Jacob Price

Assistant Professor of Mathematics
University of Puget Sound

Address: 9425 14th Ave SW, Seattle, WA 98106
Office: 1500 N. Warner St., CMB 1043, Tacoma, WA 98416
Phone: (810) 623-4150
Email: jrprice@pugetsound.edu
Website: mathcs.pugetsound.edu/∼jrprice

Education

University of Washington 2012-2018
Master of Science and Doctorate of Philosophy in Applied Mathematics
Advisor: Panos Stinis

Kalamazoo College 2008-2012
Bachelor's Degree with Honors in Mathematics and Physics
Summa Cum Laude

École Supérier de Commerce 2010-2011
Five month study abroad experience in Clermont-Ferrand, France
Program culminated in fluency
Scored five out of a possible six on the Teste de Connaissance du Français

Honors, Awards, and Fellowships

Project NExT 2019-2020
Selected to participate in professional development program for new Ph.D.s in the mathematical sciences. Addresses teaching, research, service, and professional activity. Silver '19 cohort.

Tung Family Endowment Award 2018
For exemplary work by a student in the Department of Applied Mathematics.

SIAM Chapter Award 2016
In recognition of outstanding efforts and accomplishments on behalf of the SIAM Chapter at the University of Washington.

Boeing Teaching Award 2015
Awarded for outstanding teaching by a student in Applied Mathematics.

Los Alamos Computational Physics Fellowship 2015
Awarded a summer fellowship to participate in the Los Alamos Computational Physics Workshop.

Top Scholar Fellowship Award 2012
A fellowship offered by the University of Washington to promising first year graduate students.

Senior Leadership Recognition Award 2012
Awarded for "enlightened leadership" to graduating Kalamazoo College students.

Gustave W. and Mina B. Moessen Honors Award 2012
Awarded to students graduating summa cum laude from Kalamazoo College.

Clarke Benedict Williams Award 2012
Awarded to excellent graduating Kalamazoo College mathematics or computer science students.

John Wesley Hornbeck Prize in Physics 2012
Awarded to promising graduating Kalamazoo College physics students.

Music Department Award 2012
Awarded for work in the Kalamazoo College Singers and the Kalamadudes Men's A Cappella Group.

Howard Hughes Medical Institute summer research grant 2011
Awarded in pursuant of summer undergraduate research under Dr. Eric Barth at Kalamazoo College.

Park City Mathematics Institute Undergraduate Summer School 2010
Awarded a summer fellowship to attend the undergraduate summer school on image processing.

Thomas O. Walton Prize 2010
Awarded to a member of the junior class for excellence in the work of the first two years in mathematics.

Kalamazoo College Departmental Awards 2009, 2010
Received awards from the physics and mathematics departments.

H.P. and Genevieve Connable Scholarship 2009
Awarded for exemplary performance in science division courses during the first year of undergraduate study.

Kalamazoo College Honors Scholarships 2008
Awarded the general Honors Scholarship and the Competitive Math and Science Scholarship.

Robert C. Byrd Honors Scholarship 2008
Awarded to high school seniors who show promise of continued excellence in secondary education.

Congressional Medal of Merit 2008
Awarded for exemplary citizenship and academic achievement.

Research Experience

University of Puget Sound 2018-Present
Mentees: Madelyn Shapiro (2019)
Established own laboratory to investigate multiscale modeling and simulation in several contexts. Examples include expansions of the Mori-Zwanzig formulation of model reduction, generalization of the multiscale plasma simulation technique, and the development of new multiscale analysis and numerical techniques.

University of Washington 2016-2018
Mentor: Panos Stinis
Studied theory and applications of the Mori-Zwanzig formulation of model reduction. Theoretical research included the development and numerical analysis of novel multiscale methods for systems without scale separation. Applications include nonlinear waves, nonequilibrium phenomena, plasma modeling, and biochemical engineering.

