



MATHEMATICAL SCIENCES NEWSLETTER

**DEPARTMENT OF
MATHEMATICAL SCIENCES**

WORCESTER POLYTECHNIC INSTITUTE

September 2026

MESSAGE FROM THE DEPARTMENT HEAD



Professor Burt Tilley
Interim Department Head

Welcome to the first Mathematical Sciences newsletter! While the department is based in Stratton Hall, recently renovated with improvements including a new computer lab, multiple conference rooms, a faculty lounge, and expanded spaces for undergraduate mathematics majors, the work of our faculty and students has been consistently recognized across campus. Since the start of 2026, Prof. Emeritus Suzanne Weekes was elected as Fellow to the American Association for the Advancement of Science, the WPI Board of Trustees Chair's Exemplary Faculty Prize was given to Prof. William Martin, and Prof. Francesca Bernardi was named the recipient of WPI's Denise Nicoletti Trustees' Award for Service to the Community. Funding for improving the student experience through WPI's Summer Sandbox grants program was given to Prof. William Sanguinet and Prof. Michael Smith for developing projects which implement artificial intelligence (AI) tools safely into applied mathematics education, to Prof. Samuel Tripp for building 10 different interdisciplinary projects to be incorporated into a first linear algebra course, and to Prof. Zheyang Wu for implementing an AI-practice tool, curated by the instructor, for a first applied statistics course. Graduating students have excelled as well, with Kendall Snyder winning the Pi Mu Epsilon Student Speaker Award and Bernard Ymeri winning the Provost's Award for the best Major Qualifying Project in Mathematics. In addition, we have interviews with Prof. Art Heinricher and alumna Timory Goggin.

As you read this year's newsletter, we invite you to celebrate the accomplishments of our students, faculty, staff, and alumni. The stories that follow demonstrate that, more than ever, WPI Mathematical Sciences is advancing knowledge and preparing graduates to succeed in a world increasingly shaped by data, computation, and mathematical thinking. We thank you for your continued support and for remaining an important part of the Mathematical Sciences family.

FACULTY HIGHLIGHTS

Welcome New Faculty!



Kenji Kozai
Assistant Teaching Professor

Kenji earned a Ph.D. in mathematics from Stanford University, studying the geometry of 3-manifolds. Prior to WPI, he was an RTG Postdoctoral Fellow at University of California, Berkeley, held faculty positions at Rose-Hulman Institute of Technology and Lesley University, and was a MAA Project NExT (New Experience in Teaching) fellow. He enjoys mentoring undergraduate research, having supervised projects on knotting and linking in random spatial embeddings of graphs through a National Science Foundation Research Experience for Undergraduates, as well as preparing students for mathematical competitions such as the William Lowell Putnam Mathematical Competition and the Mathematical Contest in Modeling. At WPI this B Term, Kenji will teach Denksport, where he will continue mentoring students for the William Lowell Putnam Mathematical Competition.



Francisco Ponce Carrion
Post-Doctoral Scholar

Francisco obtained his bachelor's degree from Universidad San Francisco de Quito in 2020, and he obtained his Ph.D. from North Carolina State University in 2026. Francisco's research focuses on using tools from combinatorics and algebraic geometry to study problems in statistics and biology. Francisco will be working on research with Prof. Jane Coons.



Yuehui Xu
Post-Doctoral Scholar

Yuehui Xu is an incoming Postdoctoral Scholar. She received her Ph.D. in Applied Mathematics from Indiana University Indianapolis, an M.S. in Applied Mathematics from the University of Wisconsin–Madison, and a B.S. in Financial Mathematics from Nankai University. Her research combines mathematical modeling, scientific computing, and data-driven methods to study biological systems, including cell migration, biofilm dynamics, and biomedical applications. Yuehui will be working on research with Prof. Sarah Olson.



Rholee Xu
Research Scientist

Rholee Xu is an incoming Research Scientist working with Professor Min Wu and in collaboration with Professor Luis Vifali (BBT). She received her Ph.D. in Bioinformatics and Computational Biology from WPI. Her research currently focuses on tip-growth dynamics. Specifically in feedback mechanisms of cell wall growth in relation to the cell wall thickness, secretion, and wall loosening dynamics with special focus on wall elasticity.

FACULTY AWARDS



**Professor Francesca
Bernardi**
**Denise Nicoletti Trustees'
Award for Service to the
Community**
WPI

This award honors the memory of Denise Nicoletti, whose passion for life and humanity touched many lives. Denise Nicoletti joined WPI in 1991 as the first tenure-track female faculty member in the Electrical and Computer Engineering Department and a recognized authority on ultrasonics, nondestructive testing, scaling and fractal properties, the assessment of student learning, and the promotion of science and engineering to under-represented groups.

