Jeffrey Kuan

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ACADEMIC EXPERIENCE

University of Maryland, College Park, College Park, MD   *Sept 2023 – Sept 2026*
National Science Foundation (NSF) Mathematical Sciences Postdoctoral Research Fellow
Sponsoring Scientist: Konstantina Trivisa

- Recipient of selective three-year NSF Mathematical Sciences Postdoctoral Research Fellowship (MSPRF).
- Includes undergraduate teaching and mentorship, and three years of mathematics research as the principal investigator on a project in Applied Mathematics.

University of California, Berkeley, Berkeley, CA   *Aug 2018 – May 2023*
Mathematics Ph.D. Program. Thesis title: "Deterministic and stochastic fluid-structure interaction."
Ph.D. Advisor: Sunčica Čanić.

- **Research interests:** Partial differential equations (PDEs), deterministic and stochastic fluid dynamics, fluid-structure interaction, applied mathematics, kinetic theory.

Princeton University, Princeton, NJ   *Sept 2014 – June 2018*
A.B. Degree (*summa cum laude*) in Mathematics, Certificate in Musical Performance, GPA: 3.98/4.00
Senior Thesis in Mathematics: "Willmore energy of conformal immersions"

PUBLICATIONS AND RESEARCH

1. J. Kuan, K. Tawri, and K. Trivisa. Statistically stationary solutions to the stochastic isentropic compressible Euler equations with linear damping. Submitted 2025. http://arxiv.org/abs/2510.27079
2. J. Kuan and K. Trivisa. Existence and long-time behavior of global strong solutions to a nonlinear model of tumor growth. Submitted 2025. http://arxiv.org/abs/2508.19133
3. J. Kuan, S. Čanić, and B. Muha. A regularized interface method for fluid-poroelastic structure interaction problems with nonlinear geometric coupling. Submitted 2025. https://arxiv.org/abs/2508.18065
4. J. Kuan and K. Tawri. Existence of weak martingale solutions to a stochastic fluid-structure interaction problem with a compressible viscous fluid. *Journal of Differential Equations* **449**, 113669, 2025.
5. S. Čanić, J. Kuan, B. Muha, and K. Tawri. *Deterministic and stochastic fluid-structure interaction (Book)*. Advances in Mathematical Fluid Mechanics, Birkhäuser/Springer, 2025.
6. J. Kuan, S. Čanić, and B. Muha. Fluid-poroviscoelastic structure interaction problem with nonlinear geometric coupling. *Journal de Mathématiques Pures et Appliquées* **188**, 345-445, 2024.
7. J. Kuan and S. Čanić. Well-posedness of solutions to stochastic fluid-structure interaction. *Journal of Mathematical Fluid Mechanics* **26**(4), 2024.
8. J. Kuan, S. Čanić, and B. Muha. Existence of a weak solution to a regularized moving boundary fluid-structure interaction problem with poroelastic media. *Comptes Rendus Mécanique*, **351**(S1), 505-534, 2023.
9. J. Kuan, T. Oh, and S. Čanić. Probabilistic global well-posedness for a viscous nonlinear wave equation modeling fluid-structure interaction. *Applicable Analysis* **101**(12), 4349-4373, 2022.
10. J. Kuan and S. Čanić. A stochastically perturbed fluid-structure interaction problem modeled by a stochastic viscous wave equation. *Journal of Differential Equations* **310**, 45-98, 2022.
11. J. Kuan and S. Čanić. Deterministic ill-posedness and probabilistic well-posedness of the viscous nonlinear wave equation describing fluid-structure interaction. *Transactions of the American Mathematical Society* **374***, 5925-5994, 2021.
12. K. T. Crowley, S. K. Choi, J. Kuan, J. A. Austermann, J. A. Beall, R. Datta, S. M. Duff, P. A. Gallardo, M. Hasselfield, S. W. Henderson, S.-P. P. Ho, B. J. Koopman, M. D. Niemack, M. Salatino, S. M. Simon, S. T. Staggs, and E. J. Wollack. Characterization of AlMn TES impedance, noise, and optical efficiency in the first 150 mm multichroic array for Advanced ACTPol, *Proc. SPIE* **9914**, 991431, 2016.

MANUSCRIPTS IN PREPARATION:

13. L. Bielawski, J. Kalai, C. Kelly, J. Kuan, and K. Trivisa. Mathematical modeling and mean-field limit of quorum sensing. To be submitted Fall 2025.
14. S. Čanić, A. Dai, J. Kuan, K. Tawri, and K. Trivisa. Long time behavior of stochastic compressible Euler equations with linear damping. To be submitted Fall 2025.
15. J. Kuan, S. Čanić, and B. Muha. Weak-classical consistency for fluid-poroelastic structure interaction problems with nonlinear geometric coupling. In preparation.