Washington Experimental Mathematics Laboratory 2017-2018
Mentors: Panos Stinis and Jayadev Athreya
Mentees: Jesse Rivera, Landon Shorack, Qingtong Zeng
Directed undergraduate mathematics students in the study of conditional path sampling. Provided background and training, and oversaw parameter exploration, algorithm development, code optimization, and literature reviews. Potential applications include transition path sampling in protein folding systems.

Los Alamos National Laboratory 2015-2016
Mentor: Michael Murillo
Developed proof-of-principle computational framework for multiscale modeling of plasma. Created a hybrid numerical method combining molecular dynamics simulations and kinetic BGK simulations using the heterogeneous multiscale method.

Kalamazoo College Summer Research 2011
Mentor: Eric Barth
Developed a suite of software to analyze patterns in musical compositions. Inspired by statistical mechanics, sought to quantify differences between composers in various musical eras, identify "characteristic" melodic and rhythmic patterns, and visualize harmonic structures.

Computer Programming Experience

Matlab 10+ years of experience
R 8+ years of experience
Mathematica 7+ years of experience
Python 3+ year of experience

Publications

1. **Price, J.** and Stinis, P. "Renormalization and blow-up for the 3D Euler equations". **Preprint**. https://arxiv.org/abs/1805.08766.
2. **Price, J.** and Stinis, P. "Renormalized Reduced Order Models with Memory for Long Time Prediction". *Multiscale Modeling and Simulation*. Society for Industrial and Applied Mathematics. Volume 17, Issue 1. 2019.

Presentations

1. **Price, J.** "Introducing Machine Learning in Python with Movie Recommendation". PNW Section of MAA Annual Meeting, April 2019. Portland, Oregon.
2. **Price, J.** "Renormalized Reduced Order Models for Long Term Prediction". SIAM Computer Science and Engineering, January 2019. Spokane, Washington.
3. **Price, J.** "A new mutiscale modeling framework for partial differential equations". University of Washington, Tacoma, Seminar, January 2019. Tacoma, Washington.
4. **Price, J.** "Opportunities in Scientific Computing: Outsourcing the Computation So We Can Do the Thinking...". University of Puget Sound Seminar, November 2018. Tacoma, Washington.
5. **Price, J.** "Using Hands-on Experimentation to Introduce Differential Equations". SIAM Annual Meeting, July 2018. Portland, Oregon. **Invited talk**.
6. **Price, J.** "Multiscale Techniques for Nonlinear Dynamical Systems: Applications and Theory". May 2018. **Given in fulfillment of requirements for doctoral degree**.
7. **Price, J.** "Mastery-Based Grading in Probability and Statistics". PNW Section of MAA Annual Meeting, April 2018. Seattle, Washington.
8. **Price, J.** "Cultivating an Inclusive Atmosphere in Scientific Computing through Diverse Historical Perspectives". Joint Mathematics Meeting, Jaunary 2018. San Diego, California.
9. **Price, J.** "Renormalized Reduced Order Models with Memory for Long Time Prediction". Joint Mathematics Meeting, Jaunary 2018. San Diego, California.
10. **Price, J.** and Stinis, P. "A Novel Renormalized Mori-Zwanzig Method for Model Reduction". SIAM Annual Meeting, July 2017. Pittsburgh, Pennsylvania.
11. **Price, J.** "Constructing Novel Reduced Order Models with Memory". PNW Section of MAA Annual Meeting, June 2017. Spokane, Washington.
12. **Price, J.** "Multiscale Techniques for Nonlinear Dynamical Systems: Applications and Theory". General Examination Presentation, February 2017. Seattle, Washington.
13. **Price, J.**, et al. "A Heterogeneous Multiscale Model for Plasma Simulation". University of Washington Applied Mathematics Poster Session, January 2017. Seattle, Washington. **Voted best poster, selected to be presented at SIAM Annual Meeting**. SIAM Annual Meeting, July 2017. Pittsburgh, Pennsylvania.

