WPI

Arts & Sciences

NEWS AND EVENTS

Dean's Message

What a joy it has been to serve as Dean of Arts & Sciences for the past six years. I have had the privilege of working with talented artists, humanitarians, social scientists, and researchers across all disciplines in the arts and sciences and have learned so much in the process.

One of my most important roles as dean has been to integrate the strong technology and science culture of WPI with the perspectives and values offered by the arts and humanities. This integrative approach has been part of the mission of WPI since the very beginning and was strengthened with the addition of the WPI Plan and the Great Problems Seminar. I look forward to exciting new programs that bolster this connection—programs like the National Academy of Engineering Grand Challenge Scholars Program—that integrate technical knowledge with the knowledge and capacities fostered by the humanities in order to better meet the complex social and civic needs of our global community. WPI is truly distinctive in offering a top-notch engineering, science, and technology education that is enriched by serious engagement with the humanities and arts. These disciplines not only infuse our work with creativity and originality, they deepen our understanding of what makes us human.

The humanities and arts teach us about our fears, our shared values, our dreams, and our ambitions, and they teach us how to communicate with each other on many levels and through a multitude of media. The kind of understanding cultivated through the humanities and arts is so important to scientists, especially today, when scientific and technological discovery are proceeding at a rapid pace and spreading to every corner of the globe. While technology can solve problems and improve lives, it must also be responsive to the social and cultural contexts of its implementation. A solution is only effective if it is embraced by those it is meant to serve. WPI students and graduates are in the best position to tackle the world's most challenging problems—and implement solutions—precisely because of this mixture of technological and artistic capacity, which engenders innovation and a respect for fresh perspectives. Our alumni and friends are vital to the future of this remarkable university, and I was honored to work with the multigenerational WPI community in its enduring support and celebration of the Arts & Sciences! For the last six years I have proudly served the WPI mission and carried its message: we are stronger when we work together, when we take pride in what we do, and when we have the opportunity to learn and grow continuously through our lives. *Thank you!*

The Office of Arts and Sciences is pleased to announce that 12 full-time faculty members in the arts and sciences have been promoted in academic rank; in addition, 8 faculty members, including 7 of those who were promoted, have been granted tenure.

Joseph Cullon has been promoted to associate teaching professor in humanities and arts. A historian who works across the boundaries of early American social, economic, environmental, and technological history, he joined the WPI faculty in 2012 from Dartmouth College, where he had been an assistant professor of history. He has twice served as an Andrew W. Mellon Foundation Fellow, at the American Antiquarian Society, and with the Omohundro Institute of Early American History and Culture at the College of William and Mary. He has advised a large number of student projects, many of which have been completed in collaboration with the Worcester Historical Museum.

Laureen Elgert has been granted tenure and promoted to associate professor of social science and policy studies. A specialist in environmental policy, she joined WPI in 2011 with extensive global experience as a research scientist and field researcher in the areas of health promotion and sustainable development. Focusing on the environment-development nexus, her current research explores how politics shapes global environmental policy, often with a profound impact on local livelihoods. She has advised many student projects in Ecuador, Panama, and London, and was among the major contributors to a new minor in Global Public Health at WPI.

Mohamed Eltabakh has been granted tenure and promoted to associate professor of computer science. An expert in database systems and big data, he joined the WPI faculty in 2011 after completing an appointment as a postdoctoral researcher at the IBM Almaden Research Center in California and graduate internships at Microsoft Research and Google. At WPI, he has published more than 30 peer-reviewed journal articles, conference proceedings, and workshop proceedings in the areas of query processing and optimization, indexing techniques, scientific data management, and large-scale data analytics.

Marion Emmert has been granted tenure and promoted to associate professor of chemistry and biochemistry. An expert in organometallic catalysis, she has conducted research at WPI on the catalytic oxidation of organic substrates and the separation and isolation of rare earth elements from spent electric vehicle drive units and process waste, including red mud. This work has been funded by more than $1 million in external awards, including single-investigator grants from the National Institutes of Health and the Petroleum Research Fund. She joined WPI in 2011 after serving as a postdoctoral fellow at the University of Michigan.

Joshua Harmon has been promoted to associate teaching professor in humanities and arts. He is a writer with more than 200 poems, stories, essays, and five books, published or in-press, including the essay collection *The Annotated Mixtape*, the short fiction collection *History of Cold Seasons*, and the novel *Quinnehtukqut*. Before joining WPI in 2012, he was an instructor, faculty member, and writer-in-residence at Hampshire and Vassar Colleges and Bucknell and Cornell Universities and a writer-in-residence at the Portsmouth Abbey School. He has received a National Endowment for the Arts Literature Fellowship and a Rhode Island State Council on the Arts Fellowship in Fiction, and was a Cabell First Novelist Prize finalist in 2008 and winner of an Akron Poetry Prize in 2012.

