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BIOLOGY & BIOTECHNOLOGY

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# WELCOME TO SUMMER 2025

As another remarkable academic year draws to a close, we're excited to bring you highlights and updates from the Department of Biology & Biotechnology at WPI. This issue is a celebration of our students' achievements, our faculty's innovative work, and the vibrant community that makes BBT such a special place.

## WORDS FROM DEPARTMENT HEAD

Dear Alumni and Friends,

As I reflect on the past year, I am filled with both gratitude and pride for the many ways our community continues to grow, innovate, and inspire. The Department of Biology and Biotechnology (BBT) remains steadfast in its commitment to excellence in education, research, and global impact—and we are deeply thankful for your continued support.

We are especially proud of the national and international recognition our undergraduate and graduate students have earned for their project work.

We also celebrated key milestones within our department, including faculty promotions, professional honors, and well-earned retirements. These moments remind us that the true strength of our department lies in the people—past and present—who bring our mission to life.

This year, we successfully launched our new spiral undergraduate curriculum, offering flexible academic tracks that prepare students for a wide range of careers, including pre-med, neuroscience, molecular and cellular biology, and ecology, evolution, and environmental biology. We also transitioned our Ph.D. program to Molecular and Cellular Biology, aligning it more closely with our research strengths and the evolving landscape of biotechnology and biomedical science.

Our faculty and students continue to demonstrate exceptional dedication—pushing the boundaries of knowledge in areas such as cytoskeletal dynamics, genome instability, RNA regulation, host-microbe interactions, and the engineering of novel therapeutics.

To our alumni: Thank you for staying connected and for the many ways you continue to make an impact in your communities and professions. We love hearing from you and are always eager to explore new ways to engage—whether through mentoring, partnerships, or sharing your professional journey with current students.

Looking ahead, I'm excited for all that we will accomplish together. Please don't hesitate to reach out or stop by—we always welcome you back to campus.

Warm regards,
**Reeta Rao**
Professor and Department Head
Department of Biology & Biotechnology
Worcester Polytechnic Institute

# UNDERGRADUATE ANNOUNCEMENTS

This year, our undergraduate students have gone above and beyond in academics, research, leadership, and service. From prestigious fellowships and scholarly awards to impactful community engagement, these honors reflect not only individual dedication but also the collective spirit of excellence that defines the BBT community.

## *SALISBURY AWARD WINNER*

The Salisbury Prizes was awarded to highly meritorious **Tara Broomfield**, who have faithfully, industriously, and with distinguished attainment completed all the requirements for the B.S. degree.

## *PROVOST MQP AWARD WINNERS*


This award is offered in recognition to those students who have completed outstanding Major Qualifying Projects (MQPs) as a demonstration of their competency in a chosen academic discipline. Each academic department conducts its own competition to select the winners. For our BBT Department we have our Provost MQP award winners, **Trevor Bush, Eliza Dutson, and Meghan Urakawa**.

Trevor Bush taught biology and ecology at the Cape Cod Museum of Natural History for five years. During that time, he became interested in how indigenous communities used natural medicines. This interest led him to Professor Pamela Weathers' lab at WPI, where he studied the plant Artemisia and its possible medical uses. He was especially curious about how plant-based mixtures could sometimes work better than pure drugs. At WPI, Trevor took classes in biotechnology and biochemistry to learn more about how chemical compounds affect the body and how they might help treat diseases. He worked with Artemisia compounds like artemisinin and studied their ability to treat illnesses like tuberculosis and malaria. He noticed that small changes in chemical structure could lead to big differences in how the compounds worked. Trevor's interest grew further when he worked with Professor Tanja Dominko on fibrosis research. They studied how plant compounds influenced cells involved in scar tissue formation. Trevor's work took on personal meaning when he and his mother developed autoimmune diseases that caused painful inflammation and tissue damage. This experience pushed him to explore how natural compounds could help heal damaged tissue. His Major Qualifying Project, done with Meghan Urakawa, Eliza Dutson, and Professor Weathers, focused on comparing the effects of artemisinin, its derivatives, and another compound called dihydroartemisin in human skin models. Trevor received several honors for his research, including the LaPre Fellowship, the Provost MQP Award, and first place at a world congress for animal sciences. He also co-authored a study on tuberculosis with labs at WPI and Penn State. Trevor now plans to pursue a Ph.D. in pharmacology, where he hopes to work on new drug delivery systems and treatments that reduce side effects and improve healing for patients.