Prof. Bernardi received this award for service to the community in recognition of her exceptional commitment to inclusive education and community engagement. Through initiatives such as Let's Talk Math, supporting underserved and marginalized students, leading departmental inclusion and mentoring efforts, and contributing to campus-wide programs that foster belonging and well-being, she exemplifies the spirit of service embodied by the award. Her work has created lasting impact for K–12, undergraduate, and graduate students, and the WPI community by expanding access to STEM, strengthening support networks, and advancing equity across campus.



**Professor William J.
Martin**
Exemplary Faculty Prize
WPI

This award recognizes WPI faculty members who excel in all relevant areas of faculty performance, including teaching, research and scholarship, and advising.

Prof. Martin exemplifies excellence in teaching, research, advising, and service. A leading scholar in algebraic aspects of combinatorial mathematics, he is internationally respected for his innovative, rigorous research—spanning pure math to applications in cryptography and quantum information—and for his global scholarly leadership. Equally dedicated to students, Prof. Martin has advised about 50 MQPs, brought cutting-edge ideas into the classroom, and built vibrant mathematical communities through mentoring, teaching, and long-standing service to WPI. Together, his intellectual impact, enthusiasm for teaching, and commitment to the university mark him as a model faculty member who embodies WPI's highest aspirations.



**Professor Brigitte
Servatius**
**C. C. MacDuffee Award for
Distinguished Service**
Pi Mu Epsilon

Prof. Servatius, was awarded the 2026 C. C. MacDuffee Award for Distinguished Service from Pi Mu Epsilon (PME). According to the PME website, "The C. C. MacDuffee Award for Distinguished Service honors individuals who have made significant, sustained contributions to Pi Mu Epsilon and its mission. First awarded in 1965, it is not given annually but only when service of exceptional impact merits recognition." PME is an academic society that promotes mathematics and, particularly, student engagement with the subject. Servatius has been active in PME for many years. Her service includes supporting students, which included mentoring chapter officers, advising research presentations, and helping organize regional and national PME events. She is the editor of the Pi Mu Epsilon Journal, and has made "transformative changes" during her tenure.

FACULTY AWARDS, CONT.

Grants

Professor Christopher Larsen

National Science Foundation

"New variational methods for fracture evolution"

Professor Zheyang Wu

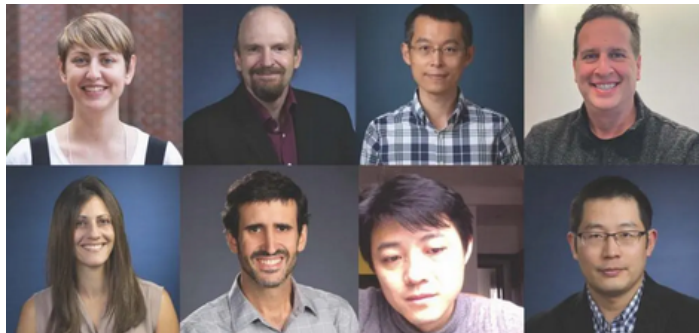
National Science Foundation

"Innovations in Integrative Association Testing for Large Genetic Data"

Professor Vadim Yakovlev

Oak Ridge National Laboratory

"Models and Machine-Learning Algorithms for Energy Efficient Carbon Fiber Production Using Microwave-Assisted Plasma"



Tenure & Promotions

Prof. Francesca Bernardi has received tenure and been promoted to Associate Professor, **Prof. Randy Paffenroth** has been promoted to Professor, **Prof. Guanying Peng** has received tenure and been promoted to Associate Professor, **Prof. Barry Posterro** has been promoted to Teaching Professor, **Prof. Dina Rassias** has been promoted to Associate Teaching Professor, **Prof. Adam Sales** has received tenure and been promoted to Associate Professor, **Prof. Qingshuo Song** has been promoted to Professor, and **Prof. Zhongqiang Zhang** has been promoted to Professor.

