Congratulations to Prof. Andrea Arnold for a new WIN Award

Prof. Andrea Arnold has been awarded a grant from the Women's Impact Network (WIN).

Andrea Arnold is the faculty advisor of the WPI Association for Women in Mathematics (AWM) student chapter. In honor of the first woman to obtain her doctorate in mathematics, Sonia Kovalevsky, the AWM group organizes Sonia Kovalevsky Day (SK Day) every spring- the seventh iteration to be held soon on April 12th). Up to 70 middle school girls with an interest in the mathematical sciences are invited on campus for the day to participate in activities to encourage them to continue to study and/or appreciate mathematics. This new award from WIN will provide funds to run the event in Spring 2026 and Spring 2027.

Congratulations again to Andrea!!

Congratulations to Prof. Francesca Bernardi on two new awards to support Girls Talk Math

Prof. Francesca Bernardi has been awarded two grants that will support outreach activities at WPI.

Francesca Bernardi is the co-founder of Girls Talk Math, a free day camp designed for girls and nonbinary high school students interested in Mathematics and media, which in 2025 will be hosted at the University of Maryland at College Park, Wake Forest University, Temple University, and Worcester Polytechnic Institute. Girls Talk Math at WPI ran for the first time in July 2022 and will be offered for the 4th time again this July. Two new awards from the Women's Impact Network and the American Mathematical Society Young Scholars Program will provide ~$50,000 in funds to run the camp in summer 2025.

Congratulations again to Francesca!!

Congratulations to the WPI Putnam Team!!

We had an outstanding Putnam Team this year, which included Irakli Bakuradze, Daniel Bielat, Amaia Biggan, Jake Brady, Andrew Caleshu, Dashiell Elliott, Jenna Goodchild, Floris Huiskers, Taran Kaylor, Yutaro Matsuyama, Tyler Mitchell, Adam Mullaney, Abhi Patel, William Sakalauskas, Justin Shen, Roy Sianez, Colin Streck, and Elliot Trilling. Please join me in congratulating

this year's Putnam team for getting a team rank of 85 (out of 477) in the 85th Putnam Competition that took place in December!

The William Lowell Putnam Mathematical Competition is the most prestigious mathematics competition for undergraduates in the US and Canada. This exam has taken place every year since 1938 and previous winners have gone on to win the Fields Medal (e.g. John Milnor, David Mumford, and Daniel Quillen). These tests are extremely challenging-- the median score of the most recent exam was a 2. On Saturday December 7th, this talented WPI Putnam team completed two sessions (A and B), each lasting 3 hours.

WPI's top scorers this year were **Yutaro Matsuyama** with a score of 16, **Adam Mullaney** with a score of 12, **Taran Kaylor** with a score of 10, and **Irakli Bakuradze** with a score of 9.

A special thank you to Prof. Guanying Peng for his time and efforts working with this talented group in B-term Denksport (MA 1801).

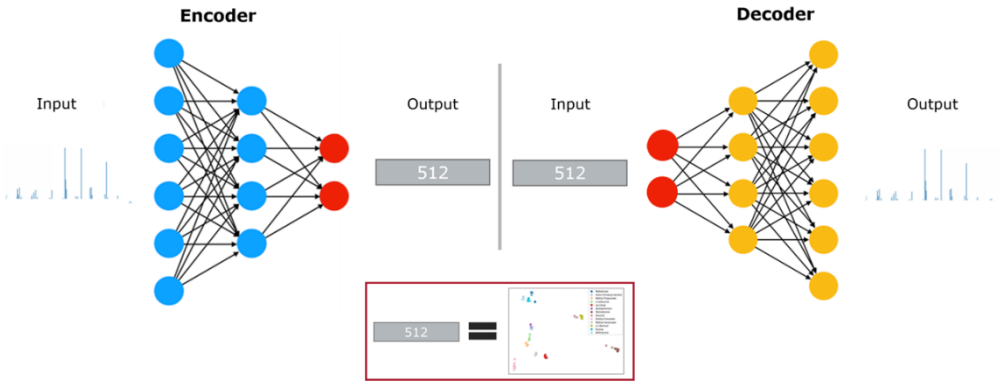
We will start training for the 86th Putnam Competition again next fall. Please consider joining the team!

