Dana Ferranti

CONTACT INFORMATION

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CURRENT POSITION

Worcester Polytechnic Institute Department of Mathematical Sciences
Assistant Research Professor 2023 -
Advisor: Sarah Olson

RESEARCH INTERESTS

- Computational methods for fluid-structure interaction at low Reynolds number, particularly the method of regularized Stokeslets.
- Biological applications of Stokes flows.
- Reduced ODE models for systems of hydrodynamically coupled bodies.

EDUCATION

Tulane University, New Orleans, LA 2017–2023

PhD, Mathematics
Thesis: *Regularized Stokeslet surfaces and a coupled oscillator system in Stokes flow*
Advisor: Ricardo Cortez

Clark University, Worcester, MA. 2010–2014

BA, Mathematics and Computer Science, Magna Cum Laude

AWARDS

Outstanding Thesis Award (Monetary award) 2024
Tulane University Department of Mathematics

Outstanding Graduate Instructor Award (Monetary award) 2023
Tulane University Department of Mathematics

PUBLICATIONS

In Review

- Analysis of the stability of an immersed elastic surface using the method of regularized Stokeslets. (2025). (**DF**, S.D. Olson). Preprint: https://arxiv.org/abs/2507.07063.

Published

- Regularized Stokeslet surfaces. *Journal of Computational Physics*. Volume 508, 113004 (2024). (**DF**, R. Cortez).
- Generalized matching preclusion in bipartite graphs. *Theory and Applications of Graphs*. Volume 5, Iss. 1, Article 1 (2018). (Z. Wheeler, E. Cheng, **DF**, L. Liptak, K. Nataraj).
- The value of prior knowledge in machine learning of complex network systems. *Bioinformatics*. Volume 30, 22 (2017). (**DF**, D. Krane, D. Craft).

RESEARCH EXPERIENCE

- **Worcester Polytechnic Institute** 2023 -
  Department of Mathematical Sciences
  - Stability analysis of a coupled elastic surface-fluid system using the method of regularized Stokeslets.
  - Generalized image systems for Stokes flows using the Lorentz reflection principle.
  - Mathematical modeling of cellular functions.
- **Tulane University** 2017-2023
  Center for Computational Science in Mathematics Department
  - Extending the method of regularized stokeslets by using exact integration over triangulated surfaces.

- Reduced models of cilia interaction to investigating the potential effect of elastic coupling and inertia on synchronization.

- **Massachusetts General Hospital** 2016–2017
  Physics Research in Department of Radiation Oncology
  - Using theoretical models to demonstrate the value of prior knowledge in determining causal relationships in complex networks, with applications to machine learning in medicine.
  - Advisor: David Craft.

Teaching Experience

As instructor

Worcester Polytechnic Institute

- Calculus IV — Fall 2025
- Independent Study: Introduction to the Immersed Boundary Method — Spring 2025
- Calculus II — Spring 2025
- Calculus IV — Spring 2024

Tulane University

- Probability & Statistics I (Math 1110) — Spring 2023
- Introduction to Applied Math (Math 2240). — Fall 2021

As teaching assistant

Tulane University

- Introduction to Applied Math (Math 2240). — 2019, 2020, 2021
- Linear algebra (Math 3090). — 2020
- Calculus I (Math 1210). — 2017, 2019
- Calculus II (Math 1220). — 2018, 2020
- Calculus III (Math 2210). — 2018

Service and Outreach

- Reviewer for *Pi Mu Epsilon* journal — 2024
- Volunteer at WPI's Sonia Kovalevsky Day — 2024
- President of AMS Graduate Student Chapter — 2019-2021
- Mathematics department tea time organizer — 2018-2022
- Treasurer of AMS Graduate Student Chapter — 2017-2019
- Member of Inclusivity in Mathematics Task Force at Tulane (IMTF) — 2020-2023

Posters & Talks

Posters

- *Stability Analysis of an Immersed Elastic Surface Using the Method of Regularized Stokeslets*
  - Mathematical Modeling, Computational Methods, and Biological Fluid Dynamics at National Institute for Theory and Mathematics in Biology (NITMB) in Chicago, IL (July 23, 2025).
  - Frontiers in Applied & Computational Mathematics at NJIT (June 5, 2025).

- *Inertial Effects in a Minimal Model of Hydrodynamically Dynamically Coupled Cilia* Blackwell-Tapia Conference at Institute of Mathematical and Statistical Innovation (IMSI) in Chicago, IL (Nov. 19, 2021).

Talks

- *A Tutorial on the Method of Regularized Stokeslets: Advanced Methods*
  Mathematical Modeling, Computational Methods, and Biological Fluid Dynamics at NITMB in Chicago, IL (July 21, 2025).

- *Numerical stability analysis of a coupled fluid-elastic structure system using the method of regularized Stokeslets*
  77th Annual Meeting of the Division of Fluid Dynamics (November 25, 2024).

- *Linear stability analysis of a coupled fluid-structure system using the method of regularized Stokeslets*
  Joint annual meeting of Korean Society for Mathematical Biology and Society for Mathematical Biology (July 1, 2024).
- *Regularized Stokeslet Surfaces*
  Division of Fluid Dynamics (APS Meetings) in Washington D.C. (November 20, 2023).
- *Simulating bodies immersed in viscous flows: new developments in the Method of Regularized Stokeslets (MRS)*
  Worcester Polytechnic Institute Mathematics Colloquium (September 8, 2023).
- *Regularized Stokeslet Surfaces* Scientific Computing Around Louisiana (March 11, 2023).
- *Regularized Stokeslet Surfaces*
  Math for All in NOLA (February 25,2023).
- *An Extension to the Method of Regularized Stokeslets*
  Special session on Recent Developments in Numerical Methods for PDEs, Joint Math Meetings 2023 (January 4,2023).
- *Computational Modeling of Bodies Immersed in Viscous Fluids*
  Hunter College Applied Math Seminar (November 3,2022).