Recognition

Professor Balgobin Nandram

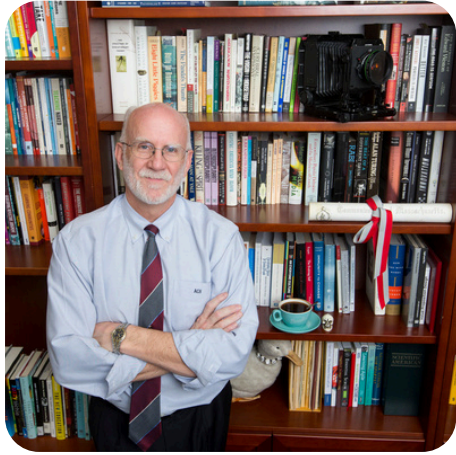
American Statistical Association

Certificate in recognition of 35 years of membership

Professor Emeritus Suzanne L. Weekes

American Association for the Advancement of Science (AAAS)

Elected a Fellow



Arthur Heinrich

Professor of Mathematical Sciences

What is your favorite part about the WPI math department?

I like being in the most important department at WPI. First, mathematics and mathematical thinking can contribute, and are in fact central, to every field of study. Second, we help students learn how to be college students. We can show them that learning to learn is their primary job and, with work, they will succeed.

When did you first start at WPI, and what was it like back then?

I started at WPI in 1992. Bill Clinton was US President, Jon Strauss was WPI President, and Sam Rankin was department head in Math. The first-year class hovered just below 700, with a crisis in 1995 when the class dropped to 589. There was no Campus Center and no Gateway Park and there was traffic on West Street. My office was Stratton 202A and I was told “Don’t worry—Stratton is number two on the list for renovation!”

Faculty complained that students were not prepared for college as well as they had been a few years before. Graphing calculators were being used to “cheat” on homework. Overhead projectors were in every classroom and the math office had a mimeograph machine.

Some things have changed dramatically, but many things have not changed at all.

What are the different roles you’ve had at WPI, and what did you like about each of them?

I have been faculty and administration. I arrived as an Assistant Professor and worked my way up to Full Professor. In 2007, I moved into administration as Associate Dean and then Dean of Undergraduate Studies. I spent two years as Interim Provost and, finally, succeeded in returning to Stratton last year (after Stratton was finally renovated).

I always liked the freedom of being a faculty member. In a sense, I think that faculty become teachers because they deeply love learning and want to share that love. I have always enjoyed project advising, including IQPs off campus and MQPs, but especially

FACULTY SPOTLIGHT, CONT.

MQPs with industrial sponsors. Project advising is kind of like an “externship” for faculty. While I would say that I have always enjoyed classroom teaching, the aspect of the WPI Plan that I believe is most important is the way that it moves the purpose of education away from passing classes and towards project work.

Please tell us about your research.

I spent more than 15 years in administration and while I still love to read research, especially in optimization and stochastic calculus, I am not on or near the cutting edges in that work.

Much of my more recent reading has been focused on innovation in higher education. At WPI, we live in a fascinating case study of how an innovation in higher education is launched and can grow and mature, while under constant pressure to “regress” to a minimum energy mean.

Higher education faces, I believe, more significant crises today than those that sparked the original development of the WPI Plan more than 50 years ago.

What do you like to do for fun outside of math?

I have always been a photographer and even spent a few years working as a professional and studying photography as a fine art before finding mathematics. With that said, my favorite subjects are landscapes and woodlands and abstractions from nature. That means a lot of hiking. Humans are fundamentally makers and photography gives me that joy in making.



Tree roots on the hill near Moss Glen Falls, Vermont

ALUMNI SPOTLIGHT



Timory Goggin

MS '25 Computer Science
BS '25 Mathematical Sciences and
Computer Science

What are you up to now? How has WPI prepared you for this life path?

I am a First Line Risk Analyst in Enterprise Technology and Security at Citizens Bank. I just finished Citizens Early

Career Development Program, where I completed three rotations over the course of a year. Attending WPI prepared me well for the transition into my career because its 7-week terms and project-based curriculum closely reflected the pace and expectations of the workplace. Every quarter at WPI meant diving into unfamiliar topics, learning them quickly and immediately applying that knowledge to meaningful projects rather than just studying theory. That experience gave me confidence to approach new challenges with curiosity. WPI strengthened my ability to collaborate with teammates, adapt to changing requirements, and solve complex problems under time constraints. The combination of technical foundations in math and computer science and the habits of continuous learning, adaptability, and hands-on problem solving that I developed at WPI have been what prepared me most for this stage of my career.

What was your favorite part about the WPI math department?