WPI Hosts 34th Annual Invitational Mathematics Meet

On Friday, October 18th, WPI held the 34th annual WPI Invitational Mathematics Meet. New England high schools were invited to send a team of four students from any grade level, accompanied by a faculty advisor, to this competition. The contest consisted of two rounds: an individual competition and a team effort.

We would like to congratulate the top-scoring team, St. Mark's School from Southborough, MA (pictured). The team members, Condy Bao, Laura Xia, Yiran Hu, and Nikhil Byrapuram, were accompanied by their advisor and teacher, Edward Valitutto.

We also congratulate the seven top individual scorers, all of whom achieved a perfect score in the individual round: Nikhil Byrapuram from St. Mark's School, Andrew Kalashnikov and Adam Yanco from Mass Academy of Arts and Sciences, Jagan Mranal from Lincoln-Sudbury High School, Pratham Mukewar and Vedant Patil from Nashua High School South, and April Sun from Lynnfield High School.



Professor Paffenroth Receives a 3-Year Grant to Develop Data Science Driven Approaches for Chemical Identification

Real-time chemical identification and classification are crucial for many reasons and accurate identification enables accurate assessment of health and safety risks, as well as effective planning and preventive measures. Machine learning classification models serve as a valuable tool to this end. However, these models typically require extensive datasets to effectively generalize beyond their training data. Due to the high time and financial costs associated with generating chemical datasets at scale, producing sufficient data to train chemical classification models poses a significant challenge. Prof. Paffenroth, Core Data Science Faculty Member and Associate Professor of Mathematical Sciences, and his Data Science PhD student Cate Dunham recently received a $1,000,000 over 3-year project with the Defense Threat Reduction Agency and the US Army DEVCOM-SC to develop state-of-the-art methods to develop deep neural networks for the generation of synthetic chemical signatures.

Link to WPI Today announcement

Congratulations to Prof. Burt Tilley for a new award from AFOSR

Prof. Burt Tilley has received a new award from the Air Force Office of Scientific Research. The grant is titled "Macroscale modelling of electromagnetic absorption in zeolite-dielectric materials" and is for three years. This research focuses on characterization of ion-exchange zeolites embedded in a dielectric matrix, with applications to reduce electromagnetic pollution in orbital environments. Prof. Tilley at WPI will lead the modeling efforts

while collaborating with experimental groups at UConn and AFRL-Kirtland.

New Simons Foundation Collaboration Award for Darko Volkov!

Professor Darko Volkov has received a new Simons Foundation Collaboration Grant for Mathematicians titled "Inverse problems for PDE's, regularization, and nueral network solutions". This 5-year grant is designed to enhance research through travel and inviting collaborators to WPI.

You can read more about this here!

Jack Cascone the first undergraduate WPI MAC student to pass the CAS Exam 5!

Jack is a recent graduate of our Actuarial Mathematics (MAC) program (May 2024), with a double major in Data Science, and the first WPI student to pass the Casualty Actuarial Society (CAS) Exam 5 while an undergraduate student!

You can read more about this here!

Congratulations again to Jack Cascone on this outstanding achievement! And congratulations to our Actuarial faculty, Profs. Barry Posterro and Jon Abraham, for their efforts to mentor our students and provide cutting edge coursework that enables our students to be successful in their Actuarial careers!

Congratulations to Bill Sanguinet on his new appointment!

WPI has again appointed teaching faculty across campus to the new tenure track teaching position. These positions were created to recognize and reward excellence in teaching at WPI.

Bill Sanguinet is part of this new 4th cohort and is now a tenure-track Assistant Professor of Teaching! Bill received his PhD in Mathematical Sciences from WPI in 2017. After teaching for our department as an adjunct instructor, he became an Assistant Teaching Professor in 2020. Over the past few years, Bill has taught the Calculus sequence, Mathematical Modeling with ODEs, Calculus of Variations, and Engineering Mathematics. With colleagues, Bill worked to develop new Calculus labs, has done extensive work to develop new problems for our Math Placement Exam, and was an advocate for switching our Calculus textbook to an open educational resource (OER). Students are fond of Dr. Bill and he even ranks as their favorite professor.