HONORS

Recipient of NSF Mathematical Sciences Postdoctoral Research Fellowship *Spring 2023*
- Recipient of National Science Foundational (NSF) mathematics postdoctoral fellowship award.

Recipient of Bernard Friedman Memorial Prize in Applied Mathematics *Spring 2020*
- Recipient of departmental prize at UC Berkeley for best PhD research in applied mathematics.

Recipient of Outstanding GSI Award *Spring 2019*
- Recognized for performance as a graduate student instructor at UC Berkeley.

Elected to Phi Beta Kappa Honor Society *Fall 2017*
- Was one of 32 students in the Princeton Class of 2018 elected in Fall 2017 for academic excellence.

Recipient of the Shapiro Prize for Academic Excellence *Fall 2015, Fall 2016*
- Recognized for both freshman year and sophomore year academic work at Princeton University.

Recipient of the Manfred Pyka Memorial Physics Prize *2015*
- Recognized for freshman year academic work in the physics department at Princeton University.

TEACHING EXPERIENCE

Instructor, University of Maryland, MD *Fall 2024, Fall 2025*
- Instructor for MATH 241H: Calculus III Honors at University of Maryland, College Park.
- Responsibilities included giving lectures, writing problem sets and exams, and holding office hours.

Graduate Student Instructor, UC Berkeley, CA. *Fall 2018 – Fall 2019, Fall 2022, Spring 2023*
- Graduate Student Instructor for Math 1A (Calculus I; Fall 2018), Math 1B (Calculus II; Spring 2019), Math 54 (Linear Algebra and Differential Equations; Fall 2019), and Math 10A (Methods of Mathematics: Calculus, Statistics, and Combinatorics; Fall 2022).
- Head Graduate Student Instructor for Math 10B (Methods of Mathematics: Calculus, Statistics, and Combinatorics; Spring 2023).
- Instructor for Math N54 (Linear Algebra and Differential Equations; Summer 2019). Gave lectures, wrote lecture notes, wrote problem sets, and wrote/graded exams for Math N54.

MENTORING EXPERIENCE

Ph.D. Students:
Amy Dai (University of California, Berkeley – 2022-Present, co-mentored with Sunčica Čanić)

Undergraduate Students:
Luke Bielawski (TREND REU student at University of Maryland, College Park, Summer 2025)
Joshua Kalai (University of Maryland, College Park – Summer 2025)
Clayton Kelly (TREND REU student at University of Maryland, College Park, Summer 2024)
Aadi Rane (University of California, Berkeley – Directed Reading Program student, Spring 2022)
Tianyue (Choco) Li (University of California, Berkeley – Directed Reading Program student, Fall 2021)
Angineh (Angie) Keshishian (University of California, Berkeley – Directed Reading Program student, Spring 2021)
Harshil Desai (University of California, Berkeley – Directed Reading Program student, Fall 2020)
Junru Lyu (University of California, Berkeley – Directed Reading Program student, Fall 2019)

ADDITIONAL EXPERIENCE

Organizer of SLMath Workshop, Berkeley, CA   *Dec 2023*
- Served as lead organizer of a five-day in-person Hot Topics Workshop titled "Recent progress in deterministic and stochastic fluid-structure interaction" at the Simons Laufer Mathematical Sciences Institute (SLMath/MSRI) in Berkeley, California (December 4, 2023 – December 8, 2023).

Co-Organizer of Applied PDE RIT, University of Maryland, MD   *Fall 2023 – Spring 2025*
- Served as co-organizer for the Applied PDE Research Interaction Team (RIT) in the math department at the University of Maryland, College Park, giving expository talks to faculty, postdocs, and graduate students, and organizing talks on applied PDEs.

Mentor for TREND REU, University of Maryland, MD   *Summer 2024, Summer 2025*
- Mentored an REU project on Cucker-Smale stochastic flocking dynamics and quorum sensing, in which the mentees used numerical methods for deterministic and stochastic ODEs to simulate collective behavior in biology, and demonstrated the stability of these numerical schemes.

Co-Organizer of Seminar in Applied PDEs, UC Berkeley, CA   *Fall 2022, Spring 2023*
- Served as co-organizer, jointly with Professor Sunčica Čanić, of the Math 290 Seminar in Modeling, Analysis and Simulation in Applied PDEs in the UC Berkeley mathematics department.