My favorite part about the WPI math department was the strong sense of community and the way it encouraged curiosity beyond the classroom. Through Math Club, I was able to explore new areas of mathematics, connect with others who shared my interests, and build relationships with students across different class years. Being surrounded by people who were excited to learn and challenge themselves motivated me to take on new problems and explore topics that pushed me beyond my comfort zone. Some of my most valuable experiences came from conversations with upperclassmen who were always willing to share advice on classes, introduce me to new concepts, or help me think through challenging problems. The professors within the math department also played a significant role in creating this environment. They took genuine interest in their students' learning and encouraged us to explore topics beyond what is taught in individual courses. The combination of supportive peers, engaged faculty, and opportunities to apply theory

ALUMNI SPOTLIGHT, CONT.

through projects both inside and outside the classroom made the math department a place where students were encouraged to keep learning and take on new challenges.

Please share a favorite memory related to WPI or the math department specifically.

One of my favorite memories from my time at WPI was being involved with programs like Sonia Kovalevsky Day and Girls Talk Math (Let's Talk Math in 2025) through the math department. These programs gave me the opportunity to connect with students in the surrounding community, including middle and high school students, and share my enthusiasm for math beyond the college classroom. One moment that stands out to me was working with a high school student who initially felt discouraged after struggling with a challenging problem. Rather than focusing on finding the answer immediately, we worked through the problem step by step and talked about how struggling with a difficult concept is often part of the learning process. Seeing the student's confidence grow as they began to approach the problem in a new way was incredibly rewarding. These experiences reminded me that mathematics is not only about solving problems, but also about inspiring others to ask questions and build confidence in their own abilities. Being able to contribute to the broader community through the math department is something I look back on as a meaningful part of my experience at WPI.

What do you like to do for fun outside of math?

Outside of math, I enjoy spending time outdoors, especially hiking and paddle boarding. I also love to read and like a wide range of genres, from historical fiction to fantasy to non-fiction. Some of the books I've read more recently, include *The Women* by Kristin Hannah, *Burning the Books* by Richard Ovensen, *A Darker Shade of Magic* by V.E. Schwab, and *Once Upon a Prime* by Sarah Hart. Admittedly, the last one does include quite a bit of math, but I enjoy seeing how mathematical ideas connect to history, art, and everyday life.



From Left: Professor Andrea Arnold,
Sarah Roberge ('26 & '27),
Timory Goggin ('25),
Professor Francesca Bernardi

STUDENT SPOTLIGHT



Bernard Ymeri

First Year Ph.D. Student in Mathematical Sciences
BS '26 Mathematical Sciences and Physics

What was your favorite part about being a student in the WPI math department?

The professors and faculty in this department are fantastic, and without them, I couldn't have possibly finished my undergrad. During my first year at WPI,

amidst all the anxiety and uncertainty that comes with starting college ("What if it's too hard?", "What if I fail?"), I was incredibly lucky to have a myriad of amazing professors. The same was true for the next 3 years as well. Just to name a few (by no means a full list), Professors Dina Rassias, Samuel Tripp, Mayer Humi, William Sanguinet, Darko Volko, Burt Tilley, and many more helped me immensely in my transition to college and/or my maturation as a student and blossoming researcher. I also want to give a shoutout to all the TAs and PLAs in the department, the majority of which were always available and willing to help.

What inspired you to pursue a Ph.D.? What inspired you to pursue it here at WPI?

Mathematics has always been my passion since childhood. I was the kid who spent his time watching math YouTube videos for fun while others were playing outside. As I went through my undergrad and encountered many of the previously mentioned amazing professors, I realized that I wanted to be that person for a set of future students. Getting to pursue this dream here in my hometown is even better. I was born and raised in Worcester, and it's because of this city and this university that I've encountered so many great people. This familiarity, along with research focuses on analysis and partial differential equations, made WPI a top choice for Ph.D. programs that I wanted to attend.

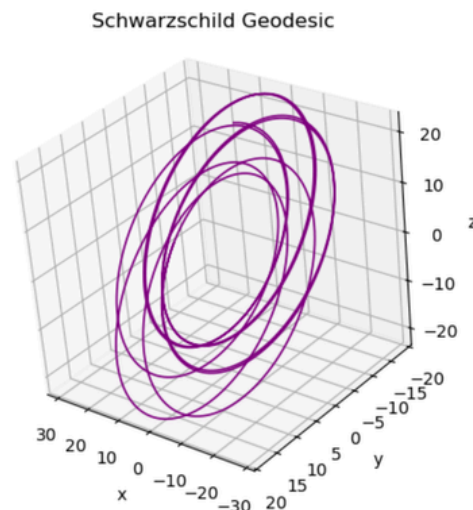
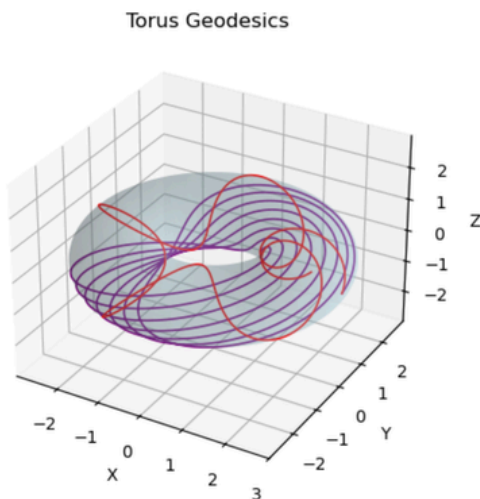
STUDENT SPOTLIGHT, CONT.