From their advisor, Prof. Pamela Weathers,
*"This outstanding creative team won the BBT Provost's MQP Award by developing a solid understanding of the science of fibrosis in order to explain and do comparative testing of artemisinin, dihydroartemisinin, and two Artemisia tea infusions to determine how these drugs affected the migration of fibroblasts and transcription of key fibrosis marker genes. It was a great team effort with great preliminary results that will provide a foundation for future work."*

Useful Link: MQP

## *INDUCTED TO LOUIS STOKES ALLIANCE FOR MINORITY PARTICIPATION (LSAMP)*

The Louis Stokes Alliance for Minority Participation (LSAMP) Scholar Program, named in honor of former congressman Louis Stokes, is a National Science Foundation (NSF) funded program intended to support historically underrepresented students in the STEM fields. Enrollment in the program is reserved for a select and highly committed group of students with a declared major in science, technology, engineering, mathematics, and pre-health professions. **Pana Nurgaliyev**, from our department was seleceted for this program.

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## *SPENCER FELLOWSHIP RECIPIENTS*

The Spencer fellowship program is generously funded through the Spencer Undergraduate Research & Lab Enhancement Initiative. This years recipients were **Lillian Hanly** and **Kavya Rajavel**. We congratulate all award recipients.

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## *LAPRE SUMMER UNDERGRADUATE RESEARCH FELLOWS*

The Undergraduate Research Fellows were supported by our WPI Alumni David LaPre. David has served as the Chair of the WPI Board of Trustees and has endowed the LaPre Fellow stipends.
This years receipients were, **Victoria Turner** and **Stasha Roganovic**.

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# CONGRATULATIONS !

We are incredibly proud of all the students recognized in this section. Your hard work, curiosity, and dedication have stood out in so many ways whether in research, academics, leadership, or service. These awards and honors reflect not just talent, but real commitment to learning and growing, both inside and outside the classroom. Each of these students has put in long hours in labs, classrooms, and community spaces. They've written, presented, collaborated, and led. And through it all, they've made this department stronger. These recognitions also reflect the support of peers, mentors, and faculty who helped along the way. To everyone mentioned here—congratulations. You've earned every bit of this recognition. We're excited to see where you go next, and we hope you stay in touch and continue to share your journey with us. To those still on the path, keep going. Your efforts matter, and we look forward to celebrating your milestones soon. Thank you for making our BBT community one that celebrates Respect, Empower and Include.

# STUDENT EXPERIENCES

## Edward Chocano Coralla

Originally from Peru, Edward Chocano Coralla is a passionate PhD candidate dedicated to uncovering the mechanisms behind membrane trafficking and developing new molecular tools. His curiosity and commitment to learning have earned him competitive fellowships and training opportunities at MBL and Cold Spring Harbor Laboratory. Beyond his own research, Edward is a devoted mentor in the Vidali Lab, always eager to share new techniques and inspire future scientists. He believes that "knowledge grows through sharing," a value that drives both his research and teaching. We are proud to celebrate Edward's recent achievement and the global scientific perspective he brings to our community.

*"I deeply believe that knowledge grows through sharing, so I continuously pass on new techniques and concepts to students in the Vidali Lab. Mentoring equally passionate future researchers has been one of the mist rewarding aspect of my scientific journey." -Edward*

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## Chantalle Chhoeuk

"During my time at WPI, I have had the opportunity to grow my skills and passion for Biology & Biotechnology through hands-on laboratory classes in cell culture, microbiology, and molecular biology. Beyond learning advanced lab techniques, I have had the chance to design my own procedures and carry out projects that pushed me to think critically both in and out of a laboratory setting. These opportunities within the BBT department have not only improved my technical abilities, but also solidified my interest in pursuing biological research as a career.

What has made my WPI journey truly meaningful is the strong sense of community I have found. I have always felt supported by the professors and peers I interact with in my classes, and I've been able to build lasting connections through collaborative lab courses and clubs such as the Biology & Biotechnology Club.

Working on team-based projects and experiments has also helped me grow as a teammate by learning how to effectively communicate and solve problems as part of a group. I've continued to grow through a variety of enriching experiences outside of labs and lectures. I had the incredible opportunity to complete my IQP in Switzerland, which deepened my appreciation for interdisciplinary projects and problem-solving. I have also enjoyed being involved in other student clubs and holding meaningful campus jobs. I worked for two years in the Provost's Office, and I currently work in WPI's vivarium assisting with lab animal husbandry. These roles showed me different sides of campus life and helped me appreciate the many ways people contribute to making research and academic possible.

Looking ahead, I feel both excited and well-prepared to pursue a career in research, potentially in the fields of immunology or microbiology. WPI has helped me discover my interests, build confidence in my abilities, and connect with people and opportunities that have shaped who I am today. I am incredibly grateful for the experiences that brought me here."

# PHD CANDIDATE ANNOUNCEMENTS

**DR. ARMAND P. FERRO AND MARY H. FERRO SUMMER 2024-2025 FELLOWSHIPS**

*The Ferro Fellowship provides summer stipend support for a doctoral student in sound academic standing who is working in the fields of Neuroscience, Infectious Disease, or Cancer Biology.*

This year four PhD candidates were selected and awarded this prestigious fellowship:

**Samuel Isife, Elizabeth DiLoreto, Abigail Rapiejko, Opeyemi Isaac**




**SAM C.TETLOW '93 AND ANDREEA STAN GRADUATE FELLOWSHIP IN BIOLOGY RESEARCH, 2024-2025**

*The Tetlow Fellowship provides stipend support for an outstanding graduate student perusing a PhD in Biology and Biotechnology.*

This year's recipient is:

**Julia Ryan**

# WELL DONE!!

We proudly celebrated the achievements of five outstanding PhD students who successfully completed their doctoral journeys in the BBT Department. Their research contributions, dedication, and perseverance have greatly enriched our academic community. We shared their accomplishments in a special social media post to honor their hard work and wish them continued success in their future endeavors.

**Elizabeth DiLoreto, Julia Ryan, Alexandra Cabral, Christina Campagna, and Caroline Muirhead.**

Useful Link: LinkedIn

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**Rachael Oluwabukola Asaolu**, a PhD student in the Department of Biology and Biotechnology, has been named one of only 20 recipients nationwide of the inaugural Presidential Ambassador for Equity and Inclusion Award from the Genetics Society of America (GSA). This prestigious honor includes a year-long GSA membership and national recognition through the society's platforms, including Genes to Genomes. Rachael's achievement highlights her commitment to advancing diversity and inclusion in science—an inspiration to the WPI community. Read more

# FACULTY HIGHLIGHTS

This year has been a remarkable one for our faculty, marked by outstanding achievements, interdisciplinary collaborations, and impactful research. From prestigious grant awards to innovative curriculum initiatives, our faculty have continued to push boundaries and elevate the academic mission of the department. These highlights not only reflect the success of individual researchers but also the strength of our community in advancing science, education, and global engagement.

## "WPI Secures Federal Grant to Train Next Generation of Biology and Biotechnology Leaders"

We have received significant federal funding to address the growing national demand for professionals and educators in biology and biotechnology. The U.S. Department of Education's **Graduate Assistance in Areas of National Need (GAANN) program** has awarded WPI nearly $900,000, which, matched by university contributions, totals approximately $1.2 million.
*"WPI has opened so many doors for Massachusetts students interested in science and technology, and this grant will enable them to build on their powerfully important work,"* said U.S. Senator Elizabeth Warren, who played a key role in securing the funding.

Associate **Professor Amity Manning**, who will oversee the program, highlighted the unique strengths of WPI's biology and biotechnology curriculum,
*"We're set up to have a great balance of research and exposure to teaching. WPI encourages students to interact closely with faculty while gaining hands-on teaching experience." - Amity*

Given the robust job outlook in the life sciences—with roles in microbiology expected to grow 6% and biochemistry positions anticipated to expand by 9% by 2033—the GAANN fellowships position WPI to significantly contribute to a field vital for medical and technological advancements. *"Training in teaching is a critical component of any scientific career,"* emphasized Professor Reeta Rao, department head and co-investigator of the fellowship. The GAANN program will ensure fellows are thoroughly prepared, integrating rigorous scientific research with comprehensive educational training.

Useful Links: WPI Announcement

The next year's recipient for GAAN program 2025-26 are:
**Sasha Freeman, Abigail Rapiejko, and Kristen Metzler.**



Reeta Rao received a **Department of Defense SBIR Phase II** grant for the project "Multiplexed Diagnostic Platform for Invasive Fungal Infection: Rapid Diagnostic for Invasive Fungal Infection", in collaboration with Dr. Baris Unal from EmergingDx Inc.

Useful links: Reeta Rao's Lab

## Davis Foundation Grant Supports Global Competency Initiative

An interdisciplinary WPI team—**Professor Lauren Mathews**, Dr. Zoe Eddy, Dr. Sarah Stanlick, and Dr. Laureen Elgert—has received a **Davis Educational Foundation grant** to enhance global and intercultural competency (GICC) in the undergraduate curriculum. Building on WPI's strong foundation in global learning, this initiative will unite faculty and stakeholders to develop and assess strategies that embed GICC across all disciplines, preparing students to lead in an interconnected world.

Useful links: Lauren Mathews, LinkedIn Announcement

# WELCOME TO WPI!

The Department of Biology & Biotechnology would like to extend a warm welcome to our newest faculty member, Dr. **Jeff Bourgeois**!

A native of Glocester, Rhode Island, Dr. Bourgeois completed his undergraduate studies at the College of the Holy Cross in Worcester. He gained valuable research experience working with Dr. Julia Paxson at Holy Cross and Drs. Irini Sereti and Ainhoa Perez-Diez at the National Institutes of Health before earning his PhD at Duke University's Program in Genetics and Genomics. At Duke, he studied interactions between the pathogen Salmonella and its hosts.

Although Dr. Bourgeois continues to regard Salmonella as one of the most intriguing pathogens, his postdoctoral research at Tufts University under Dr. Linden Hu sparked a new fascination: the Lyme disease-causing spirochete, Borrelia burgdorferi. This pathogen, while critically important to human health, remains significantly understudied and possesses an exceptional ability to interact with diverse hosts, including mammals, birds, reptiles, and ticks.

At WPI, the Bourgeois Lab aims to cultivate a passion among undergraduate and graduate students for studying host-microbe interactions. Dr. Bourgeois and his team will investigate how Borrelia burgdorferi interacts uniquely with both wild and human hosts, contributing to vital research on Lyme disease.

Professor Bourgeois was awarded a **2024 Idea Development Award** from the Department of Defense Tick-Borne Disease Congressionally Directed Medical Research Program ($350,000 in direct costs) for studies on Lyme disease that will start Summer 2025. This grant will fund his lab to identify a genetic basis of severe manifestations of Lyme disease—including instances of Lyme disease with severe, acute symptoms and cases of Lyme disease that do not respond to treatment. This grant will fund technicians and students in his lab to dissect the interactions between human macrophages and the Lyme disease spirochete Borrelia burgdorferi using RNA sequencing. Overall, this project combines microbiology, immunology, and functional genomics to better understand a disease that afflicts our local communities.

Useful Link: LinkedIn

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## "NIH R15 Grant Supports Student Research on Cellular Stress Response"

Farny's lab has received a $445,873 NIH Academic Research Enhancement Award (AREA/R15) from the **National Institute of General Medical Sciences** (NIGMS) to support our project, "Structure and Function of Non-Canonical Stress Granules.". This three-year grant will fund research training for two PhD students and up to ten undergraduates, focusing on how cells respond to environmental stress—particularly UV radiation. We've found that different UV wavelengths (UV-A, UV-B, UV-C) trigger distinct cellular responses, and this project will explore those effects in detail.

Useful Link: Farny Lab

# WPI's Scarlet Shell Lab Awarded Potts Foundation Grant for Tuberculosis Research

Professor **Scarlet Shell** and her laboratory have received significant funding from the Potts Foundation to advance critical tuberculosis (TB) research. This prestigious award will support the investigation of artemisinin, a drug commonly used against malaria, for its potential effectiveness in combating Mycobacterium tuberculosis (Mtb), the bacterium responsible for TB.

Tuberculosis remains one of the deadliest infectious diseases globally, causing over a million deaths each year. Current treatments involve prolonged courses of multiple antibiotics, presenting major challenges, particularly in regions with limited healthcare resources. This often results in incomplete treatments and growing antibiotic resistance.

Useful Links: **Shell Lab**, LinkedIn

The Shell lab's research, led by Ph.D. student Opeyemi Ibitoye, centers on a promising bacterial enzyme known as TrpG. Preliminary studies indicate that TrpG might be the target of artemisinin's activity against Mtb. By better understanding this interaction, the researchers aim to design enhanced antibiotics that could significantly shorten treatment durations and improve patient outcomes.
"Identifying how artemisinin interacts with TrpG could help us develop more effective and efficient TB drugs," Prof. Shell stated. "Our ultimate goal is to transform TB treatment by creating therapies that are more accessible and manageable for patients worldwide."

Congratulations to Professor Scarlet Shell and her research team for securing this vital support and their ongoing dedication to addressing one of the world's most pressing health challenges.

# "Amity Manning Named Inaugural Vassallo Distinguished Presidential Professor"

WPI is proud to announce that Professor **Amity Manning** has been named the inaugural Dr. Helen G. Vassallo Distinguished Presidential Professor. Established through a generous gift from Steve Vassallo '93 and Trae Vassallo, the professorship honors the legacy of Helen Vassallo MBA '82, a pioneering WPI faculty member, scientist, and leader.

Professor Manning, a member of the Biology and Biotechnology Department, is widely recognized for her impactful research on cancer cell biology and genome stability, as well as her dedication to teaching and mentoring students. Her appointment reflects the values championed by Helen Vassallo: scientific excellence, educational leadership, service, and a commitment to lifting others.

Department Head Reeta Rao praised Manning as a brilliant scientist, dynamic teacher, and collaborative leader, noting that this professorship is also the department's first endowed chair—making it especially meaningful. Helen Vassallo's legacy spans education, research, leadership, and service. She broke barriers at WPI and beyond, leaving a lasting mark on the university community. Steve Vassallo emphasized that Manning's excellence and integrity make her the perfect choice to carry forward his mother's legacy. This appointment serves as a lasting tribute to two remarkable women who inspire WPI's mission and community.

Useful Link: Amity Manning, WPI Announcement

# PATENTS

### Pam Weathers Contributes to Patent on Plant-Based Scaffolds for Tissue Engineering

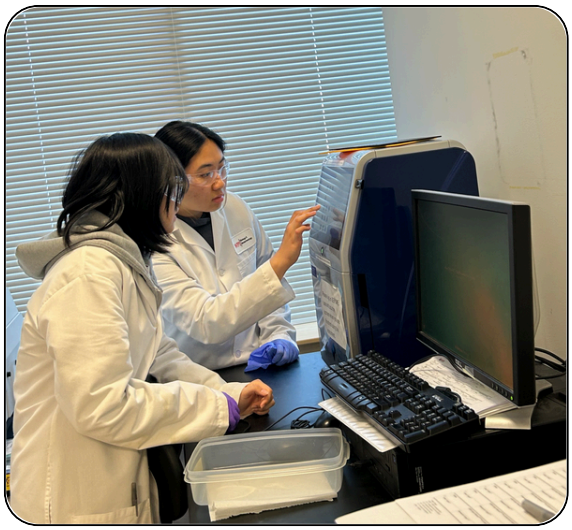
Pam Weathers, along with a team of collaborators, is a co-inventor on a newly awarded patent (US20190117839) focused on using decellularized plant tissues—such as leaves, stems, and roots—as scaffolds for mammalian cell culture. These naturally vascularized plant materials support the growth of thicker engineered tissues. Early studies in rodent models show no immune response, suggesting potential for custom grafts using a patient's own cells to accelerate healing and reduce rejection risk.

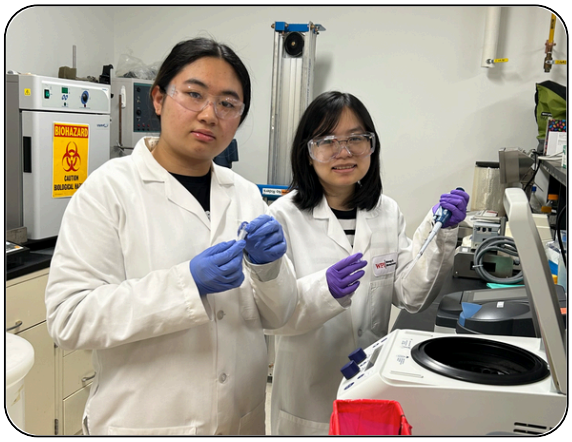
### Farny Lab Awarded Patent for Improved Gene Expression Control

The Farny Lab, in collaboration with former postdoc Dr. Andrés Felipe Carrillo Rincón (now at NYU Abu Dhabi), has been awarded a U.S. patent (US20240018529A1) for a novel method to enhance gene expression control in engineered bacteria. By modifying common DNA regulatory sequences, the team developed switches that function more precisely and across a wider range of bacterial species—not just E. coli. This innovation builds on recent work published in Microbial Biotechnology and Journal of Biological Engineering. Useful Links: Patent, Publication1, Publications2

# "WPI and MLSC Are Creating the Next Generation of Biotech Leaders"

Worcester Polytechnic Institute (WPI) is delighted to announce it has been awarded a grant from the Massachusetts Life Sciences Center (MLSC) as part of the High School Apprenticeship Challenge. This funding will support two students from Worcester Technical High School (WTHS) by providing valuable, hands-on experience in bio-manufacturing.

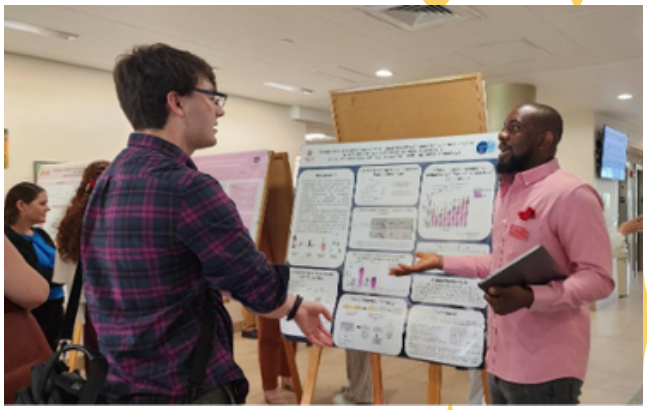





Leading this innovative initiative is Floyd Brownewell, Principal Investigator for the grant. Brownewell will oversee the apprenticeship program, guiding students through essential bioprocessing techniques and real-world applications. He is also tasked with managing the MLSC grant to ensure the program's effectiveness and planning future expansions to include more students and additional regional technical programs. "*This represents a significant milestone*," said Brownewell. "*It's the first-ever agreement between WPI's Bioprocess Center and Worcester Technical High School for a cooperative education program. Our goal is to create even broader opportunities for students to engage in meaningful STEM experiences.*"

The grant highlights WPI's commitment to preparing the next generation of STEM professionals by connecting classroom learning with practical industry experiences. A special thank you to the Massachusetts Life Sciences Center for their generous support and investment in nurturing tomorrow's leaders in science and technology.
Useful Link: Floyd Brownewell, WPI BioProcess Center

# BBT MOMENTS!

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