

# Jeffrey Kuan

jeffreyk@umd.edu

---

## 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) award, which will be done at University of Maryland, College Park.
- Includes undergraduate teaching and three years of mathematics research as the principal investigator on a project in Applied Mathematics titled: “Stochastic kinetic equations in the physical sciences”

**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), fluid-structure interaction, applied mathematics, applications of probability and stochastic processes to PDEs, 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. 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.
2. 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.
3. 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.
4. 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.
5. 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 Mecanique*, 351(S1), 1-30, 2023.
6. J. Kuan and S. Čanić. Well-posedness of solutions to stochastic fluid-structure interaction. *J. Math. Fluid Mech.* **26**(4), 2024.
7. J. Kuan, S. Čanić, and B. Muha. Fluid-poroviscoelastic structure interaction problem with nonlinear geometric coupling. *J. Math. Pures. Appl.* **188**, 345-445, 2024.
8. S. Čanić, J. Kuan, B. Muha, and K. Tawri. *Deterministic and stochastic fluid-structure interaction*, accepted to be published in *Advances in Mathematical Fluid Mechanics*, Birkhauser/Springer, under revision, 2024, 563 pp.
9. J. Kuan and K. Tawri. Existence of weak martingale solutions to a stochastic fluid-structure interaction problem with a compressible viscous fluid. Submitted 2024.
10. J. Kuan, S. Čanić, and B. Muha. Analysis of a fluid-poroelastic structure interaction problem with nonlinear geometric coupling via a regularized interface method. In preparation.
11. J. Kuan. Existence of weak martingale solutions to a stochastic kinetic Cucker-Smale model describing multiflock dynamics. 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.

## ADDITIONAL EXPERIENCE

- Organizer of MSRI 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 Mathematical Sciences Research Institute (MSRI) held in Berkeley, California.
- Co-Organizer of Applied PDE RIT, University of Maryland, MD** *Fall 2023 – Present*
- 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*
- Mentored an REU project on Cucker-Smale stochastic flocking dynamics, in which the mentee used numerical methods for deterministic and stochastic ODEs to numerically simulate flocking 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)

## TEACHING EXPERIENCE

**Instructor**, University of Maryland, MD

*Fall 2024*

- Instructor for MATH 241H: Calculus III Honors at University of Maryland, College Park.
- Responsibilities included giving lectures, writing problem sets and solutions, giving 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.

## PRESENTATIONS

1. *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).
2. *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).
3. *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).
4. *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).
5. *A stochastic fluid-structure interaction problem describing Stokes flow interacting with a membrane*. Poster presentation given on December 17, 2021 at RAMSES: Reduced order models; Approximation theory; Machine learning; Surrogates, Emulators and Simulators (virtual).
6. *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.
7. *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.
8. *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.
9. *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.
10. *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).
11. *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).
12. *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.
13. *Recent progress in stochastic fluid-structure interaction*. Given September 12, 2022 at University of Maryland, Baltimore County (UMBC) Differential Equations Seminar.

14. *Recent progress in stochastic fluid-structure interaction*. Given February 27, 2023 at McMaster University AIMS Lab Seminar (virtual).
15. *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.
16. *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.
17. *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.