Congratulations again to Bill! The Department is excited to see you in this new position!

Six faculty publish study of inclusivity in course syllabi

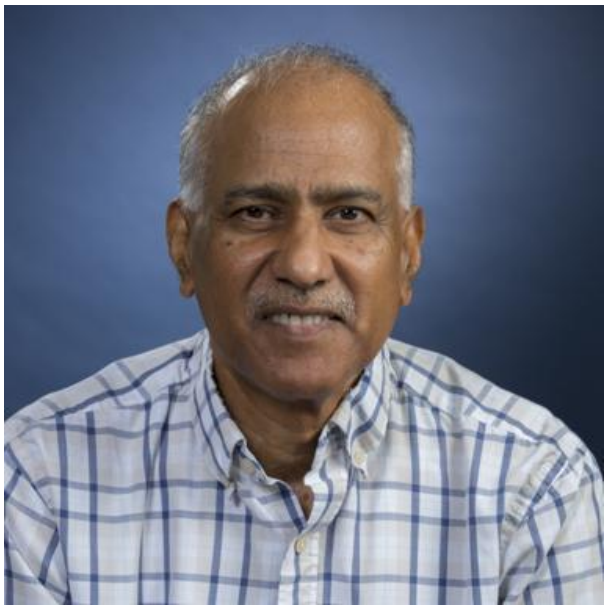
Six faculty members across four departments in the School of Arts & Sciences, including Francesca Bernardi from the Mathematical Sciences Department, have published a study of inclusivity cues in WPI course syllabi. Their article, "Cultivating inclusivity in introductory undergraduate STEM course syllabi," appeared recently with open access in *Humanities and Social Sciences Communications*.

You can read more here.

Professor Walcott's Collaborative Research on Molecular Motors Published in PNAS

Professor Sam Walcott, Director of Bioinformatics and Computational Biology and the Sinclair Professor in Mathematical Sciences, has published a new paper titled "Kinesin-1- transported liposomes prefer to go straight in 3D microtubule intersections by a mechanism shared by other molecular motors" in the Proceedings of the National Academy of Sciences of the United States of America. Part of his research focuses on molecular motors, which are able to move material around the inside of cells. This is done by utilizing chemical energy to "walk" along the cytoskeleton, the network of protein filaments that forms the interior scaffold of the cell. While much is known about how single motors work, less is known about how multiple motors work together to transport a shared cargo.

Read more about Sam Walcott's paper here.



Congratulations to Prof. Bal Nandram for a new award from NASS, USDA

Prof. Bal Nandram has been awarded a new award from the National Agricultural Statistics Service (NASS, USDA). The grant titled "Bayesian Models for Cash Rents, Production, Disclosure and Advising" was originally funded for two years (July 2022 - June 2024) and was extended for two additional years, July 2024 to June 2026, with funding totaling $663,189. Notably, this is the tenth year Bal has received funding from NASS, which now totals well over 1.5 million dollars! In addition, Bal has received several scholarly awards from the USDA, including the prestigious cooperator of the year award in 2022.

Congratulations to the WPI Putnam Team!

Congratulations to Irakli Bakuradze, Jake Brady, Dashiell Elliott, Stephen Foley, Alice Gaehring, Jenna Goodchild, Rhianna Herlihy, Keagan Hitt, Sarah LaRusso, Tyler Mitchell, Adam Mullaney, Lucy O'Toole, Justin Shen, Roy Sianez, Colin Streck, and Elliot Trilling for their outstanding performance in the 84th Putnam Competition that took place in December!

The William Lowell Putnam Mathematical Competition is the most prestigious mathematics competition for undergraduates in the US and Canada. This exam has taken place every year since 1938 and previous winners have gone on to win the Fields Medal. These tests are extremely challenging-- the median score of all participants is often 0 or 1. On Saturday December 2nd, 2023, this talented WPI Putnam team completed two sessions (A and B), each lasting 3 hours.