Dmitry Korkin, associate professor of computer science, has been granted tenure. He joined WPI in 2014 from the University of Missouri-Columbia, where he was an associate professor of computer science. His multidisciplinary research spans the fields of bioinformatics of complex disease, computational genomics, and systems biology. He also uses biomedical data analytics to explore molecular mechanisms underlying such genetic disorders as cancer, diabetes, and autism. His work has resulted in 35 peer-reviewed journal articles and has been funded by more than $1.6 million in research awards, including a National Science Foundation CAREER Award.

Aarti Smith Madan has been granted tenure and promoted to associate professor of humanities and arts. A specialist in Latin-American Studies, her research centers on the ways spatial practices inform the production and consumption of literature, film, and art in Latin America. She is the author of *Lines of Geography in Latin American Narrative: National Territory, National Literature* (under contract with Palgrave Macmillan). Her numerous honors and awards include WPI's Romeo Moruzzi Young Faculty Award for Innovation in Undergraduate Education, an Andrew Mellon Predoctoral Fellowship, and a Foreign Language and Area Studies Fellowship in Portuguese.

Ryan Smith Madan has been promoted to associate teaching professor in humanities and arts. The director of the WPI Writing Center, his research interests include the politics of language and education, cultures of scholarship and cultures of teaching, and narrative writing pedagogies. He has served as a faculty member for WPI's Frontiers, a residential summer enrichment program for high school students, and has been active as an advisor in WPI's Global Projects Program. He served as a Lillian B. Lawler Fellow at the University of Pittsburgh.

Sarah Olson has been granted tenure and promoted to associate professor of mathematical sciences. She joined WPI in 2011 after three years as a postdoctoral fellow at Tulane University, where she was sponsored by a Vertical Integration of Research and Education (VIGRE) in mathematical sciences grant from the National Science Foundation. A researcher in the areas of mathematical biology, computational fluid dynamic, and scientific computing, she received a $400,000 NSF CAREER Award for work aimed at developing new computational tools to understand the complex intertwining of physical and chemical factors that govern the movement of sperm.

Geoffrey Pfeifer has been promoted to associate teaching professor in humanities and arts and undergraduate studies. A member of the faculty since 2011, he is a philosopher whose research focuses include contemporary continental philosophy, social and political philosophy, global justice, and development ethics. His many publications include two books: *Phenomenology and the Political* (Roman and Littlefield International, 2016, with S. West Gurley) and *The New Materialism: Althusser, Badiou, and Žižek* (Routledge, 2015). In addition to teaching philosophy and international studies courses, he is an instructor in WPI's Great Problems Seminar, a project-based interdisciplinary program for first-year students.

Craig Shue has been granted tenure and promoted to associate professor of computer science. An expert in cybersecurity, computer networking, and distributed systems, he joined the WPI faculty in 2011 after serving as a cybersecurity research scientist at Oak Ridge National Laboratory. With his current work focused on building network architecture and Internet-scale measurements to identify security weaknesses in under-provisioned systems, he has published more than 30 journal articles and proceedings, and has earned one patent with four additional patents pending. As principal investigator or co-PI, he has procured more than $6 million in external funding, including sole-PI grants from the NSF and the Department of Homeland Security. In 2014 he received WPI's Romeo Moruzzi Young Faculty Award for Innovation in Undergraduate Education.

Kenneth Stafford has been promoted to teaching professor in undergraduate studies, robotics engineering, and mechanical engineering. After 21 years of active duty in the U.S. Air Force, he served for five years as commander of the Air Force ROTC program at WPI and head of the Aerospace Studies Department. He then joined the WPI faculty as adjunct assistant professor and manager of academic initiatives, and was later director of robotics, director of the Robotics Resource Center, and, starting in 2010, associate director of WPI's Robotics Engineering Program. Stafford was appointed an associate teaching professor in 2011. In addition to teaching and advising numerous student projects, he has been the campus leader for WPI's FIRST Robotics competitions and helped develop and direct the Sample Return Robot Challenge, the first NASA Centennial Challenge run by a university.
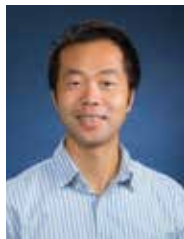
Qi Wen has been granted tenure and promoted to associate professor of physics. An experimental biophysicist who is interested in applying physical methods to understand biological phenomena, he spent five years as a postdoctoral researcher at the University of Pennsylvania before joining WPI in 2011. With a joint appointment in biomedical engineering, his highly multidisciplinary and collaborative research has resulted in more than 30 refereed publications in such areas as biopolymers, the cell cytoskeleton and ECM mechanics, and mechanotransduction.

Reflection:
The value of the Humanities & Science
by Karen Kashmanian Oates

The beauty and life-sustaining resources of the natural world, the generative potential of technology and science, as well as access to the education we need to fully achieve our democratic ideals and cultural aspirations are among our most enduring national values. Sadly, all of these are now critically compromised. If the allocation of our tax dollars provides a guide to our national priorities and values, then it is clear that many of our core values are under attack and it will be a tough few years for the sciences, arts, and humanities.

