based modeling techniques for Understanding Social and Ecological Processes*, ed. H. R. Gimblett, Oxford Press, 2000, pp. 245-275. (Refereed Chapter in a Book)

Using the Grand Canyon River Trip Simulator to Test New Launch Schedules on the Colorado River, **J.A. Bieri** and C. A. Roberts, *AWIS Magazine*, Vol. 29, No. 3, Association for Women in Science, Washington DC, 2000, pp. 6-10. (Invited Article)

Published Computer Code

NIMBioS - Habitat Quality Metrics / G Metric. Initial Release, February 2019
<https://zenodo.org/record/2556915>.

NIMBioS - Habitat Quality Metrics / Generalized Cr. Version 1.0.1, January 2019
<https://zenodo.org/record/2539751>.

NIMBioS - Network Code / Migration Network - Generalized Network Framework Code. Version 1.1.0, August 2017 <http://doi.org/10.5281/zenodo.237369>.

NIMBioS - Habitat Quality Metrics Version 1.1.0, July 2017
<https://zenodo.org/badge/latestdoi/98235744>.

Online Course Materials

Introduction to Python Programming. Initial Release 2024 - python.joannabieri.com.

Differential Equations Updated 2024, differentialequations.joannabieri.com.

Numerical Analysis Updated 2023 numericalanalysis.joannabieri.com.

Calculus Calculus I, Updated 2021, <https://joannabieri.com/calculusI.html> and Calculus II, Updated 2022 <https://joannabieri.com/calculusI.html>

Presentations

Engaging and supporting students as they explore mathematical modeling in differential equations. Joint Mathematics Meeting, Baltimore, Maryland, Jan 2019. (Invited Talk - Special Session on Teaching Differential Equations)

Flight of the Monarchs: How to Create Mathematical Models of Migration. University of Redlands, Faculty Club Forum Redlands, California. March 2018. (Talk)

A model for quantifying the importance of habitats in a migratory network. Joint Mathematics Meeting San Diego, California. Jan 2018. (Talk)

Mathematical Models for Habitat Contributions of Migrating Species on a Network. World Conference on Resource Modeling Flagstaff, Arizona. Jun 2016. (Talk)

A continuous energy-based model for the migration of species in a network. Joint Mathematics Meeting, Seattle, Washington, Jan 2016. (Invited Talk - Special Session Resource Modeling.)

Mathematical models of edge-flames: using asymptotic and numerical approaches to understand flame dynamics. 6th Annual Women in Southern California Mathematics Symposium, University of San Diego, May 2014. (Plenary Speaker)

Asymptotic and Numerical Predictions for a Model Edge Flame in a Micro-Channel. Department of Mathematics Colloquium, California State University San Bernardino, Feb 2014. (Invited Talk)

Computational Modeling of the Dynamics of Edge Flames in Narrow Channels. Joint Mathematics Meeting, Baltimore, Maryland, Jan 2014. (Talk)

Modeling Edge Flames in Microcombustors. University of California, Riverside Mechanical Engineering Department Seminar, Riverside, California, Nov 2012. (Invited Talk)

Characteristics of Non-Symmetric Edge Flames in Micro-Channels. 34th International Symposium on Combustion, Warsaw, Poland, Aug 2012. (Poster - presented by student)

Dynamics of Non-Symmetric Edge Flames in Narrow Channels. Joint Mathematics Meeting, Boston, Massachusetts, Jan 2012. (Talk)

Characteristics of Edge Flames in Micro-combustors. 65th Annual Meeting of the APS Division of Fluid Dynamics, Long Beach, California, Nov 2010. (Talk)

Mathematical Models of Flames - The Heat Equation. Undergraduate Mathematics Colloquium University of California Irvine, Oct 2010. (Invited Talk)

Modeling of Edge Flames in Narrow Channels. Department of Mathematics Colloquium, California State University San Bernardino, Oct 2010. (Invited Talk)

The Effect of Gas Expansion on Edge Flames Stabilized in Narrow Channels. 33rd International Symposium on Combustion, Beijing, China, Aug 2010. (Talk - presented by co-author)

Edge Flames. 2nd Annual Symposium for Southern California Women in Mathematics, University of Southern California, Feb 2010. (Talk)

Edge Flames in Confined Mixing Layers. 48th AIAA Aerospace Sciences Meeting, Orlando, FL, Jan 2010. (Talk)

The Stabilization of an Edge Flame in a Narrow Channel. US National Combustion Meeting, Ann Arbor, MI, May 2009. (Talk)