WPI's top scorer this year was **Jenna Goodchild** with a score of 18 and **Lucy O'Toole** was our second highest scorer with 14! **Congratulations, Jenna and Lucy!** In total, we had 9 team members breaking into the double digits this year.

A special thank you to Prof. Guanying Peng for his time and efforts working with this talented group in B-term Denksport.

We will start training for the 85th Putnam Competition again next fall. Please consider joining the team!

Worcester Polytechnic Institute Achieves Bronze Level of New Casualty Actuarial Society University Recognition Program

The Casualty Actuarial Society (CAS) has announced that Worcester Polytechnic Institute has qualified for Bronze Tier within the CAS University Recognition Program. This program recognizes academic institutions with a demonstrated commitment to preparing property and casualty actuaries through their educational offerings. The CAS is the world's only actuarial organization focused exclusively on property and casualty risks, serving over 10,000 members worldwide. CAS members work for insurance companies, educational institutions, state insurance departments, federal government agencies, independent consulting firms, and many other organizations that require management of risk.

The CAS offers three levels of recognition for universities, Bronze, Silver, and Gold. Benefits offered through this program are designed to address the specific needs of universities depending on their established tier.

The Actuarial Program in the Department of Mathematical Sciences at Worcester Polytechnic Institute provides a tight-knit, collaborative community of approximately 50 students and two full-time dedicated faculty, Professors Jon Abraham and Barry Posterro. Courses are kept relevant to the syllabi of both the Society of Actuaries (SOA) and the Casualty Actuarial Society (CAS). The Actuarial Program was recognized by the SOA in 2019 with UCAP status for its relevance to the SOA program of study.

Many students graduate with two or more exams, VEE credit, and sometimes more. The program's strong working relationship with both the SOA and the CAS provides our students with professional resources like candidate updates, access to mentor programs, and focused job and internship announcements. Within WPI, the Actuarial Club, participation in Actuarial Case Competitions with other university programs, and a dedicated Actuarial Job Fair have further established the foundation of a wide and diverse professional network.

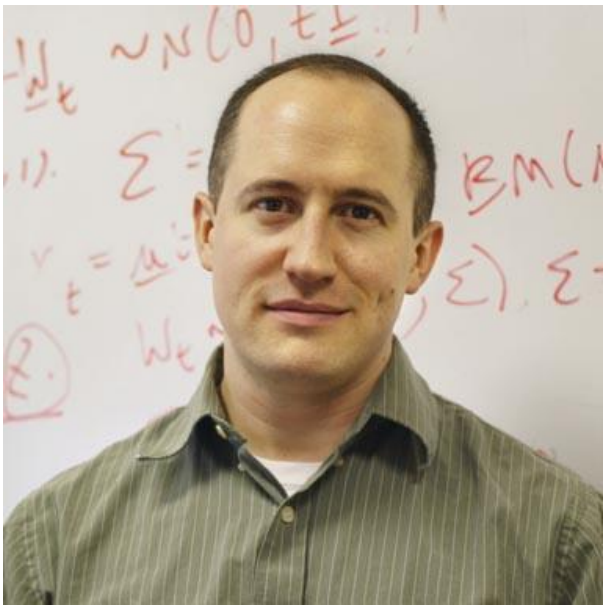
Criteria that Worcester Polytechnic Institute met to achieve this Bronze level award from the CAS include the introduction of new courses that cover exciting and relevant topics related to the field of Property and Casualty Insurance, participation in the CAS Academic Central, and having faculty with CAS credentials. In particular, our recent course offerings encompass introductory ratemaking for P&C companies, as well as reserving techniques specific to the P&C field.

"We are pleased to honor universities through the CAS University Recognition Program," said Victor Carter-Bey, DM, CEO of the Casualty actuarial Society. "Recognition at the Bronze Tier demonstrates that Worcester Polytechnic Institute is committed to exposing their students to the property and casualty actuarial career path through their participation in the CAS University Liaison, Student Central, Student Ambassador, and Academic Central Programs."