A proposed 18% cut in the NIH budget, along with more than 30% cut from the EPA and NOAA budgets, could set the health and well-being of our society back years. The important cultural work of the National Endowments for the Arts and Humanities will take many years to recover if the agency's budget is eliminated as proposed. The proposed federal budget is a clear reflection of what our government values and its vision of the American future. Our democracy thrives on the diversity of its citizens, protection of freedom of the press and public expression, and an innovative and nimble economy that translates ideas into products and is built on the curiosity, creativity, and problem-solving capacities forged through the study and practice of the arts and sciences. Yet, our democracy has not made a public commitment to these enterprises nor to the values they embody.

Our democracy is also founded on the "self-evident" equality of all people and their right to pursue their dreams and to imagine, create, and write their own life stories. No one should be denied these ambitions—from a first-generation budding scientist to a backcountry artist or philosopher. It is these aspirations that have been fueled and supported by local and national institutions created and funded by federal investments. These institutions have provided critical support to the growth and dynamism of our economy, to the education, edification, and enjoyment of our communities, and to our unique cultural and artistic heritage. Poetry, visual art, music, and dance are essential forms of human expression and cannot be reserved for only the privileged. Basic scientific research, motivated by the drive for discovery and not solely for commercial applications, will ensure better health and enduring innovation for future generations. When our federal budget does not reflect our fundamental values, which are the values of the Arts & Sciences, then it is our democracy that loses.

WPI is Big in Big Data

ComputerWorld recently listed WPI among the top 8 undergraduate programs in big data. ComputerWorld's ranking noted that WPI has dedicated itself to paving the way for the next generation of data scientists by exposing students to real-world big data problems through student research projects. A recent such project was a collaboration between the Massachusetts High Technology Council (MHTC) and WPI to develop a novel data analytics system that could help shape economic policy in Massachusetts. Under the supervision of Professor Elke Rundensteiner, students at WPI worked with experts from high tech industry, research organizations, and higher education institutions to develop the Massachusetts Technology, Talent, and Economic Reporting System (MATTERS), an online analytics dashboard empowered by a powerful dynamic data integration infrastructure. Extracting data sets across various public government data sites, the system allows users to quickly access, analyze, and visualize a number of key factors impacting the economic competitiveness of US states. More recently, MHTC developed the MATTERS index as national rankings assigned to every state based on the weighted average of key metrics in each data category capturing economic competitiveness, including the MATTERS Talent, Quality of Life, and Cost indices.