Directed Reading Program (Mentor), UC Berkeley, CA   *Fall 2019, Fall 2020 – Spring 2022*
- Served as a mentor for undergraduate independent reading projects in:
  - Real analysis, stochastic calculus, and applications to options pricing (Fall 2019)
  - Finite difference methods for ODEs and PDEs (Fall 2020, Fall 2021)
  - Navier-Stokes equations and applications to fluid-structure interaction (Spring 2021)
  - Number theory (Spring 2022)

Undergraduate Course Assistant (UCA), Princeton University, NJ   *Fall 2015 – Spring 2018*
- Conducted weekly problem sessions and answered questions from students for:
  - MAT 215: Honors Analysis (Single Variable) (Fall 2015, Fall 2016, Spring 2018)
  - MAT 217: Honors Linear Algebra (Spring 2016, Spring 2017)
  - MAT 214: Numbers, Equations, and Proofs (Fall 2017)

PRESENTATIONS

1. Invited special session talk at Joint Mathematics Meetings (Special session title: Recent developments in theoretical and numerical control of PDEs). To be given January 4-7, 2026.
2. *Analysis of a compressible flow problem describing tumor growth.* Invited minisymposium talk at SIAM Conference on Analysis of Partial Differential Equations 2025 (Minisymposium title: Recent advances in mathematical and computational fluid dynamics). Given November 17, 2025.
3. *Fluid dynamics and complex flows: modeling, analysis, and applications.* Given September 12, 2025 at the Applied Math Colloquium at University of Maryland, Baltimore County.
4. *A fluid-poroviscoelastic structure interaction problem with nonlinear coupling.* Given July 25, 2024 at AMS-UMI International Joint Meeting 2024, Special Session on PDE Theory for Fluid-Structure Interactions.
5. *A fluid-poroviscoelastic structure interaction problem with nonlinear coupling.* Given April 7, 2024 at AMS Spring Eastern Sectional Meeting, Special Session on Analysis of PDE in Inverse Problems and Control Theory.
6. *Well-posedness of solutions to stochastic fluid-structure interaction.* Given April 6, 2024 at AMS Spring Eastern Sectional Meeting, Special Session on Stochastic Methods in Fluid Mechanics.
7. *Recent progress in stochastic fluid-structure interaction.* Given February 27, 2023 at McMaster University AIMS Lab Seminar (virtual).
8. *Recent progress in stochastic fluid-structure interaction.* Given September 12, 2022 at University of Maryland, Baltimore County (UMBC) Differential Equations Seminar.
9. *A stochastic fluid-structure interaction problem describing Stokes flow interacting with a membrane.* Given September 8, 2022 at ApplMath22 (11th Conference on Applied Mathematics and Scientific Computing) in Brijuni, Croatia.
10. *A stochastic fluid-structure interaction problem describing Stokes flow interacting with a membrane.* Given August 25, 2022 at Math 290 Seminar in Modeling, Analysis and Simulation in Applied PDEs at UC Berkeley (virtual).
11. *Probabilistic well-posedness for a stochastic fluid-structure interaction problem.* Given August 23, 2022 (on behalf of Sunčica Čanić) at Mathematical Fluid Mechanics in 2022 (virtual).
12. *A stochastic fluid-structure interaction model given by a stochastic viscous wave equation.* Given March 3, 2021 at the Graduate Student Working Group in MSRI Program: Mathematical Problems in Fluid Dynamics, Spring 2021 (virtual).
13. *A stochastic fluid-structure interaction problem describing Stokes flow interacting with a membrane.* Given June 21, 2022 at HYP 2022 XVIII International Conference on Hyperbolic Problems: Theory, Numerics and Applications in Málaga, Spain.
14. *Well-posedness for probabilistic fluid-structure interaction problems.* Given March 16, 2022 at minisymposium MS52: On Fluid-Structure Interactions and Related Problems at the SIAM Conference on Analysis of Partial Differential Equations PD22 (virtual). Recipient of **Student Travel Award** for SIAM PD22 conference, in form of registration waiver.
15. *A stochastic fluid-structure interaction problem describing Stokes flow interacting with a membrane.* Given February 19, 2022 at the Vanderbilt University Shanks Workshop on Mathematical Aspects of Fluid Dynamics.
16. *A stochastic fluid-structure interaction problem describing Stokes flow interacting with a membrane.* Given February 15, 2022 at the UC Berkeley Harmonic Analysis and Differential Equations Seminar.
17. *A stochastic fluid-structure interaction problem describing Stokes flow interacting with a membrane.* Given September 8, 2021 at the UC Berkeley/Lawrence Berkeley Laboratory Applied Mathematics Seminar (virtual).
18. *A stochastic fluid-structure interaction problem describing Stokes flow interacting with a membrane.* Given August 31, 2021 (on behalf of Sunčica Čanić) at IFIP TC 7 Conference on System Modeling and Optimization – Ecuador, MSFL2 Fluid Solid Interactions and Mixtures (virtual).
19. *A stochastic fluid-structure interaction model given by a stochastic viscous wave equation.* Given April 12, 2021 at the UC Berkeley Analysis and PDE Seminar (virtual).