Dynamics of an Edge-Flame in A Narrow Channel. Joint Mathematics Meeting, Washington D.C., Jan 2009. (Talk)

Dynamics of an Edge-Flame in a Narrow Channel., 32nd International Symposium on Combustion, Montreal, Canada, Aug 2008. (Poster)

An Edge-Flame in a Mixing Layer., AMS-SIAM Joint Mathematics Meeting, Boston, MA, July 2006. (Poster)

Grand Canyon River Trip Simulator: Data Collection, Analysis and Computer Science., Colorado River Management Plan Scoping Meeting, Flagstaff, AZ, Aug 2002. (Poster)

Grand Canyon River Trip Simulator Project., Joint Mathematics Meeting, New Orleans, LA, Jan 2001. (Talk)

Grand Canyon River Trip Simulator, Nebraska conference for Undergraduate Women in Mathematics, Lincoln, NE, Feb 2000. (Talk)

Undergraduate Research Students

Summer Stafford

Habitat Quality Metrics. (Jun 2018 - August 2018)

Papers

- Quantifying the contribution of habitats and pathways to a spatially structured population facing environmental change. (In Preparation)
- Quantifying source and sink habitats and pathways in spatially structured populations: a generalized modeling approach *Ecological Modeling* (Accepted)

Presentations

- Southern California Conference for Undergraduate Research 2018
- MathFest 2019

Published Code

- NIMBioS - Habitat Quality Metrics / G Metric. February 2019
- NIMBioS - Habitat Quality Metrics / Generalized Cr. January 2019

Joseph Macias

Habitat Quality Metrics. (Jun 2018 - August 2018)

Tristan Skrabber

Modeling the Importance of Spatially Distinct Habitats in Time Dependent Animal Migration Networks. (Jun 2017 - Aug 2017)

Freeman Levine

Heat Conduction and Flame Dynamics. (Jun 2013 - Aug 2014)

Presentations

- Southern California Conference for Undergraduate Research 2013
- Pacific Coast Undergraduate Mathematics Conference 2014

Posters

- National Joint Mathematics Meeting 2014

Casey McGrath

Non-Symmetric Edge Flames in a Narrow Channel. (Jun 2011 - May 2014)

Presentations

- Southern California-Nevada Section Fall Meeting 2011
- University of Redlands Math Department Invited Talk 2011

- Southern California Conference for Undergraduate Research 2011

Posters

- 34th International Symposium on Combustion, Warsaw, Poland 2012
- National Joint Mathematics Meeting 2012 (Awarded 2012 JMM Outstanding Presentation)

Wendy Rummerfield

Matlab Programming and Non-symmetric Flame Analysis. (Jun 2013 - Dec 2013)

Posters

- National Joint Mathematics Meeting 2014
- Nebraska Conference for Undergraduate Women 2014 and 2015

Kim McCarty

Transforming Edge Flame Code: Fortran to C++. (Jun 2012 - Aug 2012)

The Effects of Flow Fields on Edge Flames in a Narrow Channel. (June 2011 - August 2011)

Posters

- Southern California Conference for Undergraduate Research 2011

Casey Peters

Microcombustion Research - Reignition Patterns in Experimental Microcombustors. (June 2012 - Present)

Kim Vilimas

Mathematical Modeling Interactions Between Human and Fish Populations: A Bio-Economic Approach. (Jun 2012 - Aug 2012)

Posters

- Nebraska Conference for Undergraduate Women 2013

Jared Duchon

Mathematical Modeling Interactions Between Human and Fish Populations: A Bio-Economic Approach. (Jun 2012 - Aug 2012)

Duncan Ashby

Edge Flame Reignition and Heating of Channel Walls. (Jun 2011 - May 2012)

Posters

- National Joint Mathematics Meeting 2012

Senior Capstone Advisees

ELLYN OBRACHTA (Mathematics) Modeling Dengue Virus; Foundations and Explorations - 2019
ALEXIS PENCE (Mathematics) Using Matrix Population Modeling for Understanding Humpback Whale Populations in the North Pacific Ocean - 2018

JIAQI (GEORGE) LI (Mathematics) Introduction to the Three Body Problem - 2018

XIAOYUE LYU (SHIRLEY) (Mathematics) The Black-Scholes Option Pricing Model and its Partial Derivative Equation - 2017