Andrea Arnold awarded tenure and promoted to Associate Professor

Andrea Arnold joined our department as an Assistant Professor in August of 2017. Prior to WPI, Andrea completed a Postdoc at North Carolina State University. Her scholarship has focused on developing and applying techniques to estimate uncertainty in model parameters when treating unknowns as random variables, approaching the inverse problem from the Bayesian statistical framework. Her scholarship has been funded through a National Science Foundation award through the Division of Mathematical Sciences and publishing her work in journals such as *Inverse Problems*. Andrea has brought aspects of her research into the classroom through special topics courses on Computational Inverse Problems and Numerical Methods for Nonlinear Equations and Unconstrained Optimization. Over the past few years, Andrea has advised many student projects, and she has been the faculty advisor for the WPI student chapter for the Association for Women in Mathematics.

Please visit this page to read more about recent WPI tenure and promotion announcements.



Marcel Blais awarded tenure

Marcel Blais received his PhD from Cornell University and joined our department in 2005. After being promoted to Teaching Professor in 2021, Marcel then switched to the new tenure-track Professor of Teaching position. Marcel has dedicated his efforts to achieving impactful and engaging delivery of course materials through his focus on theory and application, framed within a storyline that evolves over the term. He has been consistently in the lineup for our high enrollment Calculus sequence and was the PI on a Summer Sandbox Grant to redesign the Calculus Labs. He has also excelled at teaching upper-level undergraduate and graduate courses in the areas of Operations Research and Financial Mathematics. As co-director of the Wall Street FinTech Collaborative, Marcel has been mentoring FinTech related MQPs, while maintaining an active role in the Massachusetts FinTech Hub and the Center for Industrial Mathematics and Statistics.

Please visit this page to read more about recent WPI tenure and promotion announcements.

Michael Johnson promoted to Teaching Professor

Michael Johnson joined the department in 2012 after receiving his PhD from Clark University. He has taught a wide range of courses at WPI, ranging from undergraduate classes in Calculus, Statistics, Economics, and the Great Problems Seminar for freshman. Mike also teaches a graduate Applied Statistics course and various key classes for our Master's in Mathematics for Educators program. He was part of two Summer Sandbox Grants, and he was part of the team that restructured the Calculus Labs. He continues to participate in workshops, including the Faculty Institute for Online Teaching, the Kern Entrepreneurial Engineering Network, and Value Creation & Innovation. Mike previously served as the Associate Director of the Morgan Teaching and Learning Center. Within the department, he leads the Peer Review Committee and served as the department's teaching mentor for new faculty and postdocs for the past decade.

Please visit this page to read more about recent WPI tenure and promotion announcements.

Buddika Peiris awarded tenure

Buddika Peiris received his PhD from Southern Illinois University and joined our department in 2014. After being promoted to Associate Teaching Professor in 2021, Buddika switched to the tenure track Associate Teaching Professor position. Buddika has taught 16 different courses at WPI and has been the Coordinator for our Applied Statistics MS program, serving as academic advisor and project advisor to this large cohort of students. Recently, Buddika was the PI on a Summer Sandbox Grant to revamp the Statistics Labs for our high enrollment undergraduate Applied Statistics courses. As an active participant of the Center for Industrial Mathematics, Buddika has been leading the Statistics Consulting Lab (SCL) and is the PI on the National Science Foundation funded Research Experience for Undergraduates. Buddika has also continued to publish in peer reviewed journals on research projects that started as MS projects or consulting projects from the SCL.

Please visit this page to read more about recent WPI tenure and promotion announcements.

Sam Walcott promoted to Professor

Sam Walcott was recruited to WPI as an Associate Professor, with the Sinclair Professorship, in 2019. Sam is an interdisciplinary scientist that has been working to build models that provide conceptual understanding to different biological phenomena related to molecular motors and muscle mechanics. He has published in a range of top tier journals, including the Proceedings of the National Academy of Sciences and the Biophysical Journal. In the past four years, Sam has built a research group at WPI, recruiting students and postdocs. He has also been the PI or co-PI on several collaborative grants from the National Science Foundation and the National Institutes of Health, expanding his research collaborations with colleagues at UMass Lowell. Sam has been on several hiring committees in Mathematical Sciences as well as Biology and Biotechnology. He is currently serving as the Director of the Bioinformatics and Computational Biology Program.