Robotics Rises to NASA Challenge

A team of students, faculty, and staff from WPI's Robotics Engineering program is among 20 finalists in the NASA-sponsored Space Robotics Challenge (SRC). WPI is the only university team to be named a finalist. The SRC is part of NASA's Centennial Challenges program and aims to develop the capabilities that humanoid robots would need to help astronauts on a mission to Mars. Under the terms of the competition, SRC teams must program a virtual robot modeled after NASA's Robonaut 5 (R5)—commonly known as Valkyrie—to complete a series of simulated tasks in dangerous or extreme environments. The WPI team is participating in the SRC virtual competition through June and competition will culminate in a live event June 13–16 when WPI will compete for $1 million in prize money.
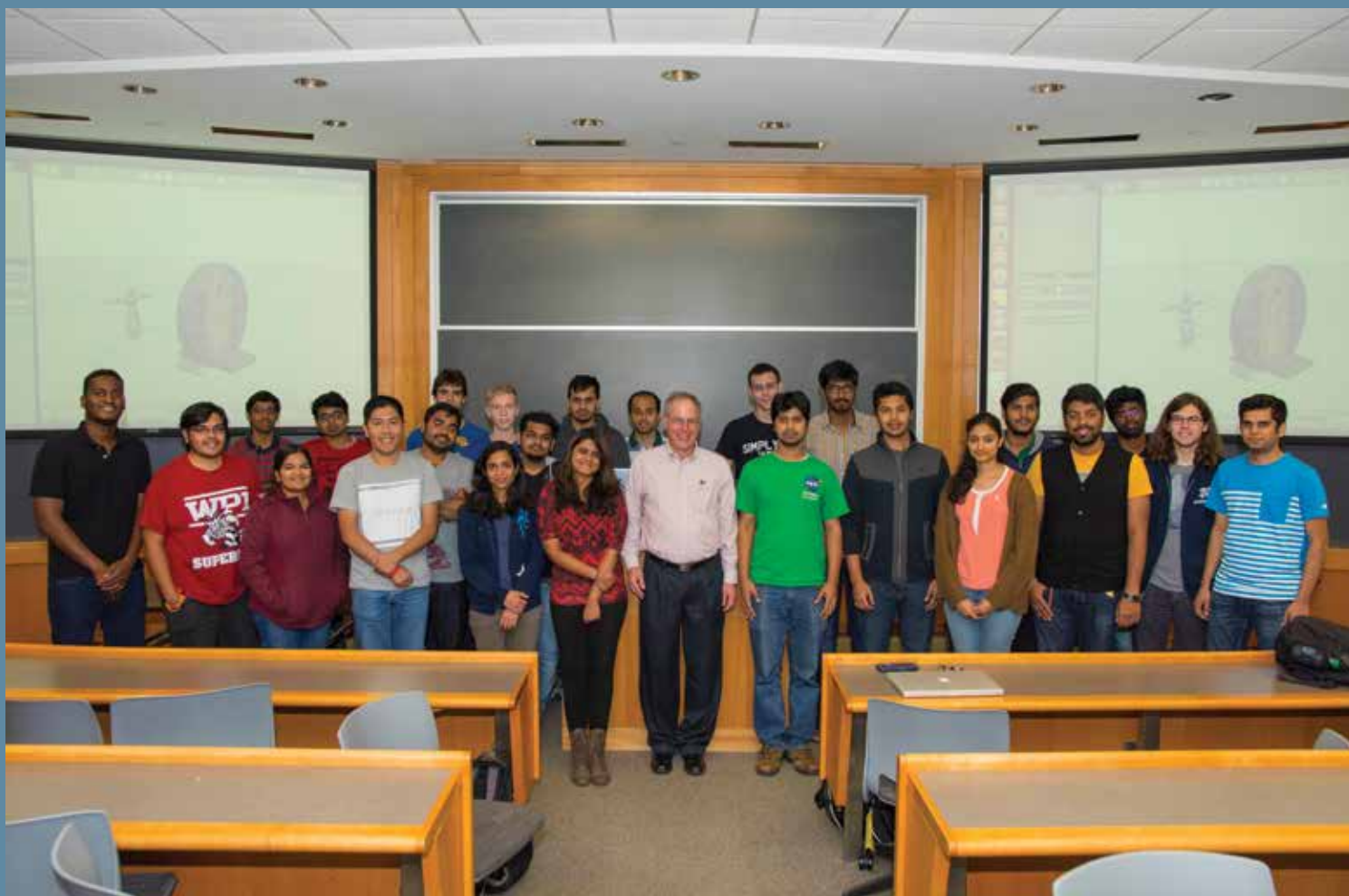
Chemistry Department Receives Recognition

The American Society for Biochemistry and Molecular Biology (ASBMB) has accredited WPI's Department of Chemistry and Biochemistry (CBC) for a full seven-year term. The accreditation recognizes WPI's strong biochemistry program and, in particular, its project-oriented approach to education and the strong advising component of the CBC program. The American Chemical Society (ACS) has also accredited the CBC department for a major in chemistry. WPI's CBC program offers an interdisciplinary culture, a focus on practical problem solving, and a close one-on-one mentorship from world-class faculty that put students at the center of groundbreaking research impacting human health, society, and environment. As noted by the recognition by ASBMB and ACS, the CBC program balances rigorous theory with practical applications, equipping students with the hands-on experience and innovative mindset that prepares them to solve real-world problems with ease.

Securing our Residential IT Networks

The Internet is part of the daily lives of billions of people, yet the technology that connects the computers and devices in our homes lacks the sophisticated IT management needed to ensure security and privacy. This leaves our home networks susceptible to remote attackers that can result in the theft of sensitive information or sabotage. Attackers can commandeer devices in our homes, such as Internet routers, DVRs, smart TVs, and even smart refrigerators, to form large "botnets" that can be used to send phishing messages and attack Internet resources. In October 2016, just that happened when a botnet composed of hacked home devices attacked Internet infrastructure and crippled access to popular websites such as Twitter, Amazon, Netflix, and Paypal.

Research by **Craig Shue**, assistant professor of computer science, aims to tackle this problem by creating a new system that combines modified residential wireless routers and cloud-based resources to show how novel mechanisms can lead to increased security for Internet users. His research is funded by an NSF CAREER grant in the amount of $507,600 and will allow Shue and his team to explore the development of network security architecture for residential networks. He envisions a framework that will allow security experts to provide monitoring services that will alert home users of attacks and automatically prevent residential botnets from being a nuisance to the Internet. This framework will allow these service experts to deploy new security protocols that will dramatically improve the Internet's security and possibly prevent large attacks on our country's internet infrastructure.