ANDERS RUDEN (Mathematics) The Riemann Mapping Theorem and Applications - 2015

MICHAEL POUNDS (Mathematics) A 2-D Look into the Heat Equation - 2015

FREEMAN LEVINE (Mathematics) Asymptotic and Perturbation Methods for ODEs - 2014

FREEMAN LEVINE (Physics) Modeling Heat Conduction in a Micro-combustor - 2014

CASEY MCGRATH (Mathematics) Convergence of Numerical Methods for PDEs - 2014

CASEY MCGRATH (Physics) Non-symmetric Edge Flames in Narrow Channels - 2014

JARED DUCHON (Mathematics) Nonlinear Dynamics - 2014

CHAUN CALVIN (Mathematics) Modeling Dance with Abstract Algebra - 2014

STEPHANIE ZARATE (Mathematics) Schedule Optimization - 2014

RACHEL SMITH (Mathematics) Linear Programming and Currency Arbitrage Detection - 2013

LINDSEY PHILLIPS (Mathematics) Modeling of Drug's Affect on Human Body - 2013

KIM VILIMAS (Mathematics) The Lorentz Equations - 2013

KEVIN LANGHAM (Environmental Science) Mathematical Modeling Tahoe Sucker - 2013
 DJ BERRY (Mathematics) Dynamical Systems - 2013
 LEANN SONKE (Mathematics) Operations Research - 2012
 ANDREA GATHMAN (Mathematics) Wine Production and Optimization - 2012
 DUNCAN ASHBY (Physics) Edge Flames and Reignition - 2012
 PHOBE HARPAINTER (Chemistry) Chemical Interfaces Numerical Analysis - 2011
 KOURTNEY BRANDON (Mathematics) Numerical Methods in Fluid Mechanics - 2011
 ERIKA LINDSLEY (Mathematics) Mathematical Models of Love - 2011
 HEATHER ENGSTROM (Mathematics) Financial Mathematics and Options Pricing - 2010
 MARK HICKS (Mathematics) The Euler Equations in Fluid Mechanics - 2010
 EVAN SHAW (Environmental Science) Santa Ana Speckled Dace - 2010

Honors and Awards

Outstanding Service Award at The University of Redlands Spring 2021
 Nominated for Mortar Board Professor of the Year at The University of Redlands Fall 2020
 Salzburg Faculty Teaching Fellow at The University of Redlands Fall 2018
 Proposal Writing Faculty Fellow at The University of Redlands 2016
 Outstanding Teaching Award at The University of Redlands 2015
 University of Redlands Faculty Research Grant 2012-2013
 Outstanding Teaching Award at The University of Redlands 2011
 Project NExT Fellow (MAA - New Experience in Teaching) 2010-2012
 NSF-AWM Mathematics Travel Grant 2010
 NASA Graduate Student Research Fellowship 2004-2009
 Career Mentoring Workshop, Wheaton College, MA 2008
 Student's Nomination for Faculty Teaching Appreciation Dinner 2008
 Community Building Grant for McCormick Graduate Leadership Council 2007-2008
 AWM Workshop for Women Graduate Students and Recent PhDs, Boston 2006
 Walter P. Murphy Fellowship for graduate studies at Northwestern 2003-2004
 Society of Physics Students, Leadership Scholarship 2001
 Hooper Grant for Undergraduate Research on GCRTsim 2000-2001
 Raytheon Scholarship for Outstanding Physics Students 2000-2001
 Anna Catherine Ryan Scholarship for Women in Physics 2000-2001
 Faculty Senate Scholarship 2000-2001
 Purdue REU program participant 2000
 Presidents Award for Outstanding Service in SPS 2000
 NASA Space Grant Recipient for research on GCRTsim 1999-2000

Professional Service

UNIVERSITY SERVICE

Educational Assessment Committee, 2023-present

- Assist departments in the development of educational assessment plans.

Faculty Mentor for Hunsaker Scholars, 2020-2022

- Organize meetings and collaborations during online learning

Faculty Mentor for Junior Faculty Members, 2020-2022

- Scheduled bi-weekly meetings to help with transition to Redlands in midst of pandemic

Salzburg Advisory Committee, 2019-2023

- Review courses for Salzburg Program
- Participate in Salzburg Symposium

WASC Interim Report on Shared Governance Committee, 2018-2019

- Created network representation of Shared Governance structure.
- Organized ideas into questions to begin building faculty survey.

May Term Advisory Committee, 2011-2015*

* Although I am not currently on the committee, I continue to run and revise the algorithm for ranking May Term grant applications.

- Reviewed courses for May Term travel
- Created rubric for considering the essay portion of applications for May Term travel grants.
- Developed algorithm for academic and financial need based ranking of May Term grant applications.

First Year Experience Advisory Committee, 2013-2016 and 2018

- Working to rethink FYE for the new LAI implementation.
- Created idea for 11am-1pm section time for First Year Seminars with 30 minutes allotted to student life.
- Attended meetings to aid in communication between various committees working on new general education requirements.