Please visit this page to read more about recent WPI tenure and promotion announcements.

Andrea Arnold awarded Gapontsev Family Collaborative Venture Fund Award

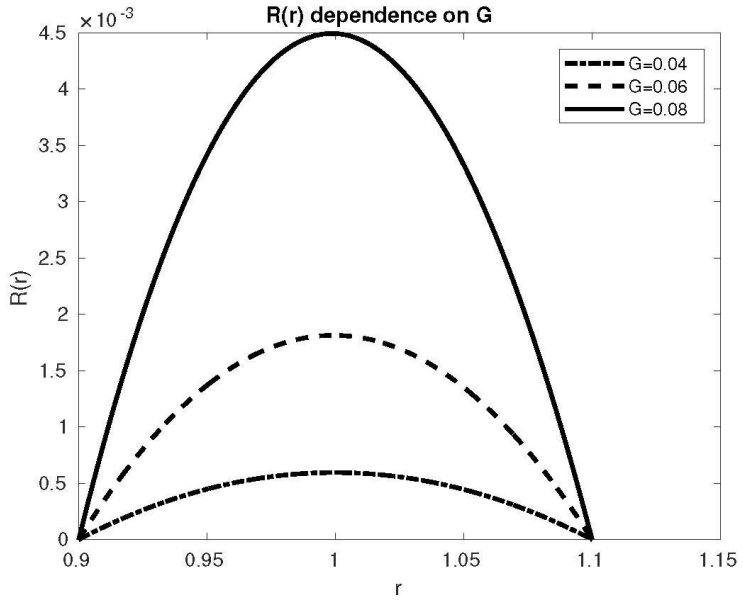
Prof. Andrea Arnold is a co-PI on a Gapontsev Family Collaborative Venture Fund Award with Profs. Loris Fichera (RBE, PI) and Haichong Zhang (RBE, co-PI). In this grant titled "Laser Tonsil Ablation: A New Incision-less Procedure for Tonsil Removal", Prof. Arnold will develop and apply computational techniques to estimate patient-specific laser treatment parameters based on virtual palpation of the tissue.

You can read more here: New Seed Grants Awarded for Photonics and DEIJ Research.

Francesca Bernardi receives Diversity, Equity, Inclusion, and Justice Planning Grant Award

Prof. Francesca Bernardi is PI on a Diversity, Equity, Inclusion, and Justice Planning Grant Award titled "Preparing to Bring Back the STEM Faculty Launch Workshop". This will analyze data of our previous workshops to identify outcomes and potential next steps, such as relaunching the workshop or applying for additional external funding.

You can read more here: New Seed Grants Awarded for Photonics and DEIJ Research.



Mayer Humi's research on traveling waves featured in the Journal of Mathematical Physics

Mayer Humi's peer-reviewed article “Traveling waves in an evolving interstellar gas cloud” has been published in the *Journal of Mathematical Physics*. This body of work was designated as a featured piece and “editor’s pick”! Link to the paper is here.

Mayer’s research in mathematical physics has recently focused on a conjecture that suggested traveling waves could be a factor in the formation of asteroids and potentially planets. Through a theoretical investigation of the role of gravity and density in interstellar gas clouds, he found that solid particles have the potential to coalesce at wave crests where the mass density is maximal.

Oren Mangoubi receives Google Research Scholar Award Grant

Oren Mangoubi is the PI for this research project titled *Matrix Diffusions for Differentially Private Linear Algebra*. In Oren's own words: As the collection of big datasets and applications of machine learning algorithms to different areas of people's lives have proliferated in recent years, privacy breaches of individuals' data in medical, census, and other sensitive datasets has led to increasing concerns. Consequently, methods which add random noise to machine learning algorithms to preserve a given level of differential privacy have become increasingly sought-after in science and industry. This award studies the use of matrix-valued diffusions to add noise to machine learning algorithms, in order to preserve the privacy of sensitive datasets while minimizing the resulting loss in the utility of these algorithms to researchers. For mor: Google Research Scholar Award