Craig Shue

Pratap Rao *Lyubov Titova*

Arne Gericke *Shawn Burdette*

Zhongqiang Zhang

Improving Solar Energy Conversion

Pratap Rao, assistant professor of mechanical engineering, and **Lyubov Titova**, assistant professor of physics, were awarded funding by the National Science Foundation (NSF) and the Massachusetts Clean Energy Center for their project entitled "Novel nanostructured metal oxides for efficient solar energy conversion - theory, synthesis, and interfacial carrier dynamics. "The objective of this research is to improve solar energy conversion efficiencies in multi-metal oxide solar cells, which could offer earth-abundant, non-toxic alternatives to existing thin-film solar cells. The efficiency will be improved by theoretically predicting and experimentally synthesizing metal oxide materials with new compositions and enhanced properties, coating thin layers of these new oxides onto nanowire-arrays, and using terahertz spectroscopy to study and optimize the bulk carrier dynamics and interfacial charge transfer in these nanostructured oxides.

Summer Program Exposes Students to Chemistry Research

Arne Gericke and **Shawn Burdette**, professors in the department of chemistry and biochemistry, have received an award from the National Science Foundation (NSF) Chemistry Division in the amount of $330,160 to provide students from two- and four-year colleges with the opportunity to participate in a 10-week summer undergraduate research experience at WPI. Designed to expose students to impactful research in membrane biochemistry and bioinspired chemical synthesis, this summer program will provide students with the opportunity to be fully engaged in all aspects of scientific discovery including project conception, execution, troubleshooting, interpretation and dissemination. WPI will partner with chemistry faculty from three institutions that are separated from the contiguous 48 states in an effort to recruit a diverse group of students each summer. These institutions are the University of the Virgin Islands, which is a historically black college and university (HBCU), and the Universities of Alaska at Anchorage and at Fairbanks, both of which serve a high population of Native-Alaskan students. Undergraduate students participating in the research experience will be embedded in and interact with an interdisciplinary community of researchers dedicated to tackling challenging problems at the forefront of science.
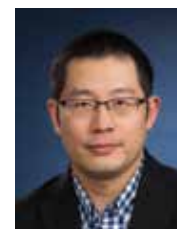
Math Research Receives DOD Funding

Zhongqiang Zhang, assistant professor of mathematical sciences, has been given an award in the amount of $113,932 from the Department of Defense's Multidisciplinary University Research Initiative (MURI) in coordination with the Army Research Office (ARO) for the project "Analysis of fractional advection-reaction-diffusion equations on bounded domains." This project is a sub award from Brown University. Under this project, Zhang will perform mathematical analysis and simulations to address anomalous transport in reactive systems of importance to combustion, functional microfluidics and materials, and systems biology. In particular, he will establish fundamental understanding of deterministic and stochastic fractional advection-diffusion-reaction on bounded domains and develop efficient simulation methods.

Transforming the Urban Transit System

Yanhua Li, assistant professor of computer science and data science, was awarded a two-year, $174,956 grant from the National Science Foundation (NSF) for his project "CRII: CPS: CityLines: Designing Urban Hub-and-Spoke Transportation System with Data-Driven Cyber-Control." Under this grant, Li's team will develop CityLines, a transformative urban transit system, employing hybrid hub-and-spoke transit service with shared shuttles. Novel cyber-control methods will be designed to guarantee the system scalability (enabling real-time transit service planning for urban scale trip demands), adaptability (allowing hub relocation and route re-planning to cope with trip demand dynamics), reliability (to traffic disruptions), and compatibility (providing inter-transit coordination with other transit services).
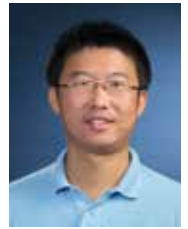
Yanhua Li

Exploring Sex-Specific Neural Pathways during Neurodegeneration

Jagan Srinivasan, assistant professor of biology and biotechnology, has been awarded a five-year RO1 grant in the amount of $1,570,381 from the National Institutes of Health (NIH) for the project "Functional connectome of sex-specific processing of social cues." Neuropathologies such as Alzheimer's and Schizophrenia exhibit gender biases, suggesting the existence of gender-specific neural circuits. Olfactory dysfunction is a major symptom during the onset of these neurodegenerative diseases. With this award, Srinivasan will use the model organism C. elegans to shed light on such disorders by elucidating the neural pathways involved in sex-specific behavioral responses to olfactory cues. Co-investigator **Dirk Albrecht**, assistant professor of biomedical engineering, will develop high-throughput multineural imaging systems adapted from his lab, to better understand the neural dynamics of behavioral responses during olfactory dysfunction.