New American Colleges and Universities Faculty Ambassador, 2013-2015

- Attended NACU Conference for Teaching Innovation
- Attended Annual NACU Summer Conference.
- Developed guidelines for University of Redlands NACU Ambassadors.
- Worked with Manhattan College professors to begin development of an online introductory course for Engineering 3:2 students.

School of Continuing Studies Curriculum Committee, 2011-2013

- Worked on the implementation of SCSCC summer school pilot program for College of Arts and Sciences courses.
- Aided in communication between SCSCC and the College of Arts and Sciences.
- Set up and attended meetings to improve communication between SCSCC and the departments of English and Mathematics.
- Developed guidelines for first time pilot courses to be proposed and approved for SCSCC summer school.
- Developed guidelines for transitioning course from pilot courses to long term approved SCSCC courses.

DEPARTMENTAL SERVICE

Data Science Program - Program Director, 2023-present

- Successfully implemented undergraduate program in data science.
- Develop curriculum, learning outcomes, assessment, budget predictions, and proposal for program in Data Science.
- Initiated cross disciplinary conversations about Data Science in the Liberal Arts.

Mathematics Department Chair, 2019-2022

- Leading effort to implement programs in data science.
- Leading effort toward program review and assessment of Math and CS majors
- Worked to revise math schedule to allow for scaffolded steps through the flexible major.

- Helped to finalize teaching credit for out of load courses.
- Aided department through transition to online teaching during COVID
- Scheduling of all mathematics classes and classrooms

Advisor for Google Developer Students Club, 2020-2022

- Helped students advertise and form new programming club on campus.

Advisor for Pi Mu Epsilon Mathematics Honor Society, 2015-2022

- Aided students in their applications for funding and travel to regional and national mathematics meetings.
- Organized honor society applications and inductions.
- Attended biweekly meetings and helped students organize events.

Advisor for Denominators Math Club, 2011-2022

- Organized yearly Pi Day Celebration.
- Facilitated lunch sessions with University Alumni.
- Aided students in their applications for funding and travel to regional and national mathematics meetings.
- Helped students get supplies and set up various events for Math Club
- Attended biweekly Denominator meetings.

Math Department Website, 2011-2018*

- Updated website to include information about math club, math placement, and current events.
- Maintained current information on department website.

* I no longer manage direct updates, but sill monitor content and suggest updates

Organize Math Tutors for Calculus, 2011-2018

- Recruited and trained tutors for Math and Physics departments
- Organized schedules and reserved rooms for tutoring each semester.
- Collected data for tutoring to aid in better budgeting for tutoring and grading in the math department.
- Worked to develop new head tutoring positions.
- Developed WeBWorK problems to help tutors review topics in Calculus.

Math Placement Committee, 2012-2014

- Responded throughout the year to emails for the math placement email account.
- Organized testing sessions throughout the academic year for math placement retakes.
- Created troubleshooting and online tutorials for Maple Math Placement Testing.
- Organized data transfers between Maple test results and WebAdvisor.
- Developed a pilot program for math placement based on SAT scores to decrease the number of students needing to place by exam.
- Developed information forms to help students and advisors with math placement during New Student Week
- Revised WebWork data transfer information to include SAT and Compass placement allowing the registrar to enforce placement prerequisites.
- Collaborated on a plan to implement ALEX Math Labs to allow students who do not place a path toward placement.

ASSOCIATE EDITOR

The UMAP Journal of Undergraduate Mathematics and Its Applications, 2017-present
Write yearly judges commentary for Math Modeling Contest, 2018-~~2022~~ 2021
NSF-REU in Mathematics at California State University, San Bernardino, 2015-2018

BOOK REVIEWER

MAA Books - Applied Mathematics, 2015

CONFERENCE ORGANIZER

Pacific Coast Undergraduate Mathematics Conference, 2013

JOURNAL REVIEWER

Reviewed papers for The American Mathematical Monthly, 2012
Reviewed papers for SIAM Review (SIREV) a journal of the Society of Industrial and Applied Mathematics, 2011

MODELING CONTEST AND POSTER SESSION JUDGE

Judge for both ICM and MCM International Math Modeling Contests, 2018-present
Judge for the M3 High School Math Contest in Modeling, 2012-2017
Judge for Undergraduate Poster Session at the Joint Mathematics Meetings, 2011-2019
Judge for the COMAP International Math Contest in Modeling, 2012

SESSION CHAIR

Joint Mathematics Meeting session on Mechanics and Mathematical Physics, 2012

ASSOCIATION FOR WOMEN IN MATHEMATICS

Committee Member for AWM Essay Contest for Young Women in Math, 2014-present

Past Research Experience**RESEARCH ASSISTANT**

Northwestern University, Evanston, IL

Jun 2004 - Jul 2009

Developed mathematical models for an edge-flame in a narrow channel. Studied edge-flames analytically using activation energy asymptotics and a diffusive thermal model. Simulated evolution equations numerically using finite-difference methods.