Derek Drumm wins 1st Place in the 2023 GRIE in Mathematical, Chemical, and Physical Sciences

The Graduate Research Innovation Exchange (GRIE) 2023 is a two-part event to celebrate and showcase graduate research at WPI. The first part was held on February 8th and the finals were held on April 4th . Congratulations to all of our student poster presenters for their outstanding posters and presentations! Thank you to all of our students that attended to cheer on your fellow graduate students and thank you to our faculty that served as lead judges and poster judges in both rounds of the GRIE.

Derek Drumm, a 4th year PhD student in Mathematical Sciences, competed in the Graduate Research Innovation Exchange (GRIE) 2023 and tied for 1st place in Mathematical, Chemical, and Physical Sciences for his presentation titled "Determining Flow Obstacles From Lagrangian Coherent Structures".

You can read more about the finals and the student winners by category in the WPI press release here.

Congratulations to WPI students John Muirhead, Brandon Voci, Andrew Adiletta, Ben Gobler and Jessica Wang for successfully participating in the Kryptos Challenge

This year we had another successful showing of student teams in the Kryptos Challenge hosted by Central Washington University (and coordinated by Prof. Stuart Boersma). Please join me in congratulating our two student teams for their outstanding performance!

John Muirhead, Brandon Voci, and Andrew Adiletta successfully solved all challenges and are recognized as *Master Code Breakers*, *attaining the TURING level of achievement*.

and

Ben Gobler and Jessica Wang successfully solved all challenges and are recognized as *Master Code Breakers*, *attaining the TURING level of achievement*.

This multi-day hacking challenge started on April 20th and ended on April 24th. The contest consisted of three cryptanalysis challenges, with 70 teams, only 12 of which solved all three problems (including two teams from WPI!). In their words, "κρυπτοσ or kryptos, is a contest open to all undergraduate students. The theme of the contest is centered around the breaking, or cryptanalysis, of ciphers (secret writing)". In addition, many thanks to Prof. Bill Martin for serving as faculty sponsor.

Andrea Arnold and Francesca Bernardi awarded two Women's Impact Network Grants

Congratulations to Andrea Arnold and Francesca Bernardi, for being awarded two individual grants from the Women's Impact Network that will help to support outreach activities that they will organize and host at WPI.

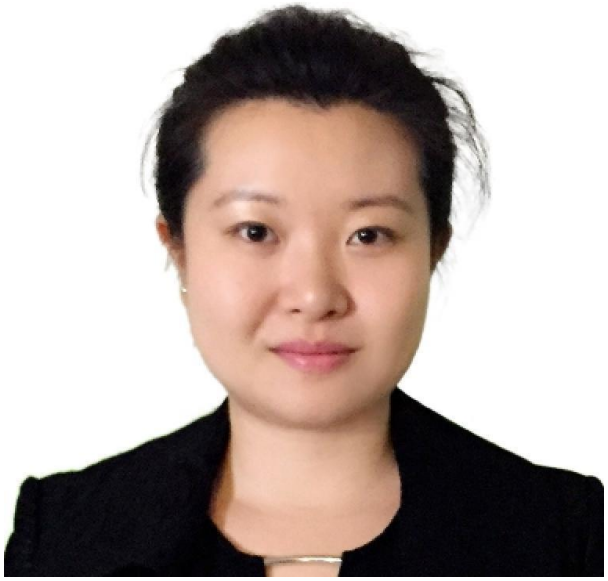
Andrea Arnold is the faculty advisor of our very active WPI Association for Women in Mathematics (AWM) student chapter. In honor of the first woman to obtain her doctorate in mathematics, Sonia Kovalevsky, the AWM group organizes Sonia Kovalevsky Day (SK Day) every spring (Link to SK Day 2023 - the 5th anniversary!). Up to 70 middle school girls with an interest in the mathematical sciences are invited on campus for the day to participate in activities to encourage them to continue to study and/or appreciate mathematics. This new award from WIN will provide funds to run the event in Spring 2024.