Jagan Srinivasan   *Dirk Albrecht*

Data Science Wins Paper and Poster Awards

Elke Rundensteiner, professor of data science, and her late colleague Professor Matthew Ward, along with colleague professor **Huong Higgins** and their PhD student Kaiyu Zhao recently received a best paper award at the 2016 IST International Symposium on Electronic Imaging at the 2016 Visualization and Data Analysis Conference for their research paper, "MaVis: Machine Learning Aided MultiModel Framework for Time Series Visual Analytics." Rundensteiner together with her PhD students Ramoza Ahsan and Rodica Neamtu also received a best research poster award at the 31st ACM/SIGAPP Symposium on Applied Computing in Pisa, Italy, for a project titled "Towards Spreadsheet Integration using Entity Identification Driven by a Spatial Temporal Model." Last but not least, Rundensteiner and her colleagues assistant professor **Xiangnan Kong** and associate professor **Emmanuel Agu** received an honorable mention award (among top 6 papers) for the research work by their PhD student Maryam Hasan on the topic of "Using Social Sensing to Discover Trends in Public Emotion", which was presented at the 2017 IEEE International Conference on Semantic Computing in San Diego, CA.

Rundensteiner also recently had several patents granted for her work in data science:

C.K. Gupta, S. Wang, A. Mehta, M. Liu, and E. Rundensteiner, "Determining an Execution Ordering",

US Patent 20160203185 A1, Granted July 14, 2016.

C. K. Gupta, S. Wang, A. Mehta, M. Liu, and E. Rundensteiner, "Nested Complex Sequence Pattern
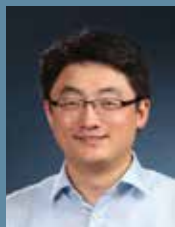
Queries Over Event Streams", Patent US 9298773 B2, Granted March 29, 2016.

*Elke Rundensteiner*   *Huong Higgins*   *Xiangnan Kong*   *Emmanuel Agu*

WPI Students Win Actuarial Competition

A team of Actuarial Mathematics students were crowned winners of the Annual Travelers Case Competition in Hartford, Conn., on March 3, 2017. Teams from five universities (Bentley, Bryant, Temple, UConn, and WPI) were given five hours to tackle a problem that involved choosing an investment policy for the company, using VaR and TVaR measurements to set appropriate surplus levels for various lines of business, setting prices for those lines that would balance the competing needs of profitability versus maintaining their customer base, and then running those choices through a simulation that produced financial results. At the end of the day, each team made a 15-minute presentation of their findings in front of an audience of 100 people, and responded to questions from a panel of Travelers senior management about their work. The student team of Emily Chen, John McGinn, and Rob Wondolowski turned in a great performance on a demanding but ultimately fun day and took home the grand prize.

Tea Sets and Tyranny

Steven C. Bullock, professor of history, has published *Tea Sets and Tyranny: The Politics of Politeness in Early America* (University of Pennsylvania Press, 2016). In his latest book, Bullock explores politeness in eighteenth-century American culture, showing that it has been a political issue since before the nation began. *Tea Sets and Tyranny* follows the experiences of six extraordinary individuals as they dealt with the problems of personal standing and public authority: a cast of characters that includes a Virginia governor consumed by fits of towering rage; a Carolina woman who befriended a British princess; and a former Harvard student who became America's first confidence man. Bullock has taught at WPI since 1989. His *Revolutionary Brotherhood: Freemasonry and the Transformation of the American Social Order, 1730–1840* (UNC Press) was the first major study of the early American fraternity. Bullock's *The American Revolution: A History in Documents* (Oxford University Press) appeared in 2003, the year he won WPI's Trustees' Award for Outstanding Research and Creative Scholarship.
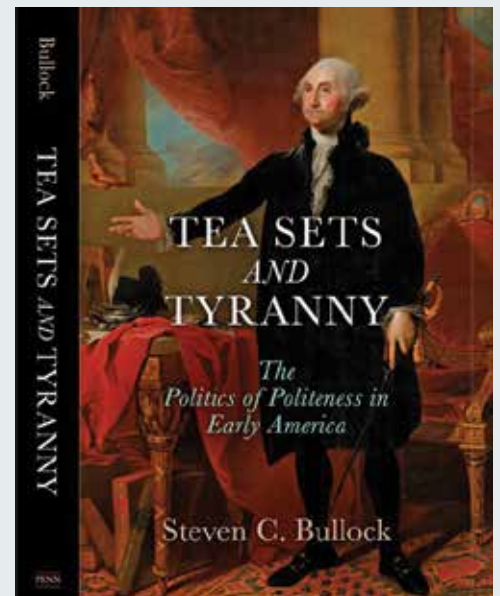
Department of Biology and Biotechnology

The education of students in WPI's Biology and Biotechnology Department goes far beyond the theoretical. Our students are creative problem solvers who are passionate about using biological concepts in innovative, applicable ways. We are proud to introduce you to two senior students majoring in Biology:

Eric Borges

Hometown:
Fairhaven, Mass.

Member of WPI Emergency
Medical Services (EMS)

Mentors:
Professor Reeta Rao and
Elizabeth Jacoby (pre-med advisor)

What I'm working on:
I am finishing up my Major Qualifying Project (MQP) at the Cardiovascular Research Center at Rhode Island Hospital. My MQP is exploring the effects of BKCa channel activators and ROS scavengers on aging vessels. Basically, we are looking to see if two different drugs can restore normal function to aged blood vessels in mice. This project has been an enjoyable challenge and has provided me with valuable experience in real-world research. It has also allowed me to meet interesting people at various levels of medical education and research.

