



Abigail Rose Drumm, PhD

PhD in Mathematical Sciences

Why did you choose to study at WPI?

My initial inspiration to explore WPI for graduate study was twofold. First, with most of my family now living in Massachusetts and having completed my undergraduate degree in Virginia, I wanted to be closer to home base for a while. Second, through an editorial role that I held for several years, I met a couple of WPI professors from non-math departments – Professor Andrew Trapp in [The Business School](#) and Professor Oleg Pavlov from [Social Science & Policy Studies](#) – who put WPI on my radar. When I visited WPI in February 2022, at the invitation of Professor Joseph Fehribach, I familiarized myself a bit with the campus and the [mathematical sciences](#) department culture and felt comfortable there.

How are you involved with the WPI community?

My main involvement with the WPI community is with the [Association for Women in Mathematics](#) (AWM) student chapter. The goal of this



Hometown

Ladera Ranch, CA

Mentor/Advisor

- [Francesca Bernardi](#)
- [Andrea Arnold](#)

Interests

- Reading and writing fiction
- Cooking/baking new vegan recipes
- Practicing yoga
- Knitting/crocheting
- Adoption and foster care

Campus Activities

- Association for Women in Mathematics (AWM)

organization is to "encourage, support, promote, and bring awareness to the wonderful work of women in all areas of the mathematical sciences." During my visit, the then-president of the chapter (who has since graduated with her PhD) told me about AWM and, in my first year, I became gradually more involved in the chapter. This year (my third), I'm serving as the president.

In addition to AWM, I have also been serving as the mathematics representative on the Arts & Sciences Graduate Student Council, which has given me the opportunity to meet inspiring students from other programs and benefit from skilled mentorship through the Dean's office.

- Mathematics representative on the Arts & Sciences Graduate Student Council

What's your favorite thing about WPI?

The first thing I'll mention is nerdy: I love the library at WPI. At my undergraduate university, I worked at the library's circulation desk, but it wasn't a STEM school. Most of the stacks there had religious, business, or psychology texts, with only a couple of bookshelves for the math textbooks. A second thing I've particularly liked about WPI is its location and design, with plenty of places to walk around, and a mix of old and new buildings to explore. I spend most of the day at a desk scratching out calculations and figuring out why code is malfunctioning, so it's good to have space to take breaks and enjoy fresh air and different sights.

Do you have a faculty or staff mentor?

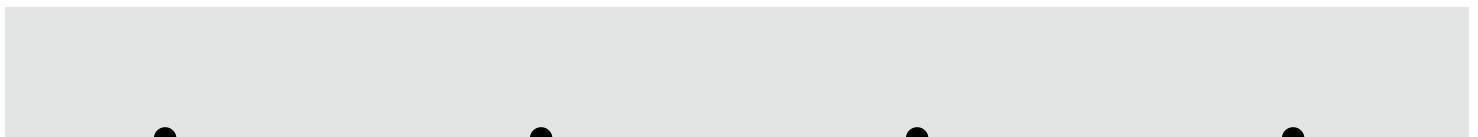
Professor Francesca Bernardi is my research advisor. I met her through a Spring 2023 Denksport class (MA 1801) she designed for the mathematical sciences department. This course blends readings, discussions, and lectures on the mathematical and literary works and influence of Sofya Kovalevskaya. I joined as her first PhD student that summer. Professor Bernardi has been an excellent advisor and mentor. She flags opportunities that would interest me or help advance my early academic

career and encourages me in the endeavors that I undertake.

Professor Andrea Arnold was one of the first professors I had at WPI. She taught one of the infamous three-hour-long evening math grad classes. Despite the rough timing, Professor Arnold was an energetic professor who was happy to chat with students even after class ended. Calibrating my work pace to the expectations of my first semester's classes, and becoming accustomed to WPI overall, was a bit of a challenge for me at first. Professor Arnold was, and continues to be, helpful and supportive as I navigate the ins and outs of the PhD program.

What projects are you working on?

My current research projects with my advisor fall under the broad umbrella of microfiltration, which operates using physical membranes with micrometer-sized pores to remove suspended solids from contaminated liquid, usually water. A first focus is on simulating membrane fouling, wherein the suspended solids accumulate on the surface of the membranes and thereby negatively impact the efficiency of the operation. A second focus is on analytically and numerically modeling the event of foulants that are larger than the membrane pores nevertheless making it through to the permeate water (the product water of filtration). The research has a clear engineering application, which is an unexpected turn for me, as I hadn't explored much in the realm of engineering before coming to WPI.



7AM

Make breakfast for my husband and myself and pack lunch

8:30AM

Drive to campus and start work in the office

11AM

Eat lunch

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