14. **Price, J.**, et al. "Multiscale Plasma Modeling: Coupling the BGK Equation and Molecular Dynamics". American Physical Society Division of Plasma Physics Conference, November 2016. San Jose, Calfiornia.

15. **Price, J.** "Multiscale Simulation Methods: Concepts and Applications". Seattle University invited talk, October 2016. Seattle, Washington. South Seattle College invited talk, May 2017. Seattle, Washington. Pacific Lutheran University invited talk, September 2017. Tacoma, Washington.

16. **Price, J.**, et al. "Combining Molecular Dynamics with Kinetic Theory". Los Alamos National Laboratory Computational Physics and Methods Technical Talk, August 2016. Los Alamos, New Mexico.

17. **Price, J.**, Shohet, G. "A Heterogeneous Multiscale Model for Plasma Simulation". Los Alamos National Laboratory Student Symposium, July 2016. Los Alamos, New Mexico.

18. **Price, J.** "Reduced Order Modeling of Systems Without Scale Separation". Nambé Group Meeting, June 2016. Los Alamos, New Mexico.

19. **Price, J.** "Initializing MD with Prime Numbers". Nambé Quarterly Meeting, July 2015. Los Alamos, New Mexico.

20. **Price, J.**, Shohet, G. "The Heterogeneous Multiscale Method: Combining Molecular Dynamics with Kinetic Theory". Nambé Quarterly Meeting, July 2015. Los Alamos, New Mexico.

21. **Price, J.**, Qian, H. "Macromolecular function is not intrinsic to structure in living cells". Poster presentation, University of Washington Applied Mathematics poster session, May 2015. Seattle, WA.

22. **Price, J.**, Qian, H. "Beyond Structure-Function Relation: A Biochemical Circuit with Kinetically Regulated Activation-Inhibition Switching". Frontiers in Biophysics Conference, March 2015. Vancouver, BC. **Awarded second best conference talk**.

23. **Price, J.** "The Numerical Computation of Lyapunov Exponents". AMATH 575: Dynamical Systems final presentation, May 2013. Seattle, WA. **Given in fulfillment of requirements for Master's degree**.

24. **Price, J.**, Barth, E. "Numerical Tools for Describing Musical Compositions". Midstates Conference for Undergraduate Research in Computer Science and Mathematics, November 2011. Granville, Ohio.

Affiliations

Mathematics Association of America	2016-Present
American Mathematical Society	2013-Present
Society for Industrial and Applied Mathematics	2012-Present
American Physical Society	2014-2018
Phi Beta Kappa Honor Society	2012-Present
Alpha Lambda Delta Honor Society	2009-Present

Teaching Experience

University of Puget Sound

Professor, MATH 160: Introduction to Applied Statistics. Introduced principles of statistics to student population with wide range of mathematical skill and comfort. Introduced programming language R and GUI R Studio. Developed suite of R functions to support students' statistical computations. Implemented a variety of in-class activities inspired by the Guidelines for Assessment and Instruction in Statistics Education. — Fall 2018, Spring 2019

Professor, MATH / CSCI 335: Optimization. Instructed a mix of computer science and mathematics majors on optimization methods including linear optimization, network optimization, and convex optimization. Introduced students to programming languages LINGO and Matlab. Developed a software development-style group project to implement the simplex method in Matlab. — Spring 2019

University of Washington

Instructor of record, CFRM 410: Probability and Statistics for Computational Finance. Delivered an overview of probability and statistics techniques need for computational finance to a mixture of online and on-campus students. Employed a unique mastery-based grading scheme that incentivied intensive practice and student excellence. — Winter 2018

Instructor of record, AMATH 301: Beginning Scientific Computing. Instructed over 400 students on scientific computing using Matlab. Reorganized curriculum to improve clarity and challenge. Coordinated with teaching assistants to maximize consistency and learning outcomes. Fluidly integrated "flipped" lectures into the curriculum. Integrated inclusive historical lessons to motivate material and inspire students of all backgrounds. — Spring 2015, Fall 2016, Fall 2017