Life after WPI:
I will be attending the University of Massachusetts Medical School in the fall. I am confident that the strong personal and academic foundation I have built at WPI will allow me to hit the ground running as a medical student.

How WPI helped me reach my goals:
WPI's fast-paced coursework and collaborative approach have helped to make me a fast-learner who thrives as part of a team. I know these qualities will serve me well as a medical student and future physician. I also truly appreciate the help that Professor Rao and Elizabeth have given me to help me stay on track toward my goals and in navigating the medical school application process.

Lindsay Gurska

Hometown:
Revere, Mass.

Varsity Softball Team (Team Captain)
& 2016 First Team Academic All-American

2016 NEWMAC Player of the Year

2016 Bonnie-Blanche Schoonover Award

Mentors:
Professors Joseph Duffy and Amity Manning

What I'm working on:
My MQP, under advisor Professor Amity Manning, has involved characterizing the role of the retinoblastoma tumor suppressor protein in regulating mitotic DNA damage. This project began during my junior year and progressed this past summer through the funding of an A&S Summer Undergraduate Research Award. During the fall of 2016, I presented my research at the 4th International Retinoblastoma Protein meeting at The Ohio State University.

Life after WPI:
I will be pursuing my PhD at the Albert Einstein College of Medicine Graduate Program in the Biomedical Sciences and plan to pursue cancer and disease research.

How WPI helped me reach my goals:
The faculty and staff at WPI have positively influenced my undergraduate experience and have constantly given me advice on what I can do with the education I've received here. The IQP and MQP projects were also eye opening experiences that have made me feel more prepared to succeed in my future endeavors. I am appreciative of how many opportunities my mentors continue to expose me to, such as allowing me to work in their labs during my time as an undergraduate.

Women Faculty Mentoring Our Women Student Scholars

In our last newsletter, we shared with you the students who were awarded a 2016–17 Clare Boothe Luce Research Scholar award. In this issue, we are proud to announce the next group of scholars for the 2017–18 academic year. WPI is committed to encouraging and supporting women in fields in which they are traditionally underrepresented. As part of that effort, WPI's Office of Arts & Sciences provides research awards made possible by the Henry Luce Foundation to support undergraduate women in math, computer science, physics, and robotics engineering. These awards recognize the students' academic accomplishments and provide them with the opportunity to deepen their education by working on a research project in collaboration with a Luce faculty mentor and research advisor.

Hannah Kraus '18
Mathematical Sciences

Mentor & Research Advisor:
Sarah Olson, associate professor of mathematical sciences

Caroline Johnston '19
Mathematical Sciences

Mentor & Research Advisor:
Suzanne Weekes, professor of mathematical sciences

Toni Joy '19
Mathematical Sciences

Mentor & Research Advisor:
Suzanne Weekes, professor of mathematical sciences

Sarah Ma '18
Mathematical Sciences

Mentor & Research Advisor:
Sarah Olson, associate professor of mathematical sciences

Erin Morissette '19
Physics

Mentor:
Lyubov Titova, assistant professor of physics

Research Advisors:
Lyubov Titova and Ron Grimm, assistant professor of chemistry & biochemistry

Sierra Palmer '19
Robotics Engineering

Mentor:
Carolina Ruiz, associate professor of computer science

Research Advisor:
Carlo Pinciroli, assistant professor of computer science

Aline Tomasian '18
Physics

Mentor:
Lyubov Titova, assistant professor of physics

Research Advisor:
Izabela Stroe, assistant teaching professor of physics

MaryAnn VanValkenburg '19
Mathematical Sciences and Computer Science

Mentor & Research Advisor:
Carolina Ruiz, associate professor of computer science

Marilyn Pifer is the Director of Research and Innovation for CRDF Global, an independent NGO that promotes safety, security, and sustainability through science and innovation. CRDF Global was established in 1995 with the initial mandate to support scientists in the former Soviet Union. It now works in over 40 countries in Eurasia, the Middle East, Africa, and Asia. Dr. Pifer oversees projects covering cooperative research, entrepreneurship and innovation, and building professional skills like grantsmanship. She is a member of the WPI Arts & Sciences Advisory Board and also served on the Provost's Global Task Force.

Richard Resnick '98 was the CEO of GQ Life Sciences, a SaaS search company focused on life science innovation, until its successful acquisition by Aptean in late 2016. He is currently working with early stage companies on growth and strategy. He was previously CEO of Harmony Line, Inc., an MIT Media Lab company, where he partnered with composer/technologist Tod Machover to develop and commercialize Hyperscore, a unique software tool to enable anyone to compose music. Prior to Harmony Line, Mr. Resnick was the CEO of Mosaic Bioinformatics and the global bioinformatics software head for Wyeth Pharmaceuticals. He is the Chair of the WPI Life Sciences Advisory Board.

