

125 Years of Graduate Degrees: 1896-2021 THE GRADUATE SCHOOL

Emma Zajdela

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Emma Zajdela is a PhD candidate in the Department of Engineering Sciences and Applied Mathematics in the McCormick School of Engineering. Her research focuses on developing mathematical models to understand and predict complex social phenomena using data. Recently, Emma was named a [Buffett Institute Global Impacts Fellow](https://buffett.northwestern.edu/engagement/graduate-student-funding/global-impacts-graduate-fellowship-program.html) (<https://buffett.northwestern.edu/engagement/graduate-student-funding/global-impacts-graduate-fellowship-program.html>).

Tell us what inspired your research and/or work.

As an undergraduate, I took a course on game theory and conducted research for the professor teaching it, Peter Tingley. I have always loved math, but game theory was special because it allowed me to understand why humans behave the way they do from a mathematical perspective. At the same time, I started working with a nonprofit called the [Malta Conferences Foundation](https://www.maltaconferencesfoundation.org/) (<https://www.maltaconferencesfoundation.org/>), that uses science diplomacy as a bridge to peace in the Middle East. I began to wonder: can we combine game theory with science diplomacy and use math to understand how to help scientists form collaborations in regions of conflict? This question has been a driver of my research ever since. I have worked on topics ranging from the mathematics of poker to autonomous vehicles. Right now, I am working on a mathematical model to understand how scientists form collaborations at conferences.

Whom do you admire in your field and otherwise, and why?

I feel incredibly lucky to have the opportunity to work with my adviser, Prof. Daniel Abrams, who is an amazing mathematician, teacher, and mentor. The president of the Malta Conferences Foundation, Prof. Zafra Lerman, whom I have worked with for the past several years, is an inspiration to so many people, including me. She has made a difference around the globe teaching science to underprivileged students, working on human rights cases, and using science for peace in the Middle East. I also have a lot of admiration for my Arabic teacher at Northwestern, Prof. Rana Raddawi, who is a ray of light in every class and cares deeply about all her students.

What inspires you?

I feel a strong duty to do my part in making the world a better and more peaceful place. This inspires me in my work on science diplomacy and my research.

What is the biggest potential impact or implication of your work?

To solve many of the current and future challenges facing society, we need international, multidisciplinary, scientific collaborations. These collaborations are particularly important in regions of conflict like the Middle East because they can help bring stability and peace to the region. My research will help generate more of these scientific collaborations and thus has the potential to have an impact on science and science diplomacy.

Why Northwestern?

My department, Engineering Sciences and Applied Mathematics, is a fun and exciting place to be because we get to use math to study a variety of topics. People in my department work with neuroscientists, biologists, and social scientists, just to name a few. One of the main reasons I came to Northwestern was to work with my adviser, Prof. Danny Abrams, a leader in the field of mathematical modeling of social systems. I also love being part of the Northwestern Institute on Complex Systems (NICO).

How do you unwind after a long day?

Before COVID-19, I had started judo at Tohkon Judo Academy in Chicago and even made it to my yellow belt! Judo is an amazing sport not only for the body but for the spirit, and I miss going to the dojo. During the pandemic, I have been playing violin a lot, which I've been playing since I was four. I'm also an avid true crime, politics, and current events podcast listener.

What books are on your bedside table?

I love to read -- when I was a kid, I used to hide one book under my pillow at night to read with a flashlight, and when my mom would confiscate it because I was staying up too late, I would have another set hidden by my feet. My favorite genres were historical fiction and biographies. Today, I like fantasy (I most recently finished *The Dagger and the Coin* series by Daniel Abraham), mystery, and spy books. I've also been going through French classics from authors like Baudelaire, Flaubert, and Zola.

What did you originally want to be when you grew up?

When I was very young, I wanted to be a marine biologist or a dolphin trainer. My grandma still hasn't forgiven me that I didn't become one because I always promised her free tickets to the shows! After that, I wanted to be a diplomat or a lawyer.

Tell us about a current achievement or something you're working on that excites you.

I became a Buffett Institute Global Impacts Fellow in 2020–21 and it has been wonderful to meet all the other fellows in the cohort from many disciplines and learn about their research. I also am very excited to be part of the organizing team for the 10th Malta Conference, which will bring together scientists from fifteen Middle Eastern countries, Morocco, and Pakistan with several Nobel Laureates for five days to develop friendships and collaborations. It should be a big celebration for the 10th anniversary of these conferences!

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