You just received the Provost's MQP Award and the Dimensions Award last year. Congratulations! Please tell us about your MQP research.

My MQP involved simulating the paths particles would take around black holes using a new numerical method me and Professor Sanguinet came up with. In general relativity, mass and energy literally bend spacetime, and different types of black holes (rotating versus nonrotating, charged versus uncharged, etc.) bend it differently. The way spacetime bends around them has been studied and described for these cases (in the form of a matrix known as the metric tensor). So, we take a particle with an initial position and momentum, and using the metric tensor, we can find its new position and momentum a certain small timestep in the future. The numerical method we used to find the new positions and momenta compared two symplectic (symplecticity is a property that helps a numerical method stay stable) Runge-Kutta methods. The two RK methods are compared to ensure they aren't deviating too far from each other.

What do you like to do for fun outside of math?

My biggest passion outside of math has always been videogames. Of course, there's the fun and entertainment factor (I've spent days and days of my childhood with a controller in my hands, enthralled by the TV screen), but they touch me on a deeper artistic level as well. Almost no other artform can take direct advantage of and immediately react to the way in which someone interacts with it. For anyone wondering, some of my favorite franchises include *Darks Souls*, *The Legend of Zelda*, *Yakuza*, *Resident Evil*, *Metal Gear Solid*, and many more.



ALUMNI AND STUDENT UPDATES

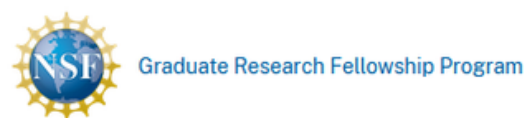


Em Beeler

BS '22 Mathematical Sciences
Minor in Computer Science

Em Beeler, BS '22, recently appeared on The WPI Podcast to discuss her experiences in WPI's Teacher Preparation Program and her work as a mathematics teacher in Worcester Public Schools.

WPI alumni win NSF GRFP awards



Three former math majors have won a fellowship from the National Science Foundation's Graduate Research Fellowship Program for 2026. Congratulations to them and their mentors!

Grace Baumgartner - graduated in May 2025 (chemistry double major) - is pursuing a Ph.D. in chemistry at Northwestern University

Tora Ito - graduated in May 2026 (data science minor) - is pursuing a Ph.D. in operations research at the Georgia Institute of Technology

Camille Williams - graduated in May 2025 (physics double major) - is pursuing a Ph.D. in microwave electromagnetics engineering at the University of Colorado Boulder

Binod Manandhar

Ph.D. '17 Mathematical Sciences

Congratulations to Binod Manandhar, PhD '17, who received Clark Atlanta University's Outstanding Scholar Award for 2024–2025 in recognition of his contributions to the university's scholarly enterprise. In fall 2026, he was promoted to Associate Professor with tenure in the Department of Mathematical Sciences.



Kendall Snyder

BS '26 Mathematical Sciences & MS '26 Applied Mathematics
Minors in Data Science and Astrophysics



Kendall Snyder received a Pi Mu Epsilon Student Speaker Award at the organization's annual meeting on January 6, 2026. Snyder is one of sixteen undergraduates nationwide who won the award this year. PME is an academic society that promotes mathematics and, particularly, student engagement with the subject.

PROBLEM CORNER

A fun brain teaser from Professor William Martin!

This is a perfectly defective sudoku. It must have exactly one of the numbers repeated in each row, column, and box.

8	9	3		5		3	7	
	1	4	2	2	3	5		8
5	5		9		6	3	1	4
7	4		7	2	1		8	
7	8	1	3		9	6		7
9	3		7	6		4	2	9
1		8	4		2	7	2	
3		2	6	1	2	8		9
4	7	1		3			6	2

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