Instructor of record, CFRM 460: Mathematical Methods for Computational Finance. Instructed over thirty students, including online students, on mathematical background material needed for pursuing further degrees in computational finance. Developed and gave lectures that were broadcast live and recorded for later viewing. Selected to redesign course curriculum after second year of teaching. Integrated new topics and modified course materials to streamline course and establish suitable challenge level. — Winter 2015, Winter 2016, Winter 2017

Math Science Upward Bound

Instructor of record, Machine Learning and Math 5. Refined and team-taught accelerated AP Statistics course. Designed and team-taught applied mathematics elective on machine learning. Introduced underrepresented high school students to key machine learning and coding techniques. — Summer 2017

Instructor of record, Study Section and Math 5. Coordinated ongoing partnership between Upward Bound program and the Department of Applied Mathematics. Led daily study sections for underrepresented high school students seeking to study STEM topics in college. Developed weeklong applied mathematics lab that introduces concepts such as differential equations and phase plots. Planned and taught an accelerated AP Statistics course for highly advanced high school students. — Summer 2017

University of Washington High School Summer School

Instructor of record, Introduction to Math Modeling. Developed and taught curriculum for two-week intensive course for advanced high school students in mathematics. Introduced topics such as differential equations, and facilitated mathematical discussions. Hosted guest speakers to discuss the wide range of applications of mathematics. — Summer 2014

Advising

University of Puget Sound Summer Research

Madelyn Shapiro. Applied the complete memory approximation to simulation of the two-dimensional Euler's equations for incompressible fluid flow. — 2019

University of Puget Sound Theses Advised

Aidan Schumann — 2019
Isomorphisms and Transformations of Linear Differential Equations

Outreach and Service

University of Puget Sound

Wednesdays at 4 Panelist: How do we assess learning in our courses? — 2019
Shared experience implementing a mastery-based grading framework to a 400 level statistics course for prospective quantitative finance students at the University of Washington.

Mathematics Department Seminar: An Honest Talk About Graduate School in Math, CS, and Physics. Spoke as panelist on the process of applying to and attending graduate school in applied mathematics. — 2018

University of Washington

Applied Mathematics Teaching Reading Group Founding Leader. Organized a new departmental reading group focusing on mathematics pedagogy. Led discussions about pedagogical literature and facilitated sharing of student teaching techniques and concerns. — 2017-2018

BIG Math Networking and Information Session Organizer. Proposed and organized event at which applied mathematics students can network with with local BIG (business, industry, and government) career opportunities. Leveraged personal and alumni networks to draw speakers from a variety of organizations. 2017

Applied Mathematics Department Diversity Committee Founding Member. Collaborated with the administration to represent student interests relating to diversity. Proposed a number of solutions to improve diversity-related outcomes in our department and in the applied mathematics community at large. Successfully applied for grant to fund women's mentorship program. 2017-2018

College Mathematics Instructor Development Source. Organized departmental attendance of online college mathematics pedagogy seminar. Shared teaching concerns and techniques with graduate students and faculty at institutions across the United States. 2016

Society for Industrial and Applied Mathematics, Student Chapter, Treasurer (2013-2014), Vice President (2014-2015), President (2015-2016). Organized weekly chapter meetings to provide valuable seminars and presentations for graduate students. Emphasized topics not covered by other aspects of the department, such as student panels on internships and tips and tricks for giving presentations. Organized first and second annual departmental poster session to increase awareness of student research. Coordinated volunteer programs and moderated question and answer sessions with visiting faculty. 2013-2016

Mathematical Biology Journal Club Leader. Led weekly discussions of contemporary mathematical biology journal articles. Organized group trip to Vancouver for Frontiers in Biophysics conference. 2014-2015

Math Fair Workshop Leader. Designed and led elementary school students through interactive and entertaining exercises designed to inspire an interest and passion for mathematics. Students were aged from third to sixth grade. Led discussions of statistics, probability, and logic. 2012-2017