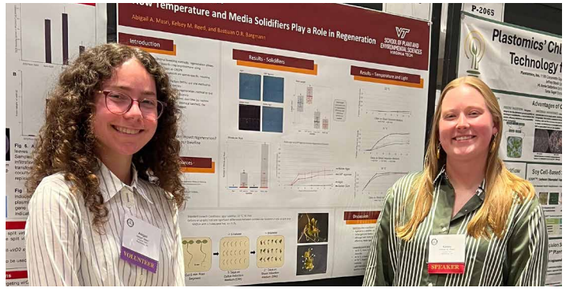
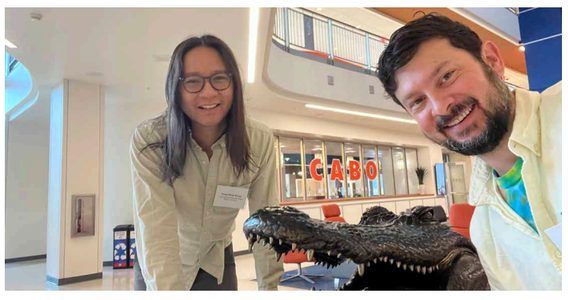
Translational Plant Sciences Center

Rooted in Discovery
2026

FRALIN LIFE SCIENCES INSTITUTE
TRANSLATIONAL PLANT SCIENCES CENTER
VIRGINIA TECH

Table of Contents





Authors

Tyler Bauguess
Jordan Bass
Max Esterhuizen
Jenise Jacques
Suzanne M. Pruitt
Felicia Spencer

Photographers

Jordan Bass
Jenise Jacques
Felicia Spencer
Kathryn Liu

Message from the Director

Welcome

Jordan Bass and I are pleased to share the 2026 edition of Rooted in Discovery, the annual magazine of the Translational Plant Sciences Center (TPSC). This issue captures a year of momentum across our community and offers a glimpse into the people, partnerships, and ideas shaping our work. We are rooted in discovery, guided by community, and committed to translation.

TPSC is an institute-level center housed within the Fralin Life Sciences Institute at Virginia Tech. Built on more than two decades of interdisciplinary collaboration, our Center brings together faculty, students, postdoctoral scholars, staff, and partners who share a commitment to advancing plant science with real-world impact. Our work bridges discovery and application, generating knowledge and developing tools that strengthen the productivity, resilience, and sustainability of the nation's foods, fuels, fibers, and forests.

TPSC fosters connection across disciplines, institutions, and sectors. We support teams as they form around shared challenges, cultivate partnerships that extend beyond campus, and create pathways for research to move from insight to implementation. This translational focus shapes both how we work and how we measure success.

Community, Translation, and Impact

The stories in this magazine reflect the range and depth of translational plant science across TPSC. They highlight collaborations that have grown into major research investments, innovative approaches to managing pests and diseases, and integrative programs that combine field experimentation, data science, engineering, and genomics. Together, these efforts demonstrate how collaboration accelerates discovery and amplifies impact.

At the center of this work are people. TPSC is a community built on mentorship, curiosity, and shared purpose. Graduate students and postdoctoral scholars are engaging with industry partners and exploring diverse career pathways. Undergraduates are contributing meaningfully to research in both local and international settings. Faculty and staff are creating an environment where collaboration is expected and supported. This collective investment in people enables translation to occur with clarity, integrity, and care.

Strategic Investments

Over the past fiscal year, TPSC made targeted investments designed to strengthen people, ideas, and collaborative capacity across the Center. These investments were guided through a transparent, community-informed process shaped by regular discussions and recommendations from the Center's seven-member Advisory Committee, which meets monthly to help identify priorities and opportunities. Seed funding supported faculty innovation grants, travel and research awards for non-PI affiliates, and interdisciplinary team formation around emerging challenges in agriculture and environmental resilience. Additional resources advanced graduate and undergraduate training, student professional development, and community-building programs such as the Symposium, Summit, Career Exploration Initiative, and Kōrero series. Together, these investments reflect a deliberate strategy to build research momentum while ensuring that decisions are informed by the collective expertise and perspectives of the TPSC community.

Looking Ahead

TPSC continues to contribute at local, national, and global scales as the research landscape evolves. Our strength lies in our people and in our ability to connect ideas, expertise, and opportunity.

As Virginia Tech advances its Global Distinction initiative, TPSC contributes by elevating the quality and visibility of its scholarship, supporting research talent across career stages, and strengthening interdisciplinary partnerships. Institutional, philanthropic, and external investments remain essential to sustaining this momentum, and we are committed to stewarding these resources in ways that empower discovery and translation.

To those featured in this magazine, thank you for your leadership and creativity. To those new to TPSC, welcome. We invite you to engage with our community, explore partnerships, and help shape what comes next.

David Schmale
Director, TPSC (October 2023-present)
Professor, School of Plant and Environmental Sciences,
Virginia Tech
dschmale@vt.edu

Executive Summary

Executive Summary from July 2024 - June 2025	
Faculty Affiliates	42
New Faculty Affiliates as of February 1, 2026	7
Colleges Represented as of February 1, 2026	6
Departments/Schools Represented as of February 1, 2026	9
External Advisory Board Members	6
Graduate Students Advised	152
Postdoctoral Fellows/Research Scientists Mentored	16
Undergraduate Researchers Advised	43
Undergraduate Research Assistants	92
Peer-Reviewed Journal Publications	111
Internal Grants	7
External Grants	76
Amount of Internal Grants	$188,000
Amount of External Grants	$13,562,877
Total Amount of Grants	$13,750,877

Welcome New Faculty!

