

# PATHWAYS

A photograph of a brick building with a bridge in the foreground, with a bright sunburst effect in the center.

**INTEGRATE**  
[ IMAGINE - INNOVATE - IMPACT ]

2021-2022

**WORCESTER POLYTECHNIC INSTITUTE**

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SCHOOL *of* ARTS & SCIENCES

# INTEGRATE

IMAGINE - INNOVATE - IMPACT



## VISION

To inspire members of the WPI community to be creators, scholars, inventors, and responsible global citizens

## MISSION

To bring together cross-disciplinary and diverse perspectives to promote discovery and communication, advance knowledge, and improve the human condition

## VALUES

Inclusion  
Collaboration  
Curiosity/Courage  
Innovation  
Respect





# FROM THE DEAN

As I write this message, we have just welcomed our students and faculty back to campus for the 2022–23 academic year. We arrive at a place that feels familiar, yet also touched by the lessons of the pandemic. We have emerged from the isolation of the last two years to reengage colleagues and students and to reignite connections both on campus and across the globe. The light we experienced as hope during the pandemic now feels more like a current, energizing us with a renewed sense of purpose and community.

Over the past year, the School of Arts & Sciences has continued to illuminate how the humanities, arts, and sciences can integrate the work of the four schools at WPI, and this will be our guiding principle over the next year. Faculty across WPI's four schools—Arts & Sciences, Engineering, Business, and The Global School—already routinely work together on joint initiatives, research, and interdisciplinary academic programs, and we will build upon that foundation. The School of Arts & Sciences has also built bridges to institutions within our local community. One such example is Quinsigamond Community College (QCC) in Worcester, Mass., who, with WPI's Department of Physics, runs the Lab for Education and Application Prototypes (LEAP), a state-of-the-art educational and research center. Through LEAP, WPI and QCC have hosted high school students for mentoring and projects, introducing them to the emerging fields of integrated photonics and advanced manufacturing. Finally, the School of Arts & Sciences has built bridges with global partners, engaging in collaborations with universities like the Zurich University of Applied Sciences (ZHAW) in Switzerland that have fostered important faculty and student collaborations and exchanges.

Cross-disciplinary and diverse perspectives are at the heart of the arts and sciences and through these perspectives we arrive closer to achieving our vision “to inspire members of the WPI community to be creators, scholars, inventors, and responsible global citizens.” Over the coming year, the School of Arts & Sciences will focus more exclusively on creating connections, building inclusive communities, and creating and implementing new modes of integration of ideas, disciplines, and institutions. To achieve this, we will rely on the ingenuity of our students, faculty, and staff, many of whom are the unsung heroes of our community—members who contribute so much but do not often share the spotlight. We recognize their contributions as we enter this phase of reinvigoration and reconnection. We thank each of you for continuing to serve as a beacon of light inviting us into a space where we experience not just inclusion but authentic belonging, while remaining true to our motto, Be Well Together.

I invite you to explore this publication to learn more about scholarship and dedication of the students, faculty, and staff of the School of Arts & Sciences.



Jean A. King, PhD  
*Peterson Family Dean of Arts & Sciences*





A young man with light brown hair, wearing a blue and white plaid shirt over a white t-shirt and large black headphones, is focused on playing a Yamaha xylophone. He is using two mallets with black heads and wooden handles. The xylophone has a black frame with the 'YAMAHA' logo in gold. The background is a dark grey wall with a large, vibrant blue and white digital waveform or spectrogram projection. The text 'FINDING THE HIDDEN SYMPHONY IN SCIENCE' is overlaid on the right side of the image in a bold, white, sans-serif font.

# FINDING THE HIDDEN SYMPHONY IN SCIENCE

Imagine More: Robbie Oleynick '24 Integrates  
Tech with Music in *Silent Sky* Production



At a university focused on progress and change, it may come as a surprise that one thing has stayed consistent on Boynton Hill over the years: there's no such thing as a typical WPI student. Rather, students are encouraged to pursue their passions—be they scientific, artistic, or athletic—by blending their curiosities and talents into a pathway unique to them and their personal journey.

Just ask Robbie Oleynick '24.

As an electrical and computer engineering major with a minor in computer science, Oleynick has managed to craft a double helix of engineering and music, building a college experience for himself that's as unique as, well, his own DNA.

"I can't imagine myself doing anything similar at any other university," he says of the opportunities to entwine his engineering curriculum with his passions for music. Said opportunities have been plentiful: spurred on by his interest in digging deeper into music technology, he's produced virtual performances for WPI's Pep Band, Concert Band, Brass Ensemble, Jazz Ensemble, and Stage Band. (He's a member of four of said ensembles, as well as VOX, WPI's student musical theatre company, and Lens & Lights, a student organization that offers lighting, sound, and projection services on and off campus.) "Even though I wasn't directly studying music, I wasn't denied any opportunity, and felt accepted simply because I enjoy music."

He's not alone in that enjoyment. Music is one of the most popular extracurricular activities at WPI, with classical pieces as well as instrumental takes on popular hits echoing across campus day in and day out. Students have their pick of nine a capella and chior groups; more than a dozen music ensembles, orchestras, and groups; a musical theatre group; a student rock association; and a campus radio station. Most important, though, are the infinite opportunities for them to flex their muscles, both creative and scientific.

For Oleynick, one of those opportunities came in the form of WPI Drama/Theatre's fall 2021 production, *Silent Sky*. It showcased a collaboration among faculty mentors and students while telling the story of Henrietta Leavitt and her groundbreaking discoveries in astronomy, highlighting the achievements of women in STEM.



*“I can't imagine myself doing anything similar at any other university.”*



After his work as an assistant in *Every Brilliant Thing* during Fall 2020's Arts & Sciences Week, Oleynick was tapped by Kate Moncrief, Paris Fletcher Distinguished Professor of Humanities, Humanities & Arts Department Head, and director of the production, to be a

member of *Silent Sky's* creative team. Having faculty thinking about opportunities for him to grow as an artist was an invaluable resource to Oleynick, and he joined without hesitation. And as WPI students are wont to do, he hit the ground running, starting from the very first script read.

"As I read the script for the first time," he explains, "I knew that the only way for me to capture the ideas I had for the soundscape was to compose an original score that fit every moment of the play." With the guidance and encouragement of Laura Eckelman, associate professor of theatre, Oleynick found the balance in his work to best support the play's overall vision.

His decision to compose the play's score goes hand-in-hand with the Humanities & Arts Requirement, a hallmark of a WPI education where students earn the equivalent of a minor in the humanities while exploring art, theatre, music, and other forms of creative expression. With the guidance of Scott Barton, associate professor of arts, communications, and humanities, Oleynick was able to turn the unconventional music practicum of *Silent Sky's* composition into a degree fulfillment without having to choose between two of his passions.

*"At WPI, I've seen so much overlap between the arts and sciences. It's the perfect community to find a new intersection of practical engineering and the humanities and arts."*

"In high school I often found that I was too busy or had other priorities," Oleynick explains, "but since the HUA Requirement is built into the WPI Plan, I'm now able to have artistic experiences that don't take away from my academic goals ... I can find the intersections of my passions."

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Composing an entire play's score is an impressive feat in and of itself, but for Oleynick, his favorite part of the whole experience came in the form of the show's final technical element where stars lit up the theatre in what he describes as "an explosion of light and sound: our own supernova." The scene left audiences in awe and was a true testament to the collaborative nature of his fellow students infusing music and art with technology to craft a memorable moment for all.

"It was incredible to realize that we had created something that couldn't be felt through a screen—it felt tactile," he says. "To have an audience appreciate your work is a profoundly satisfying experience that I had never felt with such magnitude before ... the feeling that so much can come from a group of students will stick with me."

It stuck with the rest of the WPI community as well—his work on *Silent Sky* won Oleynick a Class of 1879 Prize for Outstanding Projects in the Humanities, as well as the Skull Trophy for Outstanding Achievement, an award given to students who displayed outstanding performance in extracurricular and academic activities during their first year at WPI.

Much like his WPI journey, these opportunities for Oleynick to combine his passions are just beginning. He's already fused music and theatre, but he hopes to intersect his academic areas of interest (namely electrical and computer engineering and computer science) with the arts as well.

The resources and support systems are set, and it's up to Oleynick to decide what he'll compose (literally and figuratively) next. Whatever his future projects involve, there's no better place for him to tinker, explore, and ultimately make it happen.

"At WPI, I've seen so much overlap between the arts and sciences," he says. "It's the perfect community to find a new intersection of practical engineering and the humanities and arts."





# CHARTING THE PATH OF PARTICLES AND PROFESSIONS

**Career Impact Multiplied: WPI integrates Physics Education with Community**

In some ways, physics is the study of pathways, like the flow of light through media or the twisting trails of subatomic particles spawned in an accelerator. For Douglas Petkie, head of WPI's Department of Physics, the concept of pathways has a different meaning. Many people, he says, see physics as a discipline with one primary career trajectory: from bachelor's degree, to PhD, to academia. In reality, physics graduates are offered a wealth of ways to use their education to build satisfying careers.

Petkie says his department works to get that message across through a multifaceted, multilevel campaign that encompasses pre-college programs, undergraduate research experiences, graduate education and research, and a teacher preparation program. Connecting and integrating these efforts is mentorship, the key to the campaign's success. In an interconnected web of support, faculty, staff, and students offer guidance, encouragement, and helpful information. "When all of these things connect," Petkie says, "that's when it starts to snowball."

Examples of mentorship abound. They include the department's 30 to 40 peer learning assistants (PLA): undergraduates who help other students master the content of physics courses, but who also counsel them on career paths. Like all learning assistants across campus, they receive training in pedagogy and mentoring through the Morgan Teaching and Learning Center; Rudra Kafle, associate professor of teaching in the physics department, is also an associate director for TA (teaching assistant) and PLA development in the Morgan Center.

L Dana, the department's lab manager (who also helps train the learning assistants), never misses an opportunity to chat with undergraduate and graduate students about career opportunities. Physicist James Eakin is senior technical operations manager in LEAP, the Lab for Education and Application Prototypes, a state-of-the-art educational and research center focused on integrated photonics that WPI runs in partnership with Quinsigamond Community College (QCC). He regularly

talks with participants in WPI summer enrichment programs about his own career path, which has included stints as an entrepreneur and in industry.

Among the challenge the physics department tries to address is the persistence of misconceptions about physics and its role in science, engineering, and technology, Petkie says. "Physics is the fundamental aspect of how the world works," he notes, "which makes it a good starting point for many career paths."

The quest to create a broader appreciation for physics begins at the pre-college level. Petkie says many WPI faculty members take part in outreach programs aimed at K-12 students, including WPI summer programs like Ignite (for rising 7th and 8th graders), Launch and Frontiers (for high school students), and TouchTomorrow (for budding scientists and engineers of all ages). There is also the physics department's annual Goddard Cup, a water rocket competition named for WPI's most famous physicist graduate, Robert H. Goddard, the father of modern rocketry.

A number of physics faculty members incorporate pre-college outreach into their sponsored research programs.

For example, Lyubov Titova, associate professor, and Kun-Ta Wu, assistant professor, built K-12 outreach into their National Science Foundation (NSF) CAREER awards. Titova runs an NSF-funded Research Experience for Undergraduate (REU) program, which empowers students from traditionally disadvantaged groups to become leaders in renewable energy. Last summer, students in the REU program helped out with a hands-on program on optics for 8th and 9th grade girls that Titova ran for the Girls Inc. Eureka program, which teaches girls about STEM concepts and career opportunities.

Another example of the department's integrated approach to mentoring involved students from nearby Doherty High School. Working with QCC and the national Spark Photonics Foundation, which introduces high school students to the emerging fields of integrated photonics and advanced manufacturing, the high school seeks out internships for seniors that emphasize value creation and entrepreneurship. When it asked Petkie last year to take on eight interns, he assembled a team of WPI undergraduate and graduate students who, with help from Eakin, organized several projects connected with the integrated photonics labs in LEAP.

Career opportunities in physics include a wide range of job options, Petkie says, including working in government (in such fields as space exploration and climate change), in medicine and healthcare, in engineering and robotics, and in industry. Another path well supported at WPI is the one that takes students into K-12 classrooms. Through its STEM Education Center (SEC), the university offers a teacher preparation program for students who want to teach in STEM disciplines. Students in the physics program earn a BS in physics or other aligned field and a Massachusetts Initial Teaching License.





WPI, represented by the physics department and the SEC, is also member of PhysTEC, an organization dedicated to eliminating the national shortage of highly qualified physics teachers. In 2019 WPI was chosen to be a PhysTEC site, which, the organization says, means it is “well poised to dramatically improve their physics teacher education programs and have impacts beyond their campuses, serving as national models for program improvement.” All PhysTEC sites must employ a teacher-in-residence; Thomas Noviello, who filled that role at WPI when he was a physics teacher and science department head at Leominster, Mass., High School, recently joined the WPI faculty in a role, Petkie says, “that will strengthen our connection to the STEM Education Center through PhysTEC and WPI’s teacher preparation program.”

The Department of Physics also helps current physics teachers find new ways to engage students. For example, department faculty teach in WPI’s Master of Science in Physics for Educators program. And this past summer, Petkie participated in an NSF-funded Research Experience for Teachers program. As part of the program, Anna Valdez, a middle school STEM teacher from Duxbury, Mass., and Simon Rees, a senior physics major at WPI, enrolled in the teacher preparation program; they worked with Petkie and two WPI undergraduates on a project that used spectroscopy to monitor moisture in products to develop more efficient drying and energy conserving technologies in the pulp and paper industry.

While every physics student’s path is unique, some stand out, Petkie says. He cites the story of Javier Mann, a nontraditional student who attended Berklee College of Music before deciding to change course and enroll at QCC. He was able to transfer to WPI with the aid of a \$1 million NSF Scholarship in Science, Technology, Engineering, and Mathematics (S-STEM) program

*“Physics is the fundamental aspect of how the world works, which makes it a good starting point for many career paths.”*

Doug Petkie, department head  
and professor of physics

(overseen by Izabela Stroe, associate professor of teaching in physics). Before his senior year he participated in an REU program (which led him to scrap plans to go into industry) and instead will pursue a graduate degree in physics at WPI. He is currently at SUNY Polytechnic Institute on a six-month research contract as a result of WPI’s link to the New York institution through LEAP and the national AIM Photonics initiative.

“Javier is someone who undertook a host of academic experiences, but still wasn’t sure of his path,” Petkie says. “But with the help and support of many people at WPI, he has found a direction that works for him.”

That is the department’s real goal, according to Petkie. “We are trying to give young people experiences early on to help them find out who they want to be,” he says. “We offer the experiences, give them role models, and provide them with mentoring. It’s all in service of helping put students on career paths that they will enjoy and that can help them make a difference in the world.”





# BUILDING BRIDGES FROM WORCESTER TO THE WORLD

School of Arts & Sciences and The Global School  
Innovate and Integrate for Impact





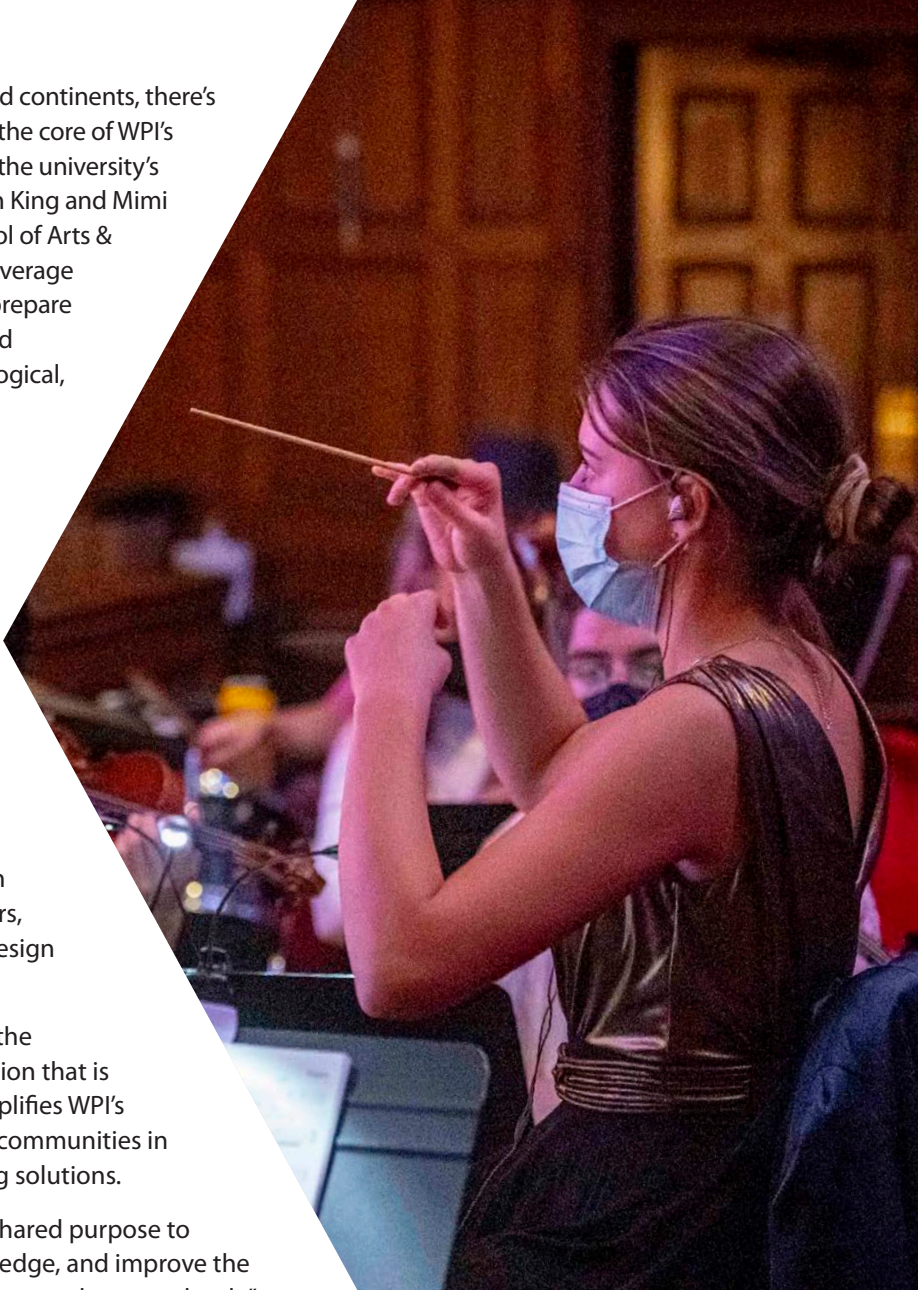
In a world where significant challenges span countries and continents, there's no place for manufactured borderlines—a philosophy at the core of WPI's distinctive approach to education and embodied in how the university's four schools work together. For their part, WPI Deans Jean King and Mimi Sheller at the helms, respectively, of the university's School of Arts & Sciences and The Global School, recognize and actively leverage the synergy of their schools' disciplines and expertise to prepare students in every area of study (including engineering and business) to make an impact on the major social, technological, ecological, and economic challenges of our times.

"When WPI was founded, it was based on building solutions, not just for Worcester, but for the world," noted King, the Peterson Family Dean of Arts & Sciences. "In that respect, we've been global since day one, but like everything this university does, we keep innovating because we want to increase our impact. This means both personal impact for our students as well as the change we can help to create in the world. With The Global School, established in 2020, we are building upon WPI's longstanding integration of STEM education with humanities, arts, social sciences, and business perspectives—and that elevates the experience for both students and faculty as they come together with partners, both local and global, to understand problems and to design solutions collaboratively."

Where WPI's School of Arts & Sciences weaves together the scientific, technological, artistic, and humanistic innovation that is found in all corners of WPI, The Global School's work amplifies WPI's commitment to have students and faculty partner with communities in defining issues together, and subsequently co-designing solutions.

"Our STEM focus, our project-based approach, and our shared purpose to promote discovery and communication, advance knowledge, and improve the human condition is why there is remarkable synergy between the two schools," explains King.

That the world is in desperate need of STEM-based solutions is hardly controversial. Climate change, economic instability, and sustainable energy—to name a few—beg experts in the STEM-focused disciplines to point the way forward, but feasible answers require broad expertise across disciplines. Real solutions, notes Sheller, "demand creativity and a critical lens, both pillars of the humanities and arts and of the social sciences, and the global perspective of stepping outside your comfort zone. Solving complex global challenges will only work if we're co-designing and co-creating these solutions with the people who will actually be using the technology," she explains. "And that is what sets our students apart: they have taken their ideas out into the world to learn from others and collaborate with others." This, she says, is the WPI model of global education, working across different social and cultural contexts with long-lasting outcomes for both WPI students and its partners around the world.



*“That is what sets our students apart: they have taken their ideas out into the world to learn from others and collaborate with others.”*

Mimi Sheller, dean of The Global School



Understanding those contexts is essential, according to Kathryn Moncrief, professor and head of the Department of Humanities & Arts (HUA) in the School of Arts & Sciences. “Interdisciplinary collaboration, within and across WPI’s schools, increases opportunities for meaningful student engagement and learning, as well as faculty research and scholarship,” Moncrief says. “Through our work in HUA, all WPI students are exposed to the breadth, diversity, and creativity of human experience and guided and challenged to think critically and independently, to communicate openly and collaboratively, and to reflect on their responsibilities to others in local, national, and global communities.”

“When you’re looking to address issues of social justice or policy, these issues are tied to people,” says King. “Our mission, our responsibility, is to guide students in developing cultural curiosity, critical thinking skills, and an understanding of what it means to be global. Through the School of Arts & Sciences, WPI provides that foundation, empowering scientists and engineers to create long-lasting impact.”

Similarly, The Global School puts great emphasis on community-based research and ethical learning, requiring that students work collaboratively with their project sponsors and partners abroad—listening first and working together to solve problems. Like King, Sheller emphasizes that students must first possess the cultural literacy and listening skills necessary to be effective collaborators—a truth, Sheller notes, that has not always been self-evident. “Some externally designed technologies have harmed the very people they were designed to help, or have created new problems,” she explains. “WPI turns that paradigm around, training the next generation to listen deeply and to think about the impact an engineering or science project is going to have on a community. The School of Arts & Sciences curriculum helps students understand the cross-cultural context and the social justice issues that may be at play.”

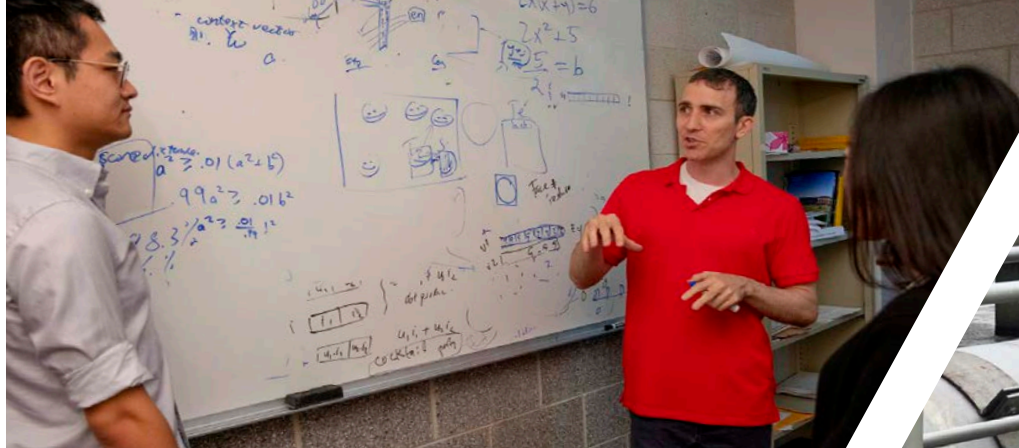
“Naturally, we provide students the background they need to accomplish their projects, but they need more,” says King. “If a student plans to travel to Ecuador, for example, and they first learn to speak Spanish, learn the history of that country and why people live as they do, that’s when they’re really positioned to bring theory to practice.”

*“It takes all of us to help our students be of and for the world.”*

Jean King, Peterson Family Dean of Arts & Sciences







Rob Krueger, professor and head of the Department of Social Science & Policy Studies in the School of Arts & Sciences, is one of a growing number of faculty who model the humanistic approach to global project work that the alliance between the two schools is designed to foster. In his work leading the Institute of Science and Technology for Development, and as director of the Ghana Project Center, Krueger inspires fellow researchers and scholars and their students to apply the skills of social sciences.

In a recent e-waste project in Ghana, where the government was cracking down on the practice of stripping wires to resell the copper inside due to the release of noxious fumes, student teams asked questions before rushing to a solution. "This project really linked culture, social science, and policy," says Krueger. By understanding what had already been tried in search of a third way—not the existing approach and not an outright ban—the team devised a burn box and filter capable of capturing the toxic fumes, constructed with charcoal, citrus juice, and coconut fibers, all locally sourced.

"As a result, policy makers could see that many Ghanaians were recycling existing waste products and making a living without a negative environmental impact," he explains. "We used a co-designed approach, learning from people's experiences and their current livelihoods."

At the core of The Global School's mission is a commitment to creating a more just and ethical world. To do so effectively, students must be able to approach these challenges with a humanistic perspective—and for that objective, both King and Sheller affirm, the School of Arts & Sciences is the perfect partner. "When we give our students a place where music, art, and design thinking are integral, we educate, excite, and engage them for global impact," says King. "It takes all of us to help our students be of and for the world."



# MERGING WITH THE FUTURE

## A Year of Progress and Transitions at WPI

While change may be inevitable, progress requires deep intentionality. This section reports on several positive changes we have experienced this year in the School of Arts & Sciences and the university at large. The future is coming—and our students and faculty are leading the way.

### WPI Navigates Presidential Transition

This year saw the departure of WPI President Laurie Leshin, who served in her position since 2014. In response, the WPI Board of Trustees unanimously elected Provost and Senior Vice President Winston Oluwole “Wole” Soboyejo to serve as interim president during the nationwide candidate search.

A highly accomplished academic and administrative leader, Wole is known for being a collaborator with great respect for the knowledge and experience of those around him. In addition to bringing a robust background in academic leadership to the position, Wole is also a renowned materials scientist and engineer with more than 30 years in academia and research institutes.

To ensure that the university maintains strong academic leadership, Art Heinricher, former dean of undergraduate studies, was announced as WPI’s interim senior vice president and provost. Art is known on campus as a leader who cares deeply about the success of WPI’s students and the excellence of our academic programs.

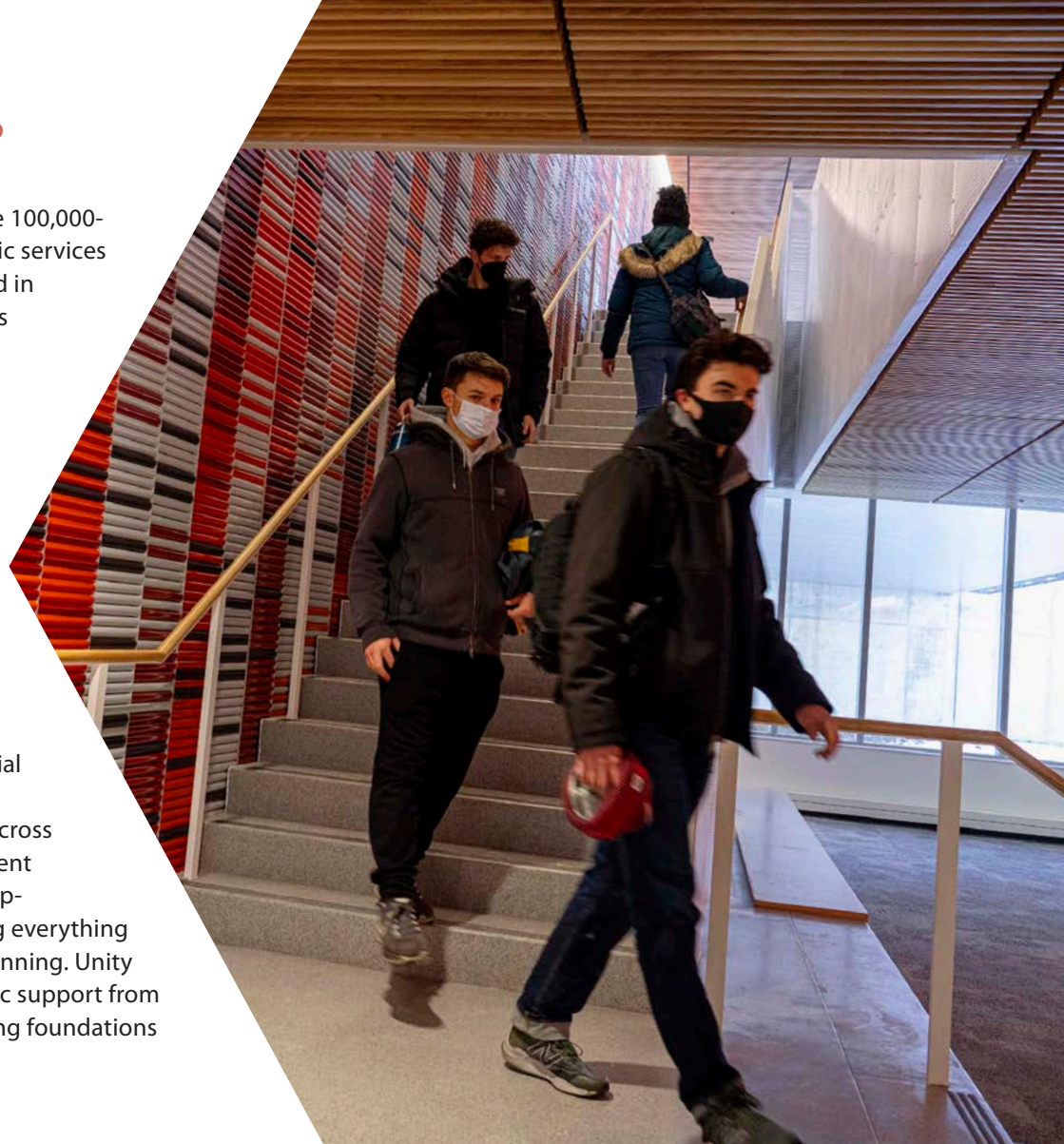




## New Unity Hall Designed to Build Connections

WPI's newest addition to campus, the 100,000-sq. ft. academic and student academic services building known as Unity Hall, opened in January 2022. The name reflects WPI's continued focus on social justice and inclusion. It also suggests the many ways that the stunning structure will help students and faculty build connections to benefit the university community—and the world beyond.

Within its five floors, the building closely locates several computationally intensive academic and research disciplines that are hallmarks of what has become known as the fourth industrial revolution. It pulls together several student services, previously spread across the campus, creating the Oliver Student Academic Services Center: a “one-stop-shopping” nexus for students seeking everything from academic advising to career planning. Unity Hall received significant philanthropic support from alumni, trustees, and friends, including foundations and trusts.







Jean King participated in a panel on youth mental health at a UMass Chan Medical School panel hosted by Congressmen Jamie Raskin and James P. McGovern

*“ Within the School of Arts & Sciences, we have musicians, mathematicians, physicists, and artists. When we can interact across these domains, that’s where we find our superpower. ”*

Jean King, Peterson Family Dean of Arts & Sciences

## WPI Unveils Dodge Family Learning Sciences & Technologies Research Lab

Bernie Dodge '70 discovered his love for teaching at WPI and credits his success in the field of learning design to his experiences on our Worcester campus. A sought-after international expert in instructional design and educational technology, Bernie is most widely recognized as the creator of WebQuest, an inquiry-oriented lesson format that enables elementary and secondary school teachers to design project-based lessons. When he and his wife, June, learned of WPI's newest academic building, Unity Hall, and its inclusion of a facility for the learning sciences, they couldn't pass up the opportunity to support it. In recognition of their generosity, the facility on the building's third floor bears the name Dodge Family Learning Sciences & Technologies Research Lab. This collaborative space now brings students and faculty together to advance the learning sciences, as well as the educational technology it makes possible.



Bernie Dodge '70 and June Dodge



# BUILDING A DIVERSE, EQUITABLE, AND INCLUSIVE FUTURE

## New Grant Expands Opportunities for Women in STEM

The Henry Luce Foundation announced a \$276,000 grant to WPI in support of women starting doctoral programs in computer science and physics—two areas in which women are significantly underrepresented. The grant, part of the Clare Boothe Luce Program, will fund two graduate fellowships per year for two years. The women selected as Luce Fellows will connect with a community of accomplished female faculty in the fields of computer science and physics, who will facilitate each student's academic and professional success.



From left, WPI students and WiCyS officers Shannon Truong, Alexa Freglette, Nicole Conill, and Mira Plante

## Student Group Promotes Women in Cybersecurity

With a shortage of candidates and a growing gender gap, the field of cybersecurity faces dual challenges—and an opportunity. As a way of addressing these two issues, students at WPI created a chapter of Women in Cybersecurity (WiCyS), a national organization with a goal of encouraging girls and women to enter the computer science fields. Since 2019, WiCyS has facilitated team and individual coding exercises, guest speakers, and mentorship programs for young women interested in cybersecurity.

Led by WiCyS President Nicole Conill '22, the student group advances the university's commitment to bringing diverse talent to the STEM disciplines.



# PRIORITIZING MENTAL HEALTH FOR ALL



Mental Health and Well-Being Task Force / Mental Health Implementation Team



## Task Force Keeps Mental Health and Well-Being a Core Priority

In commitment to a culture of wellness, WPI convened a Mental Health and Well-Being Task Force to promote healthier habits, behaviors, and decisions across our community. Led by co-chairs Jean King, Peterson Family Dean of Arts & Sciences, and Matt Barry, assistant director of the Student Development & Counseling Center, the task force included more than 35 students, faculty, and staff. The group first sought campus-wide input to better understand the intersection of mental health and well-being amidst the rigors of higher education. The community's input was solicited through a major survey, town hall listening sessions, and other input sessions. The task force then shared high-level findings to the WPI community by way of three reports focused on students; faculty and staff; and underrepresented groups on campus. "The data pointed to common issues experienced by community members and identified ways we can take individual responsibility for our own self-care while building a more resilient community for all," said King. In early March the task force transitioned its work to the Mental Health Implementation Team, led by Senior Vice President of Student Affairs Philip Clay and Director of Emergency Management Ron Bashista, to ensure continued progress on the task force's recommendations.



## New Technology Detects Depression in Voice Recordings

A group of WPI researchers led by Elke Rundensteiner, William Smith Dean's Professor in Computer Science, developed a novel technology that screens voice recordings for signs that a speaker is depressed, an advance that could alert physicians and other clinicians to people in need of mental health support. The system, known as Audio-assisted Bidirectional Encoder Representations from Transformers (AudiBERT), leverages the words a speaker uses, as well as the speaker's tone, to indicate depressive symptoms. "If widely deployed, this tool could dramatically expand mental health screening at low costs," said Professor Rundensteiner.



William Smith Dean's Professor in Computer Science Elke Rundensteiner with fellow researchers Eral Toto, assistant director of academic research computing, and ML Tlachac, a PhD student in data science



Paula Fitzpatrick, inaugural director of the Center for Well-Being

## WPI Appoints Inaugural Director of New Center for Well-Being

As part of a holistic approach to wellness, WPI's new Center for Well-Being will apply evidence-based practices to promote well-being for students and the broader WPI campus community. In 2022, WPI named Paula Fitzpatrick, PhD, as the center's inaugural director. Fitzpatrick works closely with a team tasked by the university to implement recommendations developed by its Mental Health and Well-Being Task Force. She will also collaborate with key campus partners in counseling, health services, marketing communications, physical education/athletics, residential services, and dining services offices. She will also work closely with academic departments to develop opportunities for project-based learning experiences aimed at improving campus well-being.

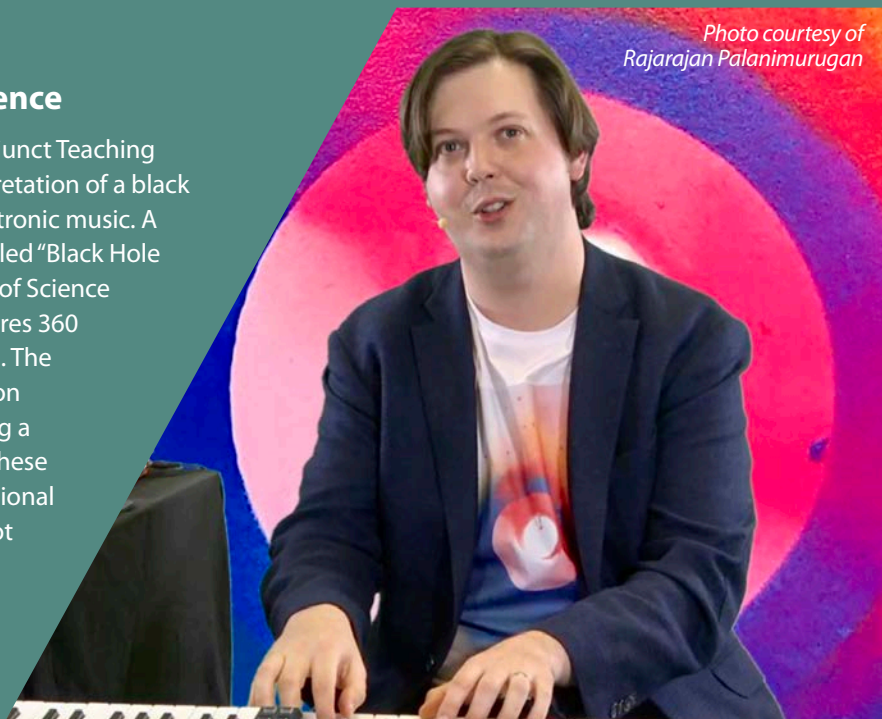
# IMAGINE

Creativity is equally important in the art studio and the science lab. It is only through imagination that we find our way through seemingly impenetrable barriers and to larger truths beyond. From the creation of a musical opus to visualizing a black hole, our students and faculty rely on creativity for breakthrough research and a living record of what it means to be human.

## **“Black Hole Symphony” Turns Astronomical Data Into Sonic Experience**

With a graph of astronomical data as his inspiration, WPI Adjunct Teaching Professor of Music David Ibbett created a symphonic interpretation of a black hole that combines live instrumentation with recorded electronic music. A chamber orchestra then performed Ibbett’s composition, titled “Black Hole Symphony,” in a series of concerts held at Boston’s Museum of Science Hayden Planetarium in the summer of 2022. The show features 360 degrees of stunning visuals to accompany the orchestration. The central sonification for the “Black Hole Symphony” is based on the electromagnetic spectrum of an active galaxy containing a supermassive black hole. Professor Ibbett then embedded these sonifications in a musical composition that delivers an emotional and intellectual impact to the audience. “This is art that is not only made in conjunction with science, but it also helps to communicate and share the joy of science,” he says. Ibbett brings this unique nexus of science and music to his students in a course he teaches at WPI.

*Photo courtesy of  
Rajarajan Palanimurugan*



*Photo courtesy of Rajarajan Palanimurugan*



## Conductor Abigail Koo Teaches Music as a Language of Hope

Five years before joining the WPI Orchestra as its Director of Orchestral Activities, Abigail Koo paused her auspicious musical career for a move to Cambodia, where she and her husband committed to five years of humanitarian work in service to those in need. During that time, her perspective on the function of music began to shift, from “art for art’s sake” to a means of healing those who have experienced trauma and loss. In Cambodia, she founded two music schools for disadvantaged children, and raised money for scholarships for young women in need. When she returned from Cambodia, Koo wanted a career opportunity in music that could functionally make a difference. Her search brought her to WPI’s project-based learning model and STEM-centered approach, which she saw as vehicles to help students connect music to the more concrete experiences in life. “At WPI, students are not just learning from their textbooks,” says Koo. “Their whole education is about going to places and making real-life changes.”



## The Maestro Takes a Bow

For more than 40 years, Doug Weeks brought world-class music—and music education—to the WPI campus. Following his retirement in 2021, WPI hosted a virtual celebration of his profound musical contribution as WPI’s administrator of music and associate head of the Department of Humanities & Arts.

During Weeks’s tenure, student involvement in musical activities grew from several dozen to nearly 500 students. He served as conductor of the WPI Concert Band, Orchestra, and Brass Ensemble—as well as a sought-after instructor and MQP advisor. In addition to a virtual celebration, WPI’s music ensembles honored Weeks in their final concert of the year, including the world premiere of an original composition commissioned in his honor.



# WPI'S GO(A)T TALENT!







## Spring 2022 Talent Show

Students, faculty, and staff set aside their books and spreadsheets to showcase their hidden and not-so-hidden talents for the first-ever WPI's Go(a)t Talent Show. The event was sponsored by the Humanities & Arts Department and the Office of Student Affairs.





# INNOVATE

In conceiving new pathways, innovators do not start from scratch. They build on previous knowledge, methodologies, and conventional wisdom to uncover a new way forward. Whether reinterpreting a canonical text or reimagining a long-held scientific belief, at the School of Arts & Sciences we believe that true innovation builds on past foundations, as well as knowledge held from disciplines seemingly disparate from our own.

## Reducing Bias in AI and Automated Rankings

AI-based algorithms that drive important decision making can carry or amplify the biases of their human creators in ranking candidates for jobs, scholarships, loans, or awards. But Elke Rundensteiner, William Smith Dean's Professor of Computer Science, and her colleagues are developing a way to address these biases with algorithms that help ensure fairness in rankings. With the help of Associate Professor Lane Harrison and PhD candidate Kathleen Cachel, Rundensteiner has developed a series of fairness metrics and novel algorithms to tackle the problem of "intersectional bias" that can occur in rankings when candidates possess more than one protected attribute, including race, gender, or age.



*Elke Rundensteiner*



*Lane Harrison*



*Kathleen Cachel*



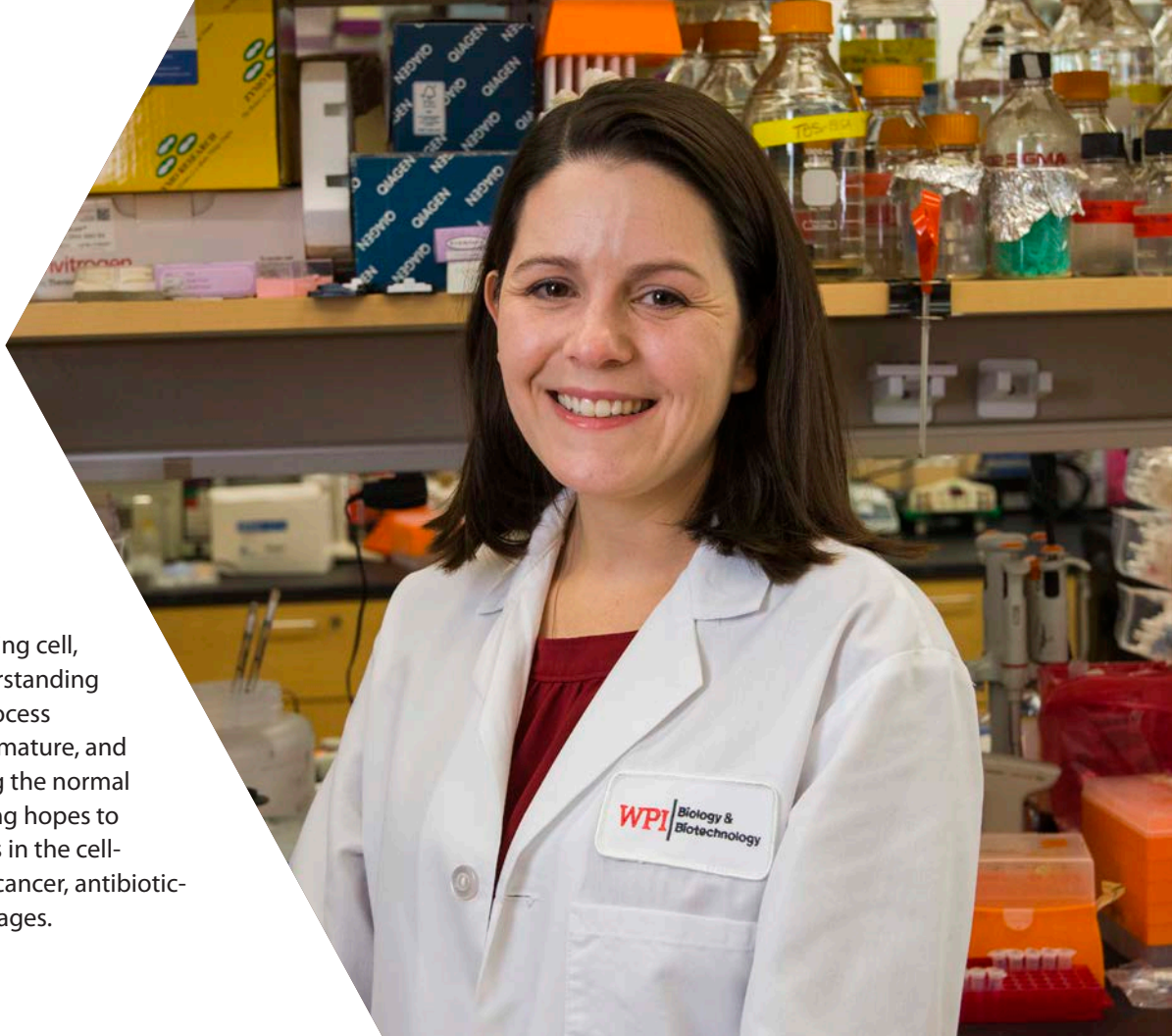
## Predicting Energy Needed for Muscle Movement

Sam Walcott, associate professor in the Department of Mathematical Sciences, received funding to develop a mathematical model that will predict the amount of chemical energy required to make muscles contract. Thanks in part to a \$1.4 million grant from the National Institutes of Health, Walcott's research could lead to improved medical treatments and the creation of better prosthetic devices.



## Understanding a Protein Essential to Normal Cell Division

The National Science Foundation awarded a \$1.1 million grant in support of Amity Manning's research of a protein critical in the process of cell division. Manning, associate professor in the Department of Biology & Biotechnology, will focus on histone modification in a dividing cell, ultimately with a view to understanding how a fundamental cellular process impacts how organisms grow, mature, and maintain life. By understanding the normal process of cell division, Manning hopes to better understand how defects in the cell-division process contribute to cancer, antibiotic-resistant bacteria, and miscarriages.



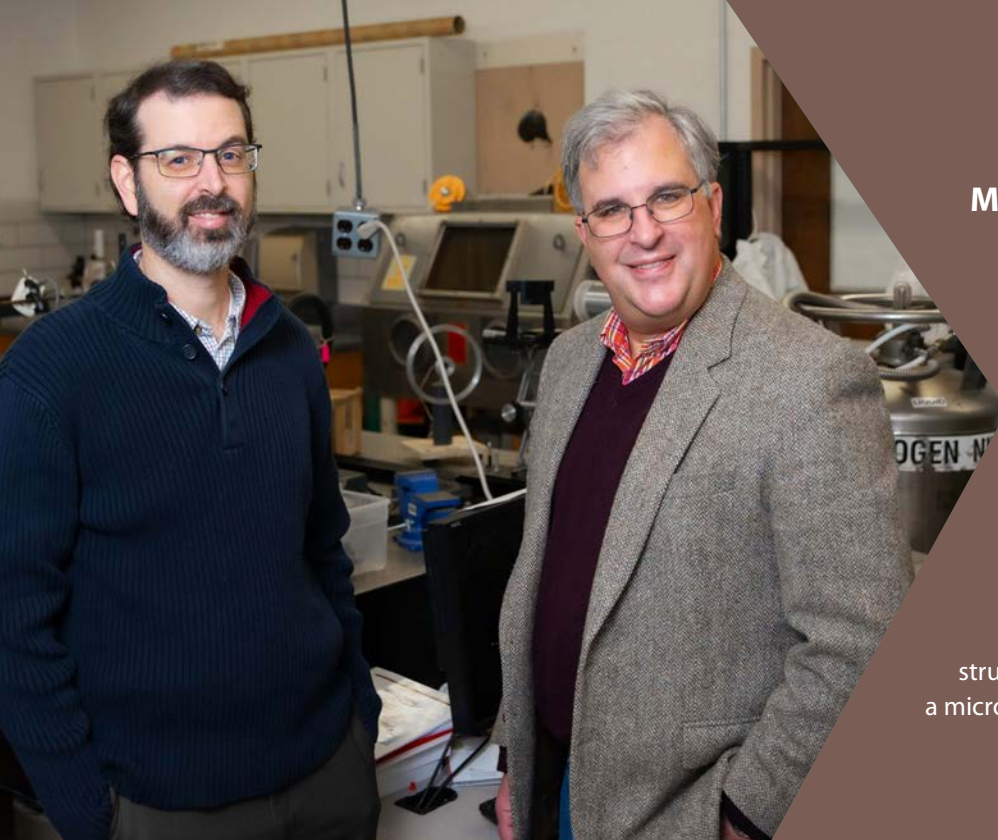
Professor of Chemistry & Biochemistry Suzanne Scarlata and Environmental and Architectural Engineering Associate Professor Nima Rahbar hold samples of enzymatic construction material.

## Creating a Negative-Emission Alternative to Concrete

Next to water, concrete is the most widely used substance on Earth—but due to its high carbon dioxide emissions, an alternative is needed to mitigate climate change. A team of WPI researchers may hold the key with the development of an entirely new construction material that is low-cost and sustainable.

The new material, known as an enzymatic construction material, is self-healing and uses an enzyme found in all living cells. This enzyme is known to remove greenhouse gas from the atmosphere and may replace concrete.





## Developing the Next Generation of Microreactors for University Research

The Nuclear Regulatory Commission has awarded David Medich, associate professor in the Department of Physics, and Derren Rosbach, associate teaching professor in the Department of Integrative & Global Studies, \$499,509 to design facilities able to house next-generation nuclear microreactors on university campuses. The emerging technology will allow for nuclear research and power generation at qualifying institutions. Medich and Rosbach will use computer simulations to determine the structure and shielding needed for safe operation of a microreactor—and will ultimately propose a pathway for federal licensing of university microreactors.

## WPI Invites Local Teachers for Hands-on STEM Research

In 2022, WPI invited teachers from Worcester-area high schools to participate in a summer lab program aimed at solving global problems through engineering. A \$599,980 grant from the National Science Foundation will fund the three-year STEM-based project, which will include both “pre-service” and “in-service” teachers from schools in Worcester and Leominster, Massachusetts. WPI students preparing to become teachers are paired with established teachers in researching solutions to sustainable development goals. Five in-service teachers and five WPI teacher-prep students per year will participate in the six-week sessions, for a total of 15 teachers and 15 students over three years. Erin Solovey, assistant professor in the Department of Computer Science serves as principal investigator (PI) on the project, with Katherine Chen, executive director of WPI’s STEM Education Center, as co-PI. “The ultimate goal of working with teachers and future teachers is to bring high-quality, purpose-driven STEM education to more students,” says Chen.



Erin Solovey



Katherine Chen



## Exploring Salmonella's Resistance to Host Defenses

Each year, Salmonella bacteria cause more than 1.35 million infections and 400 deaths throughout the United States. The metal micronutrient copper traditionally helps a host defend itself against bacteria; however, Salmonella avoids being overwhelmed by this defense. The question of *why* is central to José Argüello's research. Argüello, the Walter and Miriam Rutman Distinguished Professor in the Department of Chemistry & Biochemistry, recently received more than \$1.7 million in funding for his research from the National Institutes of Health. "Molecular networks in bacteria act like transportation systems that send cars over highways and trains over railroads," Argüello says. "In our case, we are interested in the networks that transport copper ... so that novel antibacterial treatments can be developed."



## Humanoid Robots Offer Better and Safer Care

Inspired by healthcare needs exposed by the COVID-19 pandemic, Assistant Professor of Robotics Engineering Jane Li joined with Yunus Telliell, assistant professor of anthropology & rhetoric, and Jeanine Skorinko, professor of social science & policy studies, in developing remote-controlled humanoid nursing robots able to help medical workers care for patients in quarantine or isolation. The team used social science research to develop a user-friendly robot able to perform nursing-related tasks in settings where a high risk of contagion or infection threatens the health of nurses. Early prototypes have featured immersive technologies such as haptic gloves and headsets, allowing nurses to see and feel what the robot experiences. This technology is also intended to help offset the current shortage of qualified nurses. The research team is further supported by faculty conducting social science research, who aim to understand how nurses may perceive the robots and better accept them as useful assistants.



from left: Jane Li, assistant professor of robotics engineering; Cagdas Onal, associate professor of robotics engineering; Yunus Telliell, assistant professor of anthropology & rhetoric; and Jeanine Skorinko, professor of social science & policy studies





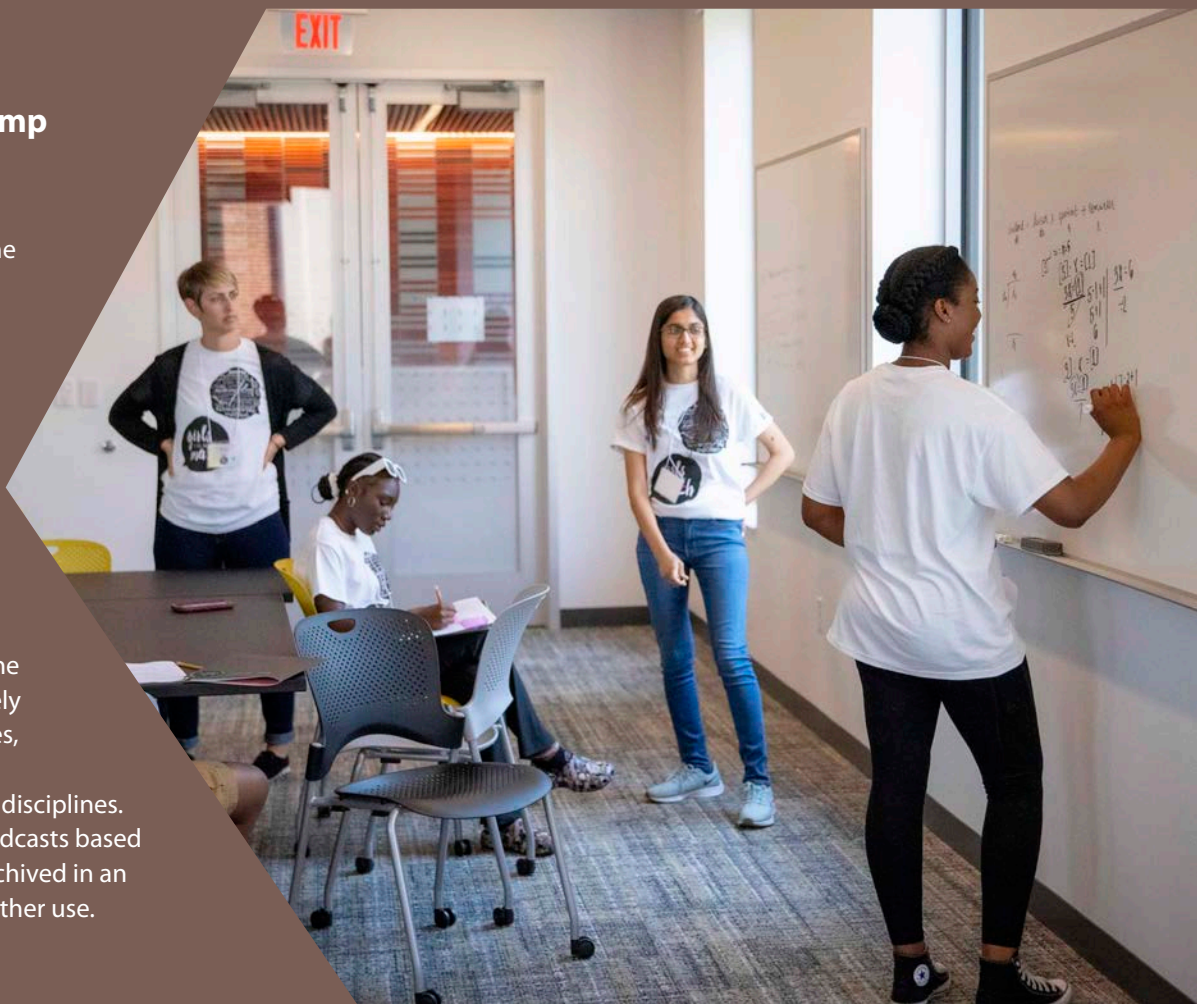
## WPI Team Takes on NASA Mining Challenge

For the first time since the pandemic began, a team of WPI students traveled to Florida to participate in NASA's Artemis Student Challenge. The challenge featured teams from 46 schools competing in a simulated lunar mining exercise using robots built from scratch. WPI's travel team included nine students—more than half of whom are women—who developed a robot named Comet as part of their Major Qualifying Project.

WPI's team, posing with Comet the robot, participated in NASA's Artemis Student Challenge. Ken Stafford, team advisor and retired WPI robotics professor, at left, accompanied the team to Florida.

## Girls Talk Math Day Camp Comes to WPI

Nineteen young women and nonbinary students came to the WPI campus last summer for a mathematics and media day camp, led by Francesca Bernardi, associate professor in the Department of Mathematical Sciences. The two-week camp, titled "Girls Talk Math," brought together aspiring mathematicians and media mavens to solve advanced problems in a group setting. The campers, who came from largely underrepresented communities, learned the critical role that mathematics plays in a host of disciplines. Campers created blogs and podcasts based on their work, which will be archived in an online media repository for further use.

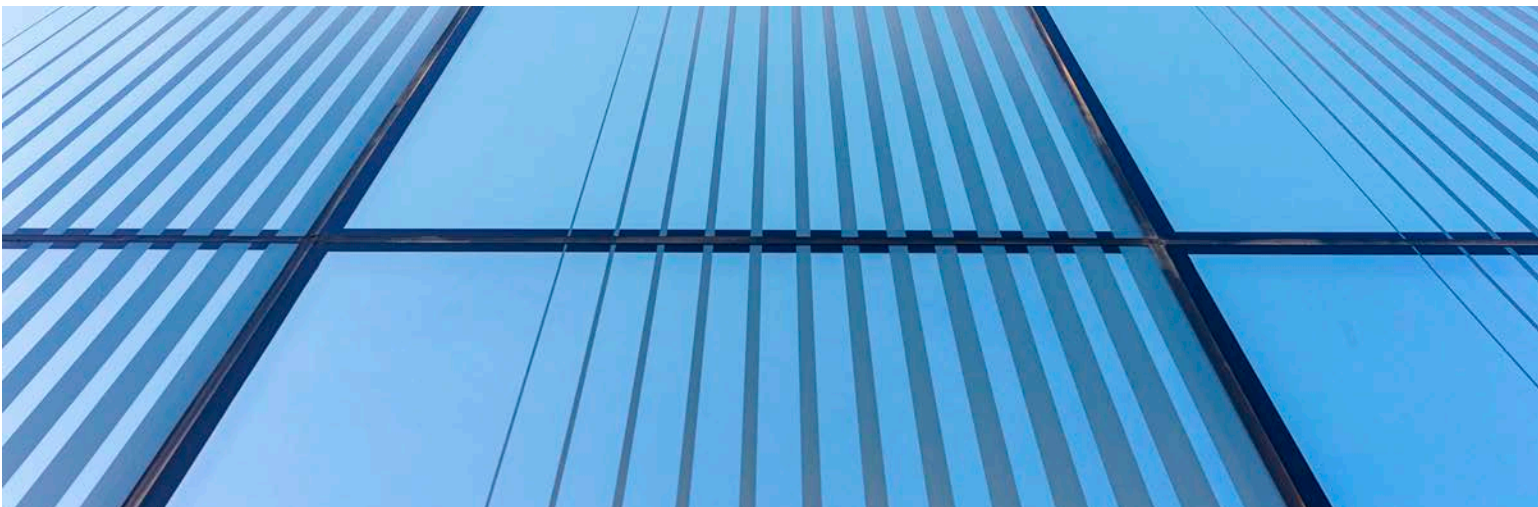




# THE POWER TO INNOVATE

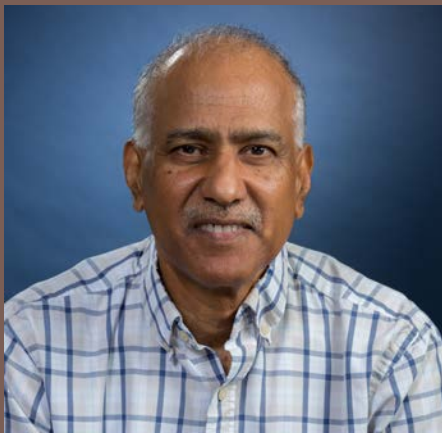
## Transdisciplinary Research Explores How Plant Cell Walls Grow

Min Wu, assistant professor of mathematical science, received a \$450,000 CAREER grant from the National Science Foundation to develop mathematical models describing how secretions and mechanical forces shape the growth of elongated plant cells. Her research could lead to insights about plants and fungi that impact agriculture and human health. Through her work, Wu will develop several mathematical models to describe cellular activity and forces related to growth. Due to the interdisciplinary nature of her work, Wu will work with Luis Vidali, associate professor in the Department of Biology & Biotechnology, to validate her models. She will also create an open-source teaching and learning platform that emphasizes the connections between mathematics and biology. "I want to teach students that the transdisciplinary way of thinking about the world is very natural," says Wu.





**Chris Larsen**, professor of mathematical sciences, received a **\$271,932 three-year grant from the National Science Foundation (NSF) Applied Mathematics Program** for his project, "Variational Fracture with Loads." Until recently, variational models for static and quasi-static fracture were viewed as incompatible with applied forces, or loads. The aim of Larsen's project is to improve on his recently introduced static formulation for variational fracture with boundary loads, and to extend mathematical results from static models to the quasi-static case.



**Balgobin Nandram**, professor of mathematical sciences, received a **\$224,822 grant from the National Agricultural Statistics Service (NASS, USDA)** for his research on "Bayesian Models for Cash Rents and Planted Acres of U.S. Counties." NASS informs many crop insurance and agricultural support programs administered by agencies such as the Farm Service Agency and the Risk Management Agency. Many farmers rent their lands to other farmers, and Nandram's work will assist NASS in anticipating what a fair annual price should be by practice (irrigated, non-irrigated, and pasture land) for nearly 3,000 counties with nearly two million operations. His research will also help estimate planted acres and harvested acres ahead of time.

**Guanying Peng**, assistant professor of mathematical sciences, received a **\$197,999 three-year grant from the National Science Foundation's Applied Mathematics Program** for his research on the topic "From Differential Inclusions to Variational Problems: Theory and Applications." Peng's research into systems in continuum mechanics and materials science will lead to novel mathematical methods with a class of partial differential equations—ultimately leading to a better understanding of the nature of their singularities.



**Vladimir Druskin**, research professor of mathematical sciences, received a **\$159,552 three-year grant from the NSF**. His project, "Collaborative Research: Multiscale Simulations and Imaging of Viscoelastic Media in Reduced Order Model Framework," builds on previous work in support of imaging for oil exploration and defense applications. Druskin and his team will now extend the approach previously developed in support of non-destructive testing and medical imaging. Druskin will serve as PI on the WPI portion of the award and will collaborate with co-researchers Elena Cherkaev of the University of Utah, and Murthy Guddati of North Carolina State University.



# OTHER MAJOR RESEARCH GRANTS

**Jose Argüello, Fernando Soncini.** National Institutes of Health/NIH/DHHS, “Molecular Determinants of Salmonella Cell-Envelope Homeostasis,” **\$2,270,357.**

**Robert Dempksi, Jose Argüello.** National Institutes of Health/NIH/DHHS, “The Role of ZIP12 in Zinc Homeostasis and Associated Neurodegenerative Pathologies,” **\$416,354.**

**Natalie Farny.** Environmental Protection Agency, “Relationship of Soil Microbial Diversity to Persistence and Stability of SynBio Microbes,” **\$449,213.**

**Natalie Farny.** National Institutes of Health/NIH/DHHS, “Identification of Genetic Suppressors of Stress Granules,” **\$147,257.**

**Neil Heffernan, Stacy Shaw.** National Science Foundation, “Collaborative Research: Common Error Diagnostics and Support in Short-answer Math Questions,” **\$239,307.**

**Jean King.** Luce (Henry) Foundation, Inc. “Clare Boothe Luce Program: CBL Graduate Fellowships in Computer Science and Physics,” **\$276,128.**

**Dmitry Korkin, Gloria Sheynkman.** National Institutes of Health/NIH/DHHS, “Predicting the Functional Impact of Alternative Splicing on Protein Interactions Using an Integrated Approach,” **\$1,291,970.**

**Amity Manning.** National Science Foundation, “CAREER: Characterization of Epigenetic Factors and Their Regulatory Roles in Modulating Mitotic Fidelity,” **\$1,112,526.**

**Xiaozhong Liu.** National Science Foundation, “SCISIPBIO: Constructing Heterogeneous Scholarly Graphs to Examine Social Capital During Mentored K Awardees Transition to Research Independence: Explicating a Matthew Mechanism,” **\$249,456.**

**Xiaozhong Liu.** National Science Foundation, “Collaborative Research: SaTC: CORE: Medium: Audacity of Exploration Toward Automated Discovery of Security Flaws in Networked Systems through Intelligent Documentation Analysis,” **\$349,276.**

**Adam Sales.** Institute of Education Sciences/Department of Education, “Direct Adjustment in Combination with Robust or Nonlinear Regression: Software and Methods for RDDs, RCTs and Matched Observational Studies,” **\$127,086.**

**Adam Sales, Neil Heffernan.** Institute of Education Sciences/Department of Education, “Improving the Power of Education Experiments with Auxiliary Data,” **\$231,188.**

**Erin Solovey, Katherine Chen, Kimberly LeChasseur, Donna Taylor, Shari Weaver.** National Science Foundation, “RET Site: Engineering for People and the Planet: Research Experiences for Teaching Integrated STEM,” **\$599,980.**

**Samuel Walcott.** National Institutes of Health/NIH/DHHS, “A Predictive Theory of Muscle Energy Consumption,” **\$1,096,336.**

**Robert J. Walls.** National Science Foundation, “Collaborative Research: SaTC: CORE: Medium: Compiler-Assisted Embedded Security,” **\$599,848.**

**Min Wu.** National Science Foundation, “CAREER: Probing Multiscale Growth Dynamics in Filamentous Cell Walls,” **\$450,000.**

**Zheyang Wu.** National Science Foundation, “New Techniques to Combine Measures of Statistical Significance from Heterogeneous Data Sources with Application to Analysis of Genomic Data,” **\$200,000.**



# INTEGRATE

Our world faces unprecedented challenges—and at the School of Arts & Sciences, we believe the way forward requires working together in a transdisciplinary approach that honors expertise, while breaking down the traditional boundaries between our disciplines. In this way, as an academic community, we uncover the hidden path to a better tomorrow.



## STEM and Social Sciences Merge in New Institute of Science and Technology for Development

WPI launched the Institute of Science and Technology for Development (InSTeD), a transdisciplinary hub where social scientists, natural scientists, and engineers work together to solve problems

through theory and real-world applications. Rob Krueger, professor of social science & policy studies, helped establish InSTeD with Interim WPI President Wole Soboyejo and Dean of the School of Arts & Sciences Jean King. “While interdisciplinary projects combine two or more academic disciplines into one activity, a transdisciplinary approach requires real appreciation of different ‘ways of knowing,’” explains Krueger. “Solving big problems in ways that respect social justice, sustainability, and humanity requires a more holistic approach.” As an example of InSTeD’s work, Krueger, along with his team and community members in the Dwenase region of Ghana, co-created micro-flush composting toilets, helping to solve the issue of a lack of access to working toilets. The technology is now being used in Ethiopia. Beyond Africa, InSTeD’s work will focus on the Global South, including Latin America. The goal of this hub reflects the mission of The Global School, founded at WPI in 2020. Its collaborative approach spans all four schools at WPI—the School of Arts & Sciences, the School of Engineering, The Business School, and The Global School—and seeks to engage faculty and students from the entire university.





## WPI and UMass Lowell Boost Interdisciplinary Research with Seed Grants

WPI and the University of Massachusetts Lowell joined forces in awarding nearly \$100,000 in seed grants to five teams of researchers from both campuses for interdisciplinary research projects focused on health and the life sciences.

Projects receiving seed grants:

- Evaluation of novel compounds against bacterial pathogens
- Development of a wheelchair-training simulator for diverse bodies
- Interdisciplinary understanding of muscle across scales for injury recovery
- Development of stable producer cell-line for recombinant adeno-associated virus vector production
- Exploration of plasmon-enhanced organic photoredox catalysis for biomanufacturing synthesis



## Barfuor Adjei-Barwuah Named First Distinguished Statesman in Residence

WPI named His Excellency Barfuor Adjei-Barwuah, formerly Ghana's ambassador to the United States, as the university's inaugural Distinguished Statesman in Residence. In this post, Adjei-Barwuah will engage with students and faculty through the Department of Social Science & Policy Studies in the School of Arts & Sciences and will interact with both the Institute of Science & Technology for Development (InSTeD) and the Provost's Office. He will also partner with University Advancement to enhance and develop the provost's Global Initiatives in Sub-Saharan Africa, particularly in Ghana.



# CELEBRATING WHERE THE ARTS & SCIENCES MEET



Jean King, Peterson Family Dean of the School of Arts & Sciences, led a discussion on the theme “Lighting the Way to a Better Normal: The State of Arts & Sciences.” Following Dean King’s presentation, new faculty were introduced, as well as the Arts & Sciences Student Advisory Council. The program concluded with a performance by the Medwin String Quartet, directed by Abigail Koo.







Faculty, staff, and students stopped by Salisbury Labs for the A&S CommUNITY Breakfast, where they enjoyed a cup of joe and the soothing sounds of the Medwin String Quartet, directed by Abigail Koo.



WPI students flocked to the Quad for complimentary (and delicious) snacks and meals, provided by a fleet of local food trucks during spring '22 Arts & Sciences Week.

## WPI Holds Arts & Sciences Week / Fall '21, Spring '22

Each year, WPI's School of Arts & Sciences explores the nexus between two critical academic pathways in a showcase of talents, ideas, and meaningful discourse. Our twice annual Arts & Sciences Week is a celebration of the interconnections between the arts and sciences, engineering, business, and global engagement at WPI. This year's program illustrated how diverse perspectives and skills are critical in improving the human condition.



WPI's student musical theatre company, VOX, performed "Dogfight," a musical interpretation of the 1991 coming-of-age drama. The fall '21 production explored themes of war, gender, and PTSD as part of Arts & Sciences Week's series of creative performances.



*“What I love about the Critical Conversations series is its interdisciplinarity. We bring together panelists and guests with varied perspectives—and together we expand the conversations around some of the most pressing issues of our time.”*

Jean King, Peterson Family Dean of the School of Arts & Sciences

#57

Most Innovative Schools.  
U.S. News & World Report (2022)



Meredith Broussard (she/her)

Assistant Professor of Humanities & Arts Yunus Telli, introduces keynote speaker Meredith Broussard as part of this year's Social Justice Summit. Broussard presented on the theme "Public Interest Technology, Artificial Intelligence, and Social Justice," exploring the unintended consequences and social justice implications of an increasingly digital world.



## Assessment, Equity, and Student Well-Being

Neuroscientist Mays Imad and Joe Bandy, assistant director of the Center for Teaching at Vanderbilt University, led a timely conversation on how rethinking our approaches to assessment could positively impact student health—as well as boost inclusion in the classroom.



# CRITICAL CONVERSATIONS



Moderated by School of Arts & Sciences Dean Jean King and Joseph Aguilar, assistant teaching professor of humanities & arts, this panel discussion featured Stacy Shaw, assistant professor of social science and learning sciences & technologies; Carissa Olsen, assistant professor of chemistry & biochemistry; and Joshua Rosenstock, professor of arts, communication, and humanities.



## Lighting the Spark through Science and Creativity

WPI held the latest in its Critical Conversations series during Arts & Sciences Week with the theme “Lighting the Spark—Science and Creativity.” This panel discussion examined the relationship between two seemingly contrasting disciplines, exploring how the arts and sciences work in tandem, and why failure is essential in both the science lab and art studio. The discussion was moderated by School of Arts & Sciences Dean Jean King and Joseph Aguilar, assistant teaching professor of humanities & arts. The panel included Carissa Olsen, assistant professor of chemistry & biochemistry; Stacy Shaw, assistant professor of social science & learning sciences & technologies; and Joshua Rosenstock, professor of arts, communication, and humanities. The panel explored such issues as “Are scientists creative?” and “Can you truly integrate the arts and sciences?”



# IMPACT

Imagination leads to innovation. Theory is where great ideas are born. But it is only when we bring theory to practice—at the lab bench, in the field, and into communities around the globe—that we are able to have real impact. Our students and faculty always have an eye on positively changing the lives of people as they theorize, research, and innovate. Through thoughtful implementation, our ideas blossom into meaningful change.

## Building Bridges with Worcester's Latino Community

Thanks to the combined efforts of Worcester Community Project Center (WCPC) Director Laura Roberts and Associate Professor of Humanities & Arts Aarti Smith Madan, WPI students have the opportunity for a global experience without leaving Worcester County. After earning a grant in 2020 to build out an undergraduate student curriculum, the Latin American & Caribbean Studies group on campus, of which Madan is part, sought to pave inroads to Worcester's Latino community. Through the WCPC and its network, students were connected with local opportunities to meet academic project requirements, namely the Interactive Qualifying Project, while connecting with global stakeholders. Last year, students implemented two projects with a focus on assisting local Latino-serving organizations: the Latino Education Institute on Chandler Street and El Buen Samaritano (EBS), a nonprofit food pantry on Piedmont Street. In the case of EBS, students helped in designing a digital system to improve their inventory system with the goal of reducing redundancy and expanding their services. "We were able to help make their food distribution more efficient," says team member Caleb Talley '23. "I'm a native of Worcester, and this was a great opportunity for me to improve the community and help those who are in need."





## Overcoming the “Hubris Problem” in Foreign Development

After decades of work in global, community-based projects, Rob Krueger, professor and department head of social science & policy studies, knows the pitfalls in assuming that one size fits all communities. In a recent article in WAMC’s *The Academic Minute*, he advocated for an approach to engineering development projects that “celebrate different forms of knowledge [and] see concepts of science, technology, and innovation as different ‘traditions of inquiry.’” Citing the hubris of many global projects in the 1950s that aimed to impose western technologies on “third-world” countries without regard for culture or context, Krueger noted the more nuanced approach of WPI’s new Institute of Science and Technology for Development (InSTeD). “WPI has created a space for transdisciplinary scholarship and action,” wrote Krueger. “With our partners, we are reframing the concepts of ‘smart villages,’ e-waste, and, indeed, innovation, so that they serve the tripartite goals of self-sufficiency, self-determination, and sustainability.”



## Math Classroom Intervention Through AI

Erin Ottmar, an associate professor in the Department of Social Science & Policy Studies, received a \$700,000 grant from the National Science Foundation (NSF) to develop technology that will help middle school teachers better understand when and how students are succeeding or struggling while learning algebra. Ottmar, a former public school teacher, will create real-time artificial intelligence tools for digital mathematics platforms so that teachers can better detect, assess, and predict the math strategies and knowledge of their students. Ottmar’s five-year project is funded by a prestigious CAREER grant that supports researchers during the early stages of their academic careers.





*“ I firmly believe that WPI students can have a global experience without ever stepping on a plane. ”*

Aarti Smith Madan, associate professor of Spanish and international studies



## Grant Funding Targets Sustainable Sanitation in Ethiopia

According to UNICEF, more than 70% of the population in Eastern and Southern Africa have little to no access to soap and water for hand washing, or facilities for the safe disposal of human waste. To help address this challenge, WPI students, researchers, and their partners are working to bring more adequate and dignified sanitation to Ethiopia at a reasonable cost. Through a five-year, \$900,000 grant awarded by the United States Agency for International Development and by Catholic Relief Services, work is now underway to implement WPI MicroFlush toilets—sustainable compost toilets that use hand washing water to flush. The WPI MicroFlush toilets use a “pour flush” model in which water from the attached sink flushes the toilet when a user washes their hands—saving water while keeping the toilets off the grid, hygienic, and odor-free. This project is part of the Stephen J. Mecca Lab for Sustainable Development, part of WPI’s new Institute of Science and Technology for Development (InSTeD).



## Director of WPI's East Asia Hub Weighs in on Taiwan Trip

As a political historian and expert on China, Professor Jennifer Rudolph brought a nuanced perspective to House Speaker Nancy Pelosi's trip to Taiwan in the summer of 2022. The issue of Taiwanese sovereignty has led to international friction with the Chinese government. In a recent article published in *The Irish Times*, Rudolph responded to the argument that then-House Speaker Newt Gingrich had made a similar trip in 1997 with only a tame rebuke from China. "When Gingrich went to Taiwan, China was angry, too," Rudolph is quoted as saying. "We weren't at the point where we are now with China actively challenging the U.S. role in the world on multiple fronts [and] engagement is seen as dead in the water. ... That is what makes the moment so fraught." In addition to her role as director of WPI's East Asia Hub, Rudolph co-directs WPI's Hangzhou and Taiwan Project Centers, and advises students pursuing Chinese studies.



## "Carbon Neutral" More Than Just a Label

A recent *Washington Post* article explored the emerging trend of "green" hotels, many of which refer to themselves as "carbon neutral" or "energy positive." However, the *Post* cites Rob Krueger, head of WPI's Department of Social Science & Policy Studies, as wary of such terminology. "Once you put the label of green or sustainable on something, many people tend to stop asking questions," he says, as quoted in the *Post*. "The architects and engineers work to create a building on paper that works a certain way. But when you put people into that building, it changes the way it functions."



# MAKING A LOCAL AND GLOBAL IMPACT THROUGH IQP

Students in the 2020-21 academic year faced more than academic challenges as they pursued their Interactive Qualifying Project (IQP); due to pandemic restrictions, they also had to find a way to work with partners and sponsors around the world without being able to physically travel to far-flung locales. As a result, many of this year's IQPs were largely hybrid, including a mix of in-person and virtual activities that saw students and advisors adjusting their travel plans and project work.

The President's IQP Awards event followed that same mode, as faculty advisors, parents, and peers gathered in the Odeum—as well as via Zoom and YouTube—to watch the IQP teams present their work to a panel of judges. Of the hundreds of teams completing IQPs, the judges selected the following five projects as this year's finalists.



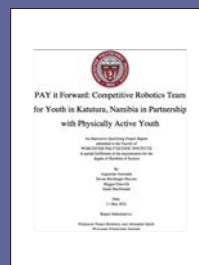
## Therapeutic Gardening: Advancing a Healing Garden Program and Partnership

### Team:

Matthew Adams, Christopher Davenport, Mairead O'Neill, Ciara Young

### Advisors:

Scott Jiusto, professor emeritus of integrative and global studies; Gbetonmasse Somasse, associate professor of teaching in social science & policy studies



## Launching a Competitive Robotics Team for Physically Active Youth

### Team:

Augustine Asumadu, Devan Blechinger-Slocum, Margaret Gunville, Sarah MacDonald

### Advisors:

Alexander Smith, associate professor of social science & policy studies  
Nancy Burnham, professor of physics



## Akyem Dwenase Sanitation

### Team:

Elaine Chen, Ruchita Choksey, Danielle Upton, Casey Willis

### Advisors:

Rob Krueger, professor of social science & policy studies



## The Role of Wetlands in the Ruamahanga Catchment

### Team:

Caroline Dalton, Daniel Dietrich, Ming Lian, Brooklyn Paris

### Advisors:

Fred Looft, adjunct teaching professor of integrative & global studies;  
Ingrid Shockey, associate teaching professor of integrative & global studies



## Mobile Farm Stand: A Vehicle for Education

### Team:

Minh Anh Kieu, Noah Brennick, Sophia Cheng, Darius Luo

### Advisors:

Derren Rosbach, associate teaching professor of integrative & global studies





## Advancing Resiliency Projects in Puerto Rico

Due to pandemic travel restrictions, Professor Emeritus Scott Jiusto and Associate Professor of Teaching Gbetonmasse Somasse began looking for an alternative travel experience for IQP teams scheduled to head to the Cape Town, South Africa, Project Center they co-direct. They were especially intrigued by the Puerto Rico Project Center (PRPC), a well-established center that has hosted groups of WPI students for more than 30 years. Jiusto then approached Assistant Teaching Professor John-Michael Davis, who, in his first year as the PRPC director, jumped at the chance to collaborate. Jiusto and Davis soon became PRPC co-directors, and began meeting with local nonprofit groups to identify new projects ideal for students in need of a new locale for their IQP research. As a result, two student teams began working with local leaders in turning an abandoned school into a comprehensive community center where residents can access health care, education and job training, computer services, and clean water, especially in emergencies. One team focused on ways to harvest clean, potable water and generate off-grid power in the case of emergencies. A second team built a website for the center that includes videos, a 360-degree tour, and computer-aided design models to promote the center and aid in fundraising.



# FACULTY HONORS



## Jurist Dean's Professors Turn Generous Gift Into World-Changing Research

Hal Jurist and his wife, Heather Jurist, wished to make an impact on some of the world's greatest problems: from climate change to world poverty, energy solutions to healthcare access. Faced with multiple means of affecting change, the Jurists decided that the key to a better future is best found through university research. To that end, the couple made a significant contribution to Beyond These Towers: The Campaign for WPI. Their gift advances faculty research by establishing an endowed deanship through a bequest, as well as by funding the Harold L. Jurist '61 and Heather E. Jurist Dean's Professors. Distinguished faculty who are named the Jurist Dean's Professors are pursuing cutting-edge research in one of WPI's multidisciplinary concentrations: robotics, decision-making/autonomous robots, cyber security systems, biomedical devices/image analysis, climate change, sustainable fuels/energy, environmental science/adaptation, and other disciplines closely aligned with these research areas.

"This generous gift from Hal and Heather Jurist recognizes the School of Arts & Sciences' leading researchers in artificial intelligence, machine learning, and biomedical data analytics," says Jean King, Peterson Family Dean of Arts & Sciences. The first Jurist Dean's Professors were announced this fall: Emmanuel Agu, computer science professor; Danielle Cote, mechanical engineering assistant professor; Dmitry Korkin, computer science professor; Pratap Rao, mechanical engineering associate professor; and Carolina Ruiz, computer science professor and associate dean of arts & sciences.



From left, Jurist Deans' Professors Dmitry Korkin, professor of computer science; Danielle Cote, assistant professor of mechanical & materials engineering; Emmanuel Agu, professor of computer science; Carolina Ruiz, professor of computer science and associate dean of arts & sciences; and Pratap Rao, associate professor of mechanical & materials engineering



# AND AWARDS

The following faculty from the School of Arts & Sciences were recognized at this year's *Annual Faculty Awards* for remarkable contributions to WPI, its students, and its community.



## Trustees' Award for Outstanding Teaching

George Heineman, associate professor in the Department of Computer Science, received this award in recognition of excellence in teaching, coupled with outstanding professional contributions.



## Trustees' Award for Outstanding Research and Creative Scholarship

, professor in the Department of Computer Science, was recognized for outstanding teaching, research, creative scholarship, academic advising, and service to the community.

## Biology Professor Elected Lifetime Fellow of World's Largest Scientific Society

Reeta Rao, professor and interim head of the Department of Biology & Biotechnology, has been elected a lifetime fellow of the American Association for the Advancement of Science (AAAS). The AAAS, the world's largest scientific society, cited Rao for her contributions in the fields of fungal infectious disease, host-pathogen interactions, and undergraduate and graduate education. She joins 564 scientists, engineers, and innovators from 24 disciplines who were recognized as this year's class of fellows. "This honor [...] is a testament to the institutional environment that supports, sustains, inspires, and celebrates science and technology," says Rao.





# OTHER NOTABLE



**Emmanuel Agu**, professor of computer science, and Atifa Sarwar, PhD student in computer science, received the best student paper award at the IEEE International Conference on Digital Health 2021.

**Daniel DiMassa**, assistant professor of humanities & arts, published *Dante in Deutschland: An Itinerary of Romantic Myth (New Studies in the Age of Goethe)* with Bucknell University Press in 2022.



**Holger Droessler**, assistant professor of humanities & arts, published *Coconut Colonialism Workers and the Globalization of Samoa* with Harvard University Press in 2022.

**Joseph Fehribach**, professor of mathematical science, authored the new textbook *Multivariable and Vector Calculus*.



**John Galante**, associate teaching professor of humanities & arts, published *On the Other Shore: The Atlantic Words of Italians During the Great War* with Nebraska Press in 2022.

**Roger S. Gottlieb**, William B. Smith Professor of Philosophy, received a Nautilus Book Award for Fiction for his novel, *The Sacrifice Zone*.



**Tian Guo**, assistant professor of computer science, received the 2022 Outstanding Achievement by a Young Alum Award from the Manning College of Information and Computer Sciences, UMass Amherst, for outstanding achievement in deep-learning research.

**Dmitry Korkin**, Harold L. Jurist '61 and Heather E. Jurist Dean's Professor of Computer Science, published a short article in *Nature Methods* on computational protein modeling and the next viral pandemic.



**Kate McIntyre**, assistant professor of humanities & arts, published *Mad Prairie: Stories and a Novella* with University of Georgia Press in 2021.



# ACHIEVEMENTS



**Dave Medich**, associate professor of physics, was elected a fellow by the Health Physics Society. This award is given to members of the society in recognition of their significant administrative, educational, and/or scientific contributions to the profession of health physics.

**Balgobin Nandram**, professor of mathematical sciences, received two awards for excellence from the National Agricultural Statistics Service (NASS), part of the United States Department of Agriculture (USDA), including a team award for the Cash Rents Team.



**Barry Posterro**, associate teaching professor of mathematical sciences, has achieved the designation of Associate of the Casualty Actuarial Society (ACAS), a professional society of actuaries specializing in the insurance of cars, homes, etc., as well as workers' compensation and professional liability policies.

**Daniel Reichman**, assistant professor of computer science, published an article in the journal *Science* on "Using Large-Scale Experiments and Machine Learning to Discover Theories of Human Decision-Making."



**Elke Rundensteiner**, William Smith Dean's Professor of Computer Science; **Ermal Toto**, assistant director of academic research computing; and **ML Tlachac**, PhD student in data science, received recognition for the best applied paper at 2021 ACM International Conference with their work "Information and Knowledge Management."

**Erin Solovey**, associate professor of computer science, published an 80-page monograph on "Improving HCI with Brain Input: Review, Trends, and Outlook" in *Foundations and Trends*.



**Stephan Sturm**, associate professor of mathematical sciences, won a Society for Industrial and Applied Mathematics (SIAM) award to co-organize a Gene Golub Summer School on "Financial Analytics: Networks, Learning, and High-Performance Computing" in Gran Sasso, Italy.

**Sam Walcott**, associate professor of mathematical sciences, has been awarded a new WPI and UMass Lowell Seed Grant for Interdisciplinary Research for the research project "Interdisciplinary Understanding of Muscle Across Scales: Recovery After Injury."



**Vadim Yakovlev**, associate research professor, co-chaired a special workshop on the theme "High-Power Microwave Industrial Applications" for the European Microwave Week 2020 (held in 2021). This large event combines three major conferences of the microwave world-wide community.

# STUDENT ACHIEVEMENTS

## Summer Training in Arts & Sciences Research (STAR)

STAR fellowships are made possible through the generosity of WPI's Arts & Sciences Advisory Board and allow our A&S undergraduate students to conduct summer research projects with a faculty advisor.



**Lauren Abraham '24**  
biology & biotechnology

**Advisor:**

Natalie Farny, assistant professor of biology



**Abigail Boaf '24**  
science, technology & policy; and computer science

**Advisor:**

Crystal Brown, assistant professor of social science & policy studies



**Thomas Kneeland '24**  
computer science and humanities with focus in music

**Advisor:**

Ben Young, jazz history database director



**Daniel Larrabee '23**  
bioinformatics & computational biology

**Advisor:**

Scarlet Shell, associate professor of biology & biotechnology



**Cole Parks '24**  
robotics engineering and computer science

**Advisor:**

Carlo Pincioli, assistant professor of robotics engineering



**Rachel Swanson '23**  
chemistry and chemical engineering

**Advisor:**

Patricia Musacchio, assistant professor of chemistry & biochemistry



**Camille Williams '25**  
mathematical sciences and physics

**Advisor:**

Vadim Yakovlev, associate research professor of mathematical sciences





# AND CONTRIBUTIONS

## DraftKings Undergraduate Fellowship for Summer Research

The DraftKings Fellowship is made possible by a generous gift from the DraftKings corporation to support work that elevates the impact of advanced research in information science and technology; each student also works with a faculty advisor.



**Sydney Gardner '23**

interactive media & game development

**Advisor:**

Farley Chery, associate professor of teaching of interactive media & game development



**Allison Rozear '24**

human & machine communications

**Advisor:**

Yunus Telliel, assistant professor of anthropology & rhetoric

## WPI Presidential Fellowship

The WPI Presidential Fellowship launches the PhD career of highly talented WPI students. This year's recipient, **Darren Cole**, seeks to blend emerging technologies with contemporary art practices through the form of site-specific research. Darren is honored to join the Interactive Media & Game Development program as a WPI Presidential Fellow and PhD candidate.



## WPI Welcomes Its First Two Neuroscience Graduates

**Katy Nippert** defended the first Computational Neuroscience Master of Science in WPI's history. Her thesis, funded in part by the National Institutes of Health, quantified changes in mRNA levels of neuronal zinc homeostatic genes. Results from her study can be used to understand how alterations in expression levels of these targeted genes and subsequently related proteins result in neuronal diseases such as schizophrenia. She is now a PhD student in the Neuroscience and Behavior Graduate Program at UMass Amherst.

**Advisor:** Adam Lammert, assistant professor of biomedical engineering

**Benjamin Roop's** thesis focused on using artificial intelligence and advanced signal processing techniques to improve the accuracy and efficiency of reverse correlation—a method widely used in neuroscience, cognitive science, and psychology to uncover hidden perceptual representations (e.g., letters, faces, phonemes). His work is expected to broaden the scope of possible studies into human perception. He now serves as associate staff at MIT Lincoln Laboratory.

**Advisor:** Adam Lammert, assistant professor of biomedical engineering

# ARTS & SCIENCES STUDENT ADVISORY COUNCILS

The A&S student advisory councils advise the dean on initiatives that have a direct impact on students, including those that increase the visibility of the arts and sciences at WPI.

## 2022-23 A&S UNDERGRADUATE ADVISORY COUNCIL



**Isaac Benjamin '24**  
physics



**Robbie Oleynick '24**  
humanities & arts



**Gabriella Guzman Jerry '24**  
bioinformatics & computational biology



**Mira Plante '24**  
computer science



**Jada Hinds-Williams '23**  
social science & policy studies



**Schuyler Rae Pritchard '24**  
interactive media & game development



**Aruzhan Koshkarova '23**  
data science



**Catherine Reynolds '23**  
chemistry & biochemistry



**Alana Lue Chee Lip '24**  
biology and biotechnology



**Maceo Richards '23**  
data science



**Camille McDonnel '23**  
physics



**Natalie Tierney '24**  
mathematical sciences



# 2022-23 A&S GRADUATE ADVISORY COUNCIL



**Jezabel Aleyda Aponte Figueroa**  
social sciences & policy studies



**Trusting Inekwe**  
computer science



**Jacob Bouchard**  
physics



**Ashley Lockwood**  
mathematical sciences



**Darren Cole**  
interactive media & game development



**Gabrielle Plainte**  
neuroscience



**Geri Dimas**  
data science



**Madison Rennie**  
chemistry & biochemistry



**Sabine Hahn**  
biology & biotechnology



**Sarah Weintraub**  
bioinformatics & computational biology



The 2021-22 Graduate Student Council

# WHO WE ARE

## DEAN'S OFFICE



**Jean King**

PETERSON FAMILY DEAN OF ARTS & SCIENCES



**Carolina Ruiz**

ASSOCIATE DEAN OF ARTS & SCIENCES



**Rebecca Ouellette**

DIRECTOR OF OPERATIONS



**Carrie West**

SENIOR EXECUTIVE ADMINISTRATOR



**Alicia Briggs**

ADMINISTRATIVE ASSISTANT

# 100%

of undergraduates complete the equivalent of a minor in Humanities & Arts



# DEPARTMENT HEADS



**Rob Krueger**  
SOCIAL SCIENCE  
& POLICY STUDIES



**Anita Mattson**  
CHEMISTRY &  
BIOCHEMISTRY



**Kathryn Moncrief**  
HUMANITIES  
& ARTS



**Sarah Olson**  
MATHEMATICAL  
SCIENCES



**Douglas Petkie**  
PHYSICS



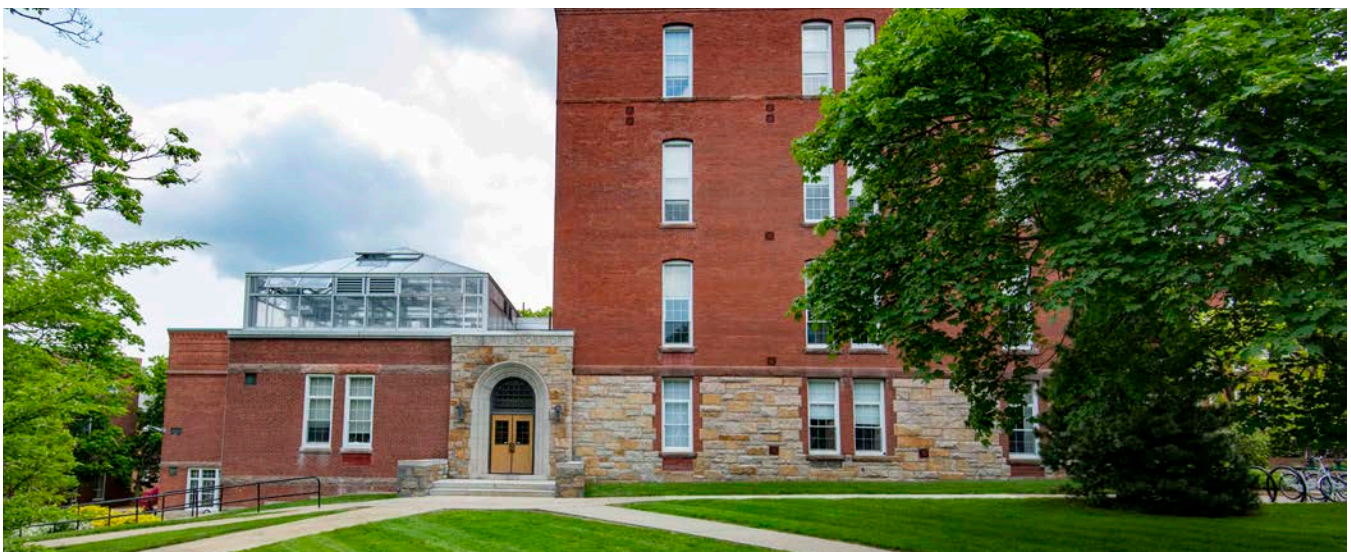
**Reeta Rao**  
BIOLOGY &  
BIOTECHNOLOGY



**Craig Shue**  
COMPUTER  
SCIENCE



**Jing Xiao**  
ROBOTICS  
ENGINEERING





# PROGRAM DIRECTORS



**Peter Hansen**

INTERNATIONAL &  
GLOBAL STUDIES



**Neil Heffernan**

LEARNING SCIENCES  
& TECHNOLOGIES



**Kevin Lewis**

PROFESSIONAL  
WRITING



**Ryan Madan**

WRITING  
CENTER



**Michael Radzicki**

SYSTEM  
DYNAMICS



**Elke Rundensteiner**

DATA  
SCIENCE



**Elizabeth Ryder**

BIOINFORMATICS &  
COMPUTATIONAL BIOLOGY



**Jeanine Skorinko**

PSYCHOLOGICAL &  
COGNITIVE SCIENCE



**Gillian Smith**

INTERACTIVE MEDIA &  
GAME DEVELOPMENT



**Jagan Srinivasan**

NEUROSCIENCE





# A&S WELCOMES NEW LEADERS



**Craig Shue**, associate professor in the Department of Computer Science, has been appointed head of WPI's Department of Computer Science. His research in enterprise and residential network security has resulted in a range of government and private-sector funding, including a 2017 NSF CAREER Award. He directs WPI's Scholarship for Service Program, which funds cyber security students, and directs WPI's Cyber Security Program.

**Kevin Lewis**, professor of practice in the Department of Humanities & Arts, was appointed director of the Professional Writing Program. In addition to being a veteran technical writer from the software industry, he has recently earned his MFA in screenwriting, adding creative writing to his writing and teaching interests.



**Elizabeth Ryder**, professor of biology & biotechnology, was appointed interim director of the Bioinformatics & Computational Biology (BCB) Program. Her research interests include agent-based modeling of biological systems, as well as educational research developing high school curriculum integrating biology and computer science.

# 2022-23 NEW FULL-TIME FACULTY

**Matthew Ahrens**  
ASSISTANT TEACHING PROFESSOR

**Areas of interest:**  
computer science education  
and program design; designing  
teaching interventions and  
domain-specific languages as a  
user interface for computa-  
tional models, application domains,  
and content areas



**Nicole Buczkowski**  
POSTDOCTORAL SCHOLAR  
MATHEMATICAL SCIENCES

**Areas of interest:**  
nonlocal models and  
fracture mechanics



**Ernesto Caceres-Valenzuela**  
POSTDOCTORAL SCHOLAR  
MATHEMATICAL SCIENCES

**Areas of interest:**  
construction and analysis of  
numerical methods to model the  
behavior of some variables of interest  
arising from Partial Differential  
Equations that represent physics  
phenomena



**Christopher Collins**

ASSOCIATE TEACHING PROFESSOR  
BIOLOGY & BIOTECHNOLOGY

**Areas of interest:**  
tick-borne diseases and disease  
ecology; effects of human activity  
on the ecology and life cycles of  
disease hosts such as mice, ticks,  
and mosquitoes



**Tharindu DeAlwis**

POSTDOCTORAL SCHOLAR  
MATHEMATICAL SCIENCES

**Areas of interest:**  
time series analysis, developing  
algorithms based on sufficient  
dimension reduction  
techniques, envelope methods,  
deep learning, and machine  
learning methods



**Laura Eckelman**  
ASSOCIATE PROFESSOR  
HUMANITIES & ARTS

**Areas of interest:**  
theatrical lighting design, stage  
management, production  
management, arts administration



**Kara Fontenot**

ASSISTANT TEACHING PROFESSOR  
HUMANITIES & ARTS

**Areas of interest:**  
composition, literature and the  
humanities, technical writing,  
African American and Ethnic  
American literature, folklore,  
world culture, and ethics





**Abby Pecoske-Fulton**

POSTDOCTORAL SCHOLAR  
MATHEMATICAL SCIENCES

**Areas of interest:**  
mathematical biology,  
dynamical systems, and  
computational mathematics

**Binan Gu**

POSTDOCTORAL SCHOLAR  
MATHEMATICAL SCIENCES

**Areas of interest:**  
mathematical modeling of  
dynamics on networks, fluid  
mechanics, partial differential  
equations, and stochastic  
processes

**Hsin-Han Hung**

INSTRUCTOR  
HUMANITIES & ARTS

**Areas of interest:**  
instructional design,  
multimedia-assisted materials,  
and virtual reality technology  
related to computer-assisted  
language learning (CALL)

**Melissa Kagan**

ASSISTANT TEACHING PROFESSOR  
INTERACTIVE MEDIA & GAME DESIGN

**Areas of interest:**  
walking simulators, self-help role-  
playing games, therapy games,  
critical play, mechropolitics and death  
studies, archival adventuring, and  
pedestrian performance

**Richard Lopez**  
ASSISTANT PROFESSOR  
SOCIAL SCIENCE & POLICY STUDIES

**Areas of interest:**  
utilizing tools in modern  
neuroscience (e.g., fMRI) and  
longitudinal modeling of behavior  
to understand how humans align  
their thoughts and emotions  
with goals

**Lakmini Nadeesha  
Jayaweera Imiya  
Mohottige**

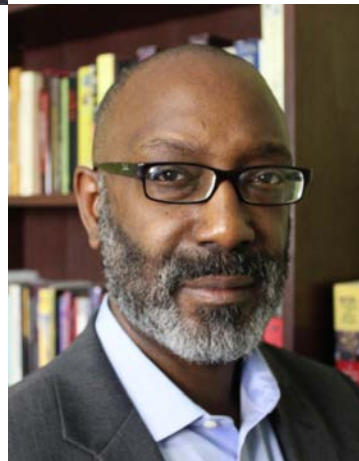
POSTDOCTORAL SCHOLAR  
MATHEMATICAL SCIENCES

**Areas of interest:**  
financial time series, spatial  
statistics, asymptotic  
theory, and higher-order  
approximations

**Jennifer Mortensen**

ASSISTANT TEACHING PROFESSOR  
COMPUTER SCIENCE

**Areas of interest:**  
bioinformatics, computational  
biology, and computer  
science education

**Trent Masiki**

ASSISTANT PROFESSOR  
SOCIAL SCIENCE & POLICY STUDIES

**Areas of interest:**  
social, historical, and  
intercultural ties that bind  
African Americans to other  
ethnoracial communities of  
African descent in the U.S. and  
the global African diaspora

**Fabrizio Murai**

ASSISTANT PROFESSOR  
COMPUTER SCIENCE/DATA SCIENCE

**Areas of interest:**

statistical and machine learning models for studying high-impact, real-world, computational and social phenomena

**Thomas Noviello**

INSTRUCTOR  
PHYSICS

**Areas of interest:**

K-12 physics education, teacher preparation, teacher support, ensuring all learners have equal access to student-centered curriculum

**Matthew Scinto**

VISITING ASSISTANT  
TEACHING PROFESSOR  
AND ORCHESTRA DIRECTOR  
HUMANITIES & ARTS

**Areas of interest:**

working with individuals dealing with memory loss, helping them reconnect to their loved ones and enjoy movement to music

**Carly Thorp**

PROFESSOR OF PRACTICE  
MATHEMATICAL SCIENCES

**Areas of interest:**

statistical consulting to R&D, quality, and manufacturing engineers; applying statistics to real-world scenarios

**Samuel Tripp**

ASSISTANT TEACHING PROFESSOR  
MATHEMATICAL SCIENCES

**Areas of interest:**

combinatorial and computational methods in low-dimensional topology

**Nathan Uricchio**

POSTDOCTORAL SCHOLAR  
MATHEMATICAL SCIENCES

**Areas of interest:**

matroid theory, graph theory, design theory, and combinatorics

**Adam Wagner**

ASSISTANT PROFESSOR  
MATHEMATICAL SCIENCES

**Areas of interest:**

combinatorics, graph theory, and exploring new ways computers and machine learning methods can be used in mathematics

**Hermine Vedogbeton**

ASSISTANT RESEARCH PROFESSOR  
SOCIAL SCIENCE & POLICY STUDIES

**Areas of interest:**

social justice, environmental justice, ecosystem services, sustainable communities, and gender and health in the developing world



# FACULTY PROMOTION & TENURE

The following faculty were promoted or received tenure in 2022. For a list of faculty receiving tenure under WPI's new "Excellence in Teaching" track, see the next section.



**Esther Boucher-Yip** was promoted to teaching professor in the Department of Humanities & Arts. She was named in 2021 to WPI's new tenure track for teaching faculty. A member of the faculty since 2012, she teaches writing and rhetoric courses and directs two project centers. In 2021, she received the WPI Trustees' Award for Outstanding Teaching.



**Drew Brodeur** was promoted to teaching professor in the Department of Chemistry & Biochemistry. He joined the faculty as a visiting assistant professor in 2010 and then as an assistant teaching professor in 2011. He helped redesign his department's general chemistry laboratory offerings to provide a project-based, self-directed research experience.

**Shawn Burdette** was promoted to professor in the Department of Chemistry & Biochemistry. Associate head of his department, he joined the faculty in 2011 and was awarded tenure in 2015. He teaches a range of lower- to upper-level chemistry courses.



**Jim Cocola** was promoted to professor in the Department of Humanities & Arts. He was awarded tenure in 2015 and teaches courses in American studies, comparative literature, creative writing, and film studies; he received WPI's Romeo L. Moruzzi Young Faculty Award for Innovation in Undergraduate Education in 2015.



**Joseph Cullon** has been promoted to teaching professor in the Department of Humanities & Arts. He teaches American history courses that lie at the intersection of environmental history and urban history. With the support of a National Endowment for the Humanities grant, he led an initiative to build an interdisciplinary set of courses in the urban humanities.



**Althea Danielski** was promoted to associate teaching professor in the Department of Humanities & Arts. Since joining the faculty in 2016, she has developed curriculum and introduced courses in integrated skills in English. She has been an advisor at WPI's project center in Melbourne, Australia, and helped create an English course for international graduate students.

**Wen-Hua Du** was promoted to associate teaching professor in the Department of Humanities & Arts. A member of the faculty since 2017, she teaches Chinese language courses and serves as associate director of WPI's China Hub. She is co-director of WPI's project center in Hangzhou and co-founding director of the Taiwan center.



**Michelle Ephraim** was promoted to professor in the Department of Humanities & Arts. She joined the faculty in 1999 and was awarded tenure in 2006. She teaches creative writing and courses that focus on the intersection of religion, gender, sexuality, and race.



**John Galante** was promoted to associate teaching professor in the Department of Humanities & Arts. He was named in 2021 to WPI's new tenure track for teaching faculty. Galante teaches courses in history and international and global studies, with a particular focus on Latin America, migration, and global networks of interaction and exchange. He led the creation of WPI's Latin American and Caribbean Studies Initiative.



**Ron Grimm** was awarded tenure and promoted to associate professor in the Department of Chemistry & Biochemistry. He teaches general chemistry and the physical chemistry laboratory. Students conducting research with Grimm focus on surface science projects related to solar energy materials and nanocontainers for therapeutic drug delivery.

**Hektor Kashuri** was promoted to associate teaching professor in the Department of Physics. He has taught all of his department's introductory physics courses, as well as intermediate mechanics, and he is developing computational materials to introduce software programming into the physics curriculum. He has led summer programs for kindergarten through 12th grade students in Worcester and participated in pre-collegiate programs aimed at promoting STEM.



**Uma Kumar** was promoted to teaching professor in the Department of Chemistry & Biochemistry. She has taught lecture courses and laboratories in general chemistry and organic chemistry. She participated in redesigning the department's general chemistry laboratory curriculum, with an overhaul that added a research component to all general chemistry courses.



**Amity Manning** was awarded tenure and promoted to associate professor in the Department of Biology & Biotechnology. A member of the faculty since 2015, she redesigned a foundational undergraduate cell biology course and created upper-level courses in cancer biology and genomic instability. Her research focuses on the mechanisms underlying chromosomal and genomic instability, both factors in cancer.



**Rodica Neamtu** was named to WPI's new tenure track for teaching faculty as a professor of teaching. She teaches courses on databases, data mining, and the social implications of computing, and she co-founded and co-directs the university's project center in Romania. Her research focuses on data mining and machine learning for use in diverse domains such as medicine, economics, transportation, and complex decision making.



**Erin Ottmar** was awarded tenure and promoted to associate professor in the Department of Social Science & Policy Studies. A faculty member since 2015, she has taught in WPI's Learning Sciences & Technologies program, the Psychological & Cognitive Sciences program, and the Teacher Preparation program. Her research focuses on mathematics cognition, teaching, and learning.



**Joshua Rohde** was promoted to associate teaching professor in the Department of Humanities & Arts. He is the conductor of all the university's vocal ensembles and uses music to encourage students' engagement with social issues, developing a course on music composed in response to conflict and discrimination. In 2021 he was awarded WPI's Romeo L. Moruzzi Young Faculty Award for Innovation in Undergraduate Education.