Francesca Bernardi is the co-founder of Girls Talk Math: Engaging Girls through Math Media - a free day camp for girls and non-binary high school

students interested in Mathematics and Media, which is now hosted at UNC Chapel Hill, University of Maryland at College Park, and Worcester Polytechnic Institute. Girls Talk Math (GTM) at WPI ran for the first time in July 2022 (link to last year's press release) and will run again this July. This new award from WIN will provide funds to run the camp in Summer 2023 and for the first time, support for daily transportation to and from campus will be provided to participants.

Vladimir Druskin receives 3-year award from the Air Force Office of Scientific Research

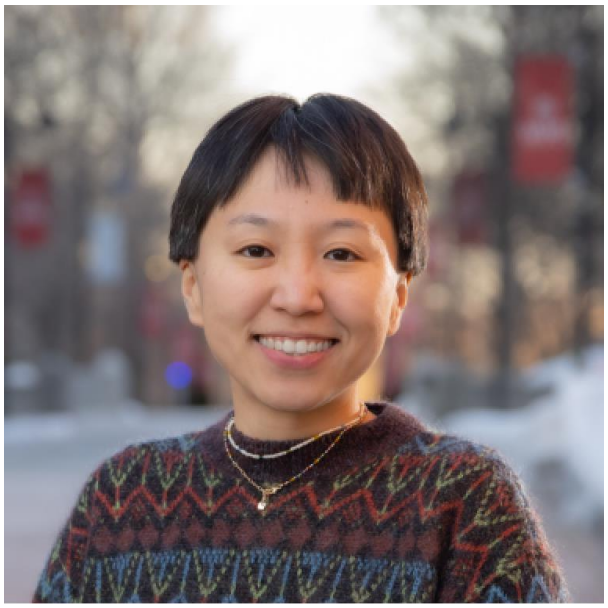
This 3-year award from the Air Force Office of Scientific Research is titled "Reduced Order Model Algorithms for SAR Imaging in Multi-Scattering Dispersive Environment". Vladimir Druskin is the PI on this collaborative award with Mike Zaslavsky at Southern Methodist University (co-PI). In Vladimir's own words: *The project scope includes the development and theoretical foundation of data-driven model order reduction imaging algorithms for the cases when conventional linearized approaches fail*.



Fangfang Wang awarded tenure

Fangfang Wang, an associate professor in the Department of Mathematical Sciences, has been awarded tenure. Fangfang Wang joined our department as an associate professor in August of 2019 and previously had positions at University of Wisconsin Madison, University of Connecticut, and University of Illinois at Chicago. She focuses her research on high dimensional inference with applications in financial econometrics and remote sensing satellite data. Fangfang has been an active member of the department, working with students and postdocs on various projects. She has also provided valuable service to committees, especially in her role chairing the undergraduate committee. In terms of Statistics courses, she worked collaboratively to revamp the Statistics Labs and recently developed the undergraduate experimental Time Series course. Fangfang has also been publishing in high impact journals and received collaborative funding from NASA.

https://www.wpi.edu/news/wpi-announces-faculty-promotions-and-tenure-awards-3



Min Wu awarded tenure and promoted to Associate Professor

Min Wu has been awarded tenure and promoted to Associate Professor in the Department of Mathematical Sciences. Min Wu joined our department as an assistant professor in August of 2017. Prior to WPI, Min completed a Postdoc at École Normale Supérieure in Paris and a Visiting position at Northwestern University. Her research is at the intersection of computational mathematics and mathematical biology, with a focus on modeling tissue growth, morphogenesis, and cell walls. At WPI, Min has been fully engaged in a variety of research-driven mentoring efforts, ranging from work with high school students to postdocs. Min has brought her research into the classroom through a special topics course on continuum mechanics, "Nonlinear elasticity: Theory and Application", at the graduate level and a co-taught seminar course in quantitative biology in the Bioinformatics and Computational Biology Program. Her promise in research and teaching was recently recognized with an NSF CAREER Award.

https://www.wpi.edu/news/wpi-announces-faculty-promotions-and-tenure-awards-3