In what ways does project-based education prepare students to have global impact?

Project-based education is essential to working globally, particularly for students in the arts and sciences. One of our goals at CRDF Global is to encourage the migration of research results from the laboratory to the marketplace, which can be a remarkably hard sell in some countries and institutions. WPI's approach to project-based education imbues students with the idea that the work they are doing is not only an intellectual pursuit but can make a practical impact. The projects that students undertake, including those at international project centers, motivate students to look beyond their immediate research question to the practical application of what they are studying.

How can an international project experience influence a student's career path?

I have not seen a stronger approach or broader commitment to international project work in the sciences at any university than what WPI offers. WPI students conducting projects abroad gain a perspective on how their studies impact the world in a way that they cannot always see from the "ivory tower" of academia, or even the Two Towers of WPI. This can open a student's view of the possibilities open to them. When I finished my PhD in molecular biology, I assumed that I would work in a laboratory for my entire career. But an experience abroad as an undergraduate had planted the wish to work outside the U.S., and an opportunity to work with the U.S. Embassy in Moscow completely changed my outlook to a focus on international science collaboration. I haven't worked in a lab since.

What advice would you give students who seek a career with an organization that works internationally?

Learn a language! The chance to develop foreign language skills during university education can be too easily neglected. Even doctoral programs that always used to have a foreign language requirement often no longer emphasize these skills. If you would like to live and work in China, French West Africa, Southeast Asia, or the Middle East, it would be helpful not always to use English as your common ground. I strongly recommend that students interested in an internationally-oriented career take a language or two. Even if you never become fully fluent, a reasonable grasp of a second or third language can open unexpected opportunities.

How did your experience as a computer science graduate student influence your career?

Like many computer science students, I left WPI looking for a job writing software. This led me to a position with the Human Genome Project at the MIT Whitehead Institute. So, in a simple way, computer science led to a position in genomics and now genomics is my career. In a richer sense, the skills I gained in software, data, and difficult mathematics helped me build an analytical framework that I rely on to this day to make decisions. A lot of CEOs in the life sciences will come up through the sales or finance ranks of commercial start-ups. It is rarer for someone to come up through product development like I did. My computer science background allows me to have a deeper understanding with the R&D teams of the companies I run because they know I was once one of them.

What advice would you give students who have an idea for a company?

Talk to everyone about your idea. Don't hide it. You'll be told you can't do it over and over again. You have to be prepared to hear that and learn not to believe it, because each objection refines your idea. Also, be very careful about who you start a company with. Entrepreneurs often have an idea but need something else in order to achieve it. For example, someone may have a software idea but can't code. It is really tempting to find someone with that skill and become equal founders. In doing this, you risk choosing the wrong partner and it is an enormous risk. First find a mentor who has successfully launched a company before and wants to guide you. Entrepreneurs mostly learn through failing so they genuinely want to use what they have learned to help those in similar positions. If you ask, you will almost always find someone willing to coach you not only in picking the right founding team but in launching and building your company.

What would you tell alumni who are interested in becoming involved with WPI?

The most rewarding way to become involved with WPI is to interact with the students. You can offer to help with a student competition like i3 or GRIE (Graduate Research Innovation Exchange) or host a student project. You will find that WPI students are smart, engaged, and are ready to make big changes to the world – and maybe to you too.

The **arts and sciences** are an integral part of WPI's mission to create, discover, and convey knowledge at the frontiers of technological academic inquiry for the betterment of society. You can support WPI's commitment to providing students with a unique, experiential STEM education by participating in the funding initiatives below. For more information, contact Monica Ellis, Director of Academic Advancement, Arts & Sciences, at mellis@wpi.edu or 508-831-4836.

The Dean's Fund for Faculty Excellence

WPI recruits world-class scholars who provide WPI students with a world-class education in the arts and sciences. The Dean's Fund for Faculty Excellence supports faculty teaching and research by funding professional development opportunities for faculty as well as their students (e.g., a faculty member and a student attending a professional meeting). This also provides funds for faculty who are outstanding researchers in their fields to purchase materials and instrumentation.

The Dean's Fund for Graduate Studies

WPI offers master's and PhD programs in Arts & Sciences that are competitive with top universities worldwide. This fund allows WPI to bring the best and brightest master's and PhD students to WPI by providing the financial resources to offer competitive funding and fellowship opportunities to graduate students.

Arts & Sciences Undergraduate Research Fellows Program

This intensive summer research experience provides students with opportunities to conduct research under the mentorship of WPI faculty. Fellows are awarded stipends that allow them to stay on campus for the summer to work full-time on individual research projects. They gain experience in modern research techniques and learn to plan and execute experimental strategies. These valuable opportunities are made possible thanks to the generous support of WPI alumni and friends.

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