**Erin Solovey** was awarded tenure and promoted to associate professor in the Department of Computer Science. Her research is in the field of human-computer interaction. After joining the faculty in 2018, she has taught a mix of undergraduate and graduate courses in computer science and neuroscience while placing an emphasis on mentoring women and supporting STEM education.



**Qingshuo Song** was awarded tenure as associate professor in the Department of Mathematical Sciences. His research is focused on stochastic control theory. He has revamped his department's computational methods of financial mathematics course to include cloud computing and machine learning in the financial industry.



**Luis Vidali** was promoted to professor in the Department of Biology & Biotechnology. He leads his department's graduate program and has implemented initiatives such as a new doctoral qualifying exam format and a reproducible biostatistics course. He is faculty advisor for the WPI chapter of the Society for Advancing Chicanos/Hispanics and Native Americans in Science.



**Jacob Whitehill** was awarded tenure and promoted to associate professor in the Department of Computer Science. He has taught courses in machine learning and deep learning for undergraduate and graduate students, as well as object-oriented programming for first-year computer science majors.



**Wilson Wong** was promoted to associate teaching professor in the Department of Computer Science. He joined the faculty in 2015 and now teaches courses on database systems and software engineering. He is co-author of *The Architecture of Computer Hardware, Systems Software, and Networking: An Information Technology Approach, 6th Edition*.



*“ At WPI, students are not just learning from their textbooks and in classrooms. Their whole education is about going to places and making real-life changes. ”*

Abigail Koo, assistant professor of humanities & arts

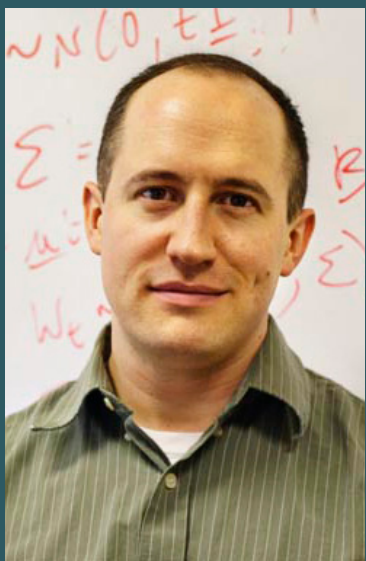
# A&S FACULTY APPOINTED TO NEW TENURE TRACK FOR EXCELLENCE IN TEACHING

Eight faculty members from the School of Arts & Sciences have been named to a new tenure track created in 2021 to recognize and reward excellence in teaching. The group, nominated by deans and selected by then-Provost Wole Soboyejo, includes scholars from a range of disciplines.

Research universities such as WPI typically award tenure only to faculty members who balance teaching, research, and service, but the new tenure path opens the pursuit of tenure to those focused primarily on teaching. The university expects to appoint 15 teaching faculty members per year over three years to the new tenure track. These 45 will be known as assistant, associate, or (full) professors of teaching and will be expected to spend most of their time teaching, while also demonstrating professional growth and service to their academic communities.

**Marcel Blais**, professor of teaching in the Department of Mathematical Sciences.

He teaches courses in operations research, calculus, and financial mathematics, and has served as associate department head since 2017.



**Esther Boucher-Yip**, associate professor of teaching in the Department of Humanities & Arts. She teaches courses in the professional writing program and in academic English for international students. She was awarded the 2021 Trustees' Award for Outstanding Teaching.



**Farley Chery**, associate professor of teaching in the Interactive Media & Game Development Program. He created a course for the technical art concentration at WPI, launched a studio art initiative, led a student art portfolio initiative, and has taught courses in visual technologies.



**John Galante**, assistant professor of teaching in the Department of Humanities & Arts. He teaches courses in history and international and global studies, with a particular focus on Latin America, migration, and global networks of interaction and exchange. He led the creation of WPI's Latin American and Caribbean Studies Initiative.





**Destin Heilman**, teaching professor in the Department of Chemistry & Biochemistry. He teaches biochemistry and general chemistry courses and is chair of the teaching faculty council. In 2013, he received the WPI Trustees' Award for Outstanding Academic Advising.



**Ryan Madan**, associate professor of teaching in the Department of Humanities & Arts. He has been director of WPI's Writing Center since 2014. He teaches courses on writing, rhetorical theory, and pedagogy, and he advises senior projects in the professional writing major.



**Rodica Neamtu**, associate professor of teaching in the Department of Computer Science. She teaches courses on databases, database management software, data mining, and the social implications of information processing. She co-founded and co-directs WPI's Bucharest Project Center.



**Gbetonmasse Somasse**, associate professor of teaching in the Department of Social Science & Policy Studies. He teaches introductory economics courses, development economics, environmental economics, and econometrics. He is associate head of his department and director of WPI's project center in Cape Town, South Africa.





# A&S ADVISORY BOARD

WPI's Arts & Sciences Advisory Board advises and assists the dean in continually improving the quality and direction of opportunities for undergraduate and graduate students in the arts and sciences through educational advances, research opportunities, and connections to external stakeholders.

**Sergio Salvatore '02** (Co-Chair), Senior Director of Engineering, Vimeo

**Kimberly Warren** (Co-Chair), Vice President, MITRE

**Lauren Baker '82**, President & CEO, Boston Biomedical Associates

**Douglas Borden III '96**, Independent Management Consultant

**Neal Cappellino '87**, Producer & Engineer

**John Gabranski '75**, Consultant

**Arjan "Ari" Giaya, PhD '01**, Founder and President, LaunchBay, LLC

**Maryann Goebel '73**, Member of the Board of Directors, Seacoast National Bank

**Mary Ellen Lane, PhD**, Dean of the Graduate School of Biomedical Sciences and Professor of Neurobiology, UMass Medical School

**Kenneth Maynard, PhD**, Senior Director, Takeda Pharmaceuticals, Inc.

**Ellen McCaskill '89**, Senior Project Manager, ExxonMobil Global Projects Co.

**Linda McGoldrick**, Global Business Strategy Leader and Policy Expert Marilyn Pifer, PhD, former Director of Research and Innovation, CRDF Global

**Eliza Jane Reilly, PhD**, Executive Director, National Center for Science and Civic Engagement

**Richard Resnick '98**, CEO, Cureatr

**Joseph Rock '90**, Senior Scientist, Philips Research North America

**Sharon A. Savage '91, MD**, Chief, Clinical Genetics Branch, Division of Cancer Epidemiology and Genetics, National Cancer Institute

**Naveen Selvadurai '02**, Co-Founder, Foursquare Labs

**Nina Simon**, Author, Cultural Manager, and Ashoka Fellow

**Urvashi Tyagi '01**, Chief Technology Officer, ResMed

**Michael Wallent '91**, Corporate Vice President, Director of Program Management, Microsoft

**Kristin Deming Wheeler '93**, Director Patent Counsel, Acushnet Company

## IN MEMORIAM:

**Steven Davi '85** (1963–2022), Senior Vice President, Synacor







A&S faculty shared their neuroscience research with Don Peterson, alumnus and former chair of the University's Board of Trustees. Mr. Peterson and his wife, Maureen, established the Peterson Family professorship in 2008



# CELEBRATING FIVE YEARS OF ARTS & SCIENCES

The School of Arts & Sciences offers bachelor's, master's, and PhD degree programs that allow students to explore their interests and find the path that will help them meet their professional and personal goals.

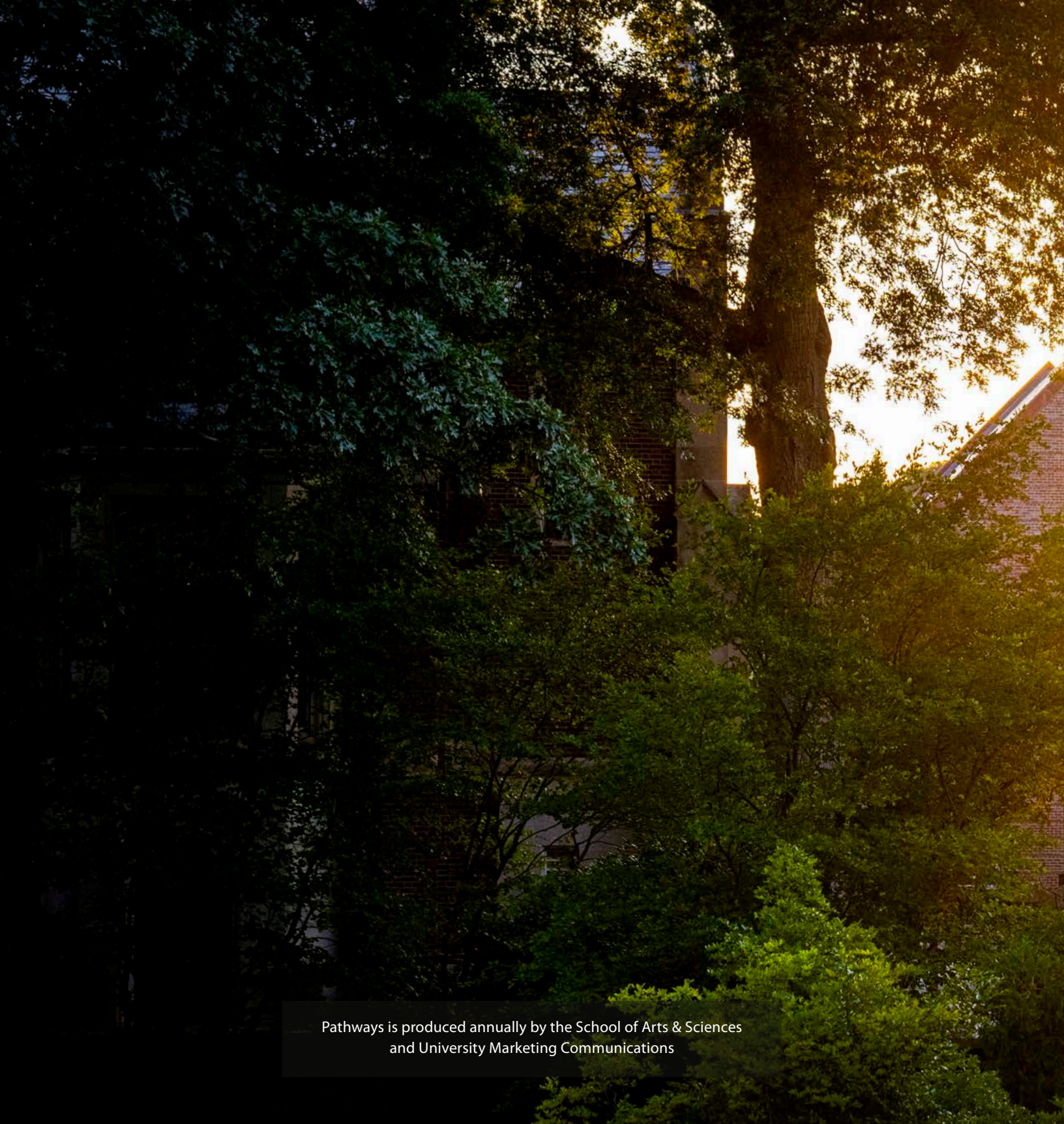
## Undergraduate Enrollment in A&S Major Degree Programs (2017-21)

PROGRAM	2017	2018	2019	2020	2021	TOTAL
Actuarial Mathematics	41	40	50	44	32	<b>207</b>
Applied Physics	1	5	8	15	16	<b>45</b>
Biochemistry	68	79	92	98	106	<b>443</b>
Bioinformatics & Computational Biology	27	35	36	43	39	<b>180</b>
Biology & Biotechnology	147	157	156	162	196	<b>818</b>
Chemistry	34	31	41	38	51	<b>195</b>
Computer Science	753	808	899	931	1,035	<b>4,426</b>
Data Science	0	0	0	72	130	<b>202</b>
Economic Science	9	7	4	7	9	<b>36</b>
Engineering Physics	3	1	0	1	0	<b>5</b>
Environ & Sustainability Studies	6	9	16	21	26	<b>78</b>
Humanities & Arts	8	6	5	10	14	<b>43</b>
Interactive Media & Game Development-Technology	4	44	65	88	95	<b>296</b>
Interactive Media & Game Development	103	78	67	59	84	<b>391</b>
Interdisciplinary	0	0	4	5	8	<b>17</b>
International & Global Studies	9	7	5	8	6	<b>35</b>
Liberal Arts & Engineering	4	4	1	1		<b>10</b>
Mathematical Sciences	96	116	122	136	125	<b>595</b>
Physics	70	83	83	81	79	<b>396</b>
Professional Writing	19	28	27	18	26	<b>118</b>
Psychological Science	9	19	22	27	40	<b>117</b>
Robotics Engineering	404	426	432	424	424	<b>2,110</b>
Science (First-Years Only)	8	4	2	11	11	<b>36</b>
Society, Technology & Policy	9	9	6	12	12	<b>48</b>
System Dynamics	1	1	0	0	0	<b>2</b>
<b>Total</b>	<b>1,833</b>	<b>1,997</b>	<b>2,143</b>	<b>2,312</b>	<b>2,564</b>	<b>10,849</b>



## Graduate Enrollment in A&S Major Degree Programs (2017-21)

PROGRAM	DEGREE	2017	2018	2019	2020	2021	TOTAL
Applied Mathematics	MS	6	8	5	3	1	23
Applied Statistics	MS	28	13	19	21	11	92
Biochemistry	MS	1	3	3	3	1	11
Biochemistry	PhD	9	7	8	5	5	34
Bioinformatics & Computational Biology	MS	6	7	6	6	6	31
Bioinformatics & Computational Biology	PhD	7	8	9	8	12	44
Biology & Biotechnology	MS	6	4	4	5	5	24
Biology & Biotechnology	PhD	16	19	17	17	15	84
Bioscience Management	MS	11	27	27	61	75	201
Biotechnology	MS	19	40	48	44	42	193
Chemistry	MS	2	4	3	1	5	15
Chemistry	PhD	13	14	11	14	17	69
Computational Media	PhD	0	0	0	3	5	8
Computer Science	MCS	0	0	0	0	19	19
Computer Science	MS	96	80	83	83	76	418
Computer Science	PhD	39	39	52	50	54	234
Data Science	MS	105	111	129	99	76	520
Data Science	PhD	30	36	46	50	49	211
Financial Mathematics	MS	29	14	12	9	1	65
Industrial Mathematics	MS	2	2	0	0	2	6
Interactive Media & Game Development	MFA	0	0	0	0	2	2
Interactive Media & Game Development	MS	16	25	32	22	16	111
Interdisciplinary	MS	0	1	3	1	1	6
Interdisciplinary	PhD	4	6	4	4	2	20
Learning Sciences & Technology	MS	2	1	2	5	2	12
Learning Sciences & Technology	PhD	14	9	10	5	10	48
Master of Mathematics for Educators	MME	19	25	28	25	28	125
Mathematical Sciences	PhD	26	28	26	18	14	112
Mathematics for Educators	MS	1	0	2	2	0	5
Neuroscience	MS	0	0	0	3	6	9
Physics	MS	5	4	5	3	5	22
Physics	PhD	18	20	19	20	20	97
Physics for Educators	MS	2	3	2	2	2	11
Robotics Engineering	MS	137	150	142	146	223	798
Robotics Engineering	PhD	31	36	40	39	46	192
Science & Technology for Innovation in Global Development	MS	0	0	0	3	6	9
Social Science	PhD	1	2	5	4	3	15
Statistics	PhD	0	0	3	9	9	21
System Dynamics	MS	2	2	4	1	0	9
System Dynamics	PhD	1	1	2	1	1	6
System Dynamics/Innovation Management	MS	2	0	0	1	0	3
<b>Total</b>		<b>706</b>	<b>749</b>	<b>811</b>	<b>796</b>	<b>873</b>	<b>3,935</b>



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