CONSULTANT FOR GRAND CANYON RIVER TRIP SIMULATOR

Grand Canyon National Park, AZ

Aug 2003 - Aug 2004

Advised planners at the Grand Canyon National Park on the use of the Grand Canyon River Trip Simulator (GCRTsim). Participated in planning meetings and public comment sessions for the National Park. Carried out computational river trip analysis used in the creation of the Colorado River Management Plan.

PLANNING TECHNICIAN

Grand Canyon National Park, AZ

May 2001 - Aug 2003

Carried out mathematical modeling, calibration analysis, and statistical analysis for the Grand Canyon River Trip Simulator (GCRTsim). Aided in planning analysis and statistics for the Colorado River Management Plan using the Grand Canyon River Trip Simulator.

UNDERGRADUATE RESEARCH: MODELING AND SIMULATION LAB

Northern Arizona University, Flagstaff, AZ

Aug 2000 - May 2001

Participated in modeling and analysis for the Grand Canyon River Trip Simulator (GCRTsim). Aided in programming and design of GCRTsim. Worked in statistical analysis and database management for GCRTsim. Trained people in the use of GCRTsim.

RESEARCH EXPERIENCE FOR UNDERGRADUATES IN PHYSICS

Purdue University, West Lafayette, IN

Jun 2000 - Aug 2000

Participated in research at the Purdue Rare Isotope Measurement Laboratory (PRIME Lab) accelerator facility. Worked on the GEANT (GEometry ANd Tracking) program to describe the passage of elementary particles through matter, using Monte Carlo methods for high-energy particle interactions.

Past Teaching Experience

LECTURER

Northwestern University, Evanston, IL

Jan 2008 - May 2009

Taught multivariable and vector calculus. Designed and conducted lectures. Prepared exams and quizzes. Worked closely with students in both lecture and office hours to help them understand the course material. Graded students work and assigned course grades. Developed essay assignments for use in multivariable calculus classes. Head instructor for multivariable calculus, Winter 2009.

SEARLE CENTER GRADUATE TEACHING CERTIFICATE PROGRAM

Northwestern University, Evanston, IL

Sep 2007 - Sep 2009

Participated in lectures and workshops discussing methods of successful course design, assessment and evaluation. Examined current academic research on teaching and mentoring. Designed a mathematics course incorporating essay writing into the traditional calculus class.

TUTOR

Effective Educators, Highland Park, IL

June 2008 - Sep 2008

Tutored both math and science for ACT test preparation. Tutored high school students in algebra, statistics, calculus, geometry, and trigonometry. Helped develop personal study methods for students planning on attending college.

TEACHING ASSISTANT

Northwestern University, Evanston, IL

Sep 2004 - Jun 2005 (Head TA: Jan 2005)

Lead weekly lab sections for undergraduate students differential equations. Helped students to learn and use Matlab. Held weekly recitation section for multivariable calculus. Created solution sets for and graded exams. Acted as the head teaching assistant for multivariable calculus: worked with faculty to develop the course web page, organized and scheduled other teaching assistants, acted as point-person to the faculty teachers.

PHYSICS LAB TECH AND TA

Northern Arizona University, Flagstaff, AZ

Aug 1999 - May 2002

Set up and tested introductory physics labs for all introductory physics classes. Aided students in physics lab experiments and computer use. Helped write and update lab manual for new computer systems. Lead weekly astronomy lab.

Professional Organizations

American Mathematical Society (AMS)

Association for Women in Mathematics (AWM)

Consortium for Mathematics and its Applications (COMAP)

Resource Modeling Association (RMA)

List of Courses Taught

Math for Social Justice (General Education Course)

Mathematics of Art Architecture and Music (General Education Course)

Single Variable Calculus

Multivariable Calculus

Vector Calculus

Introduction to Mathematical Modeling

Ordinary Differential Equations

Nonlinear Dynamics and Chaos

Partial Differential Equations

Introduction to Machine Learning

Numerical Analysis

Senior Capstone Mathematics Seminar

Introduction to Programming in Python

Introduction to Data Science

Mathematics for Data Science