Dr. Renata Carneiro
Research Assistant Professor, Food Science and Technology

Dr. Dennis Cladis
Assistant Professor, Food Science and Technology

Dr. Enakshi Ghosh
Assistant Professor, Entomology

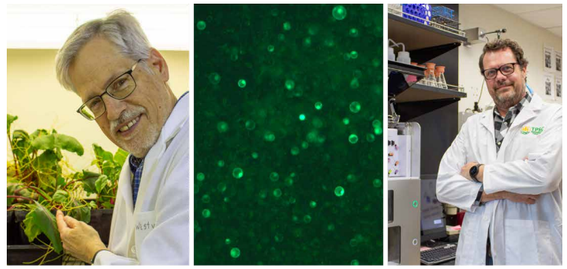
Dr. Allie Igwe
Assistant Professor, Biological Sciences

Dr. Priyamvada (Priya) Voothuluru
Assistant Professor, Plant & Environmental Sciences

Dr. Kong Wong
Assistant Professor, Biological Systems Engineering

Dr. Yongfa (Jay) You
Assistant Professor, Plant and Environmental Sciences

Organic Collaboration Propagates NSF Grant



Left to Right: Dr. Jim Westwood, *Cuscuta campestris*, & Dr. Bastiaan Bargmann.

James Westwood has come to believe that parasitic weeds are not just cunning adversaries but also likely to be potential heroes in plant genomics.

"I've come from the background of trying to think about practical control of parasitic weeds, and now I've come around to thinking about it as a tool where it's used for something good," said Westwood, professor in the School of Plant and Environmental Sciences. "I was not prepared for this, yet this is where science can take you if you just keep following your curiosity."

Westwood has been following that curiosity for three decades. His research of the invasive interlopers, along with multiple long-time collaborators, has led to a $1 million National Science Foundation grant to study the use of parasitic plants for a new method of plant genetic manipulation that could enhance food production.

"This is a novel and innovative idea of using cuscuta as a way to intruduce genetic changes without having to go through the tissue culture step."

Westwood's collaborators include the following:

- Bastiaan Bargmann, assistant professor in the School of Plant and Environmental Sciences at Virginia Tech
- Michael Axtel, professor at Pennsylvania State University
- Soyon Park, assistant professor at the University of Missouri

Westwood has been cultivating these collaborations for years. He has worked with Bargmann since the latter's arrival at Virginia Tech in 2019, with Axtel for over 12 years, and Park was Westwood's postdoctoral fellow before moving to Missouri a few years ago. With the new funding, Westwood and Bargmann have been able to hire their first joint researcher, Matilda Cashman '24, to help with this project fulltime.

Like pieces in a jigsaw puzzle fitting together, Westwood said that the aspects of the researchers' various projects came together at about the same time for the overall research goal of using genetically modified parasitic weeds, *Cuscuta campestris*, to manipulate the genomic properties of a host plant.

The researchers believe the findings could help address an increasing global demand for food caused by climate changes or growing populations.

"One way to address them is through traditional breeding, which is relatively slow. It could take a decade or more to bring a new crop to the market," said Bargmann, an affiliated faculty with the Translational Plant Sciences Center. "The application of biotechnology tools can greatly speed that up, or maybe even allow us to obtain traits that we couldn't get through traditional breeding, such as drought tolerance, increased nutritional benefits, or disease resistance."

There are several challenges to the traditional method of plant genetic modification. The first is the amount of time it takes for a plant to regenerate from tissue samples that have been genetically modified cells.

"This is a novel and innovative idea of using *cuscuta* as a way to introduce genetic changes without having to go through the tissue culture step," said Bargmann. "We basically infect the plant with the parasite and that will do the job for us. Then hopefully the next generation of seeds will have that genetic modification in it, which would be transformative technology."

Cuscuta's attachment to a host plant is similar to a graft junction of two plants in the same species that allows the RNA and proteins to travel across the graft junction.

"We know that the RNA and proteins will move from the parasite to the host, and if that could end up being transferred into the seed for a permanent genetic change, then that kind of completes the circuit of what we need to work," said Westwood, an affiliate with the Invasive Species Collaborative and theTranslational Plant Sciences Center.

Using a parasite to alter plants is not particularly new. Bargmann points out that bacteria are parasitic pathogens scientists have been using for years to transfer DNA and transform plants for desired results. What is novel is the use of a parasitic weed as a tool to genetically modify its host so that its seeds pass on that modification.

Another challenge with the more common genetic modification methods is the unpredictability of transferability of the method from one subspecies to another. For example, if one soybean plant is successfully modified, it is not a given if another varient of that soybean will be successfully altered using the same techniques.

"Even with soybeans, there are many varieties, and they're not all as amenable to transformation as others. There's certain ones that you can transform more easily and others that just will not," said Westwood, an affiliate with the Fralin Life Sciences Institute. "There's still a big bottleneck to using genetic engineering even in what you would think would be well known systems. It's not that easy."

Left to Right: Matilda Cashman, Hope Gruszewski, and Cinaiya Huddleston look at *Cuscuta campestris* tissue cultures. Photos by Felicia Spencer for Virginia Tech.

Westwood says that using the *cuscuta* parasite as a genetic modifier might address this because the parasite has a broad host range. It can attach to multiple hosts from different species and that often extends from one genotype variety to most others. In addition, the attached *cuscuta* vines create "bridges" between each of its different hosts, making it ideal for genomic modification.

"Weeds have always been a neglected and understudied area, and underappreciated," Westwood said. "But nothing is ever as simple as you think. This is why we keep going forward."

The Zhang Lab from left to right: Yaojie Zheng, Matheus Ogando do Granja, Luciana Rosso, Bo Zhang, Muliang Peng, Virginia Claire Lehmann, and Gordon Burton. Zhang's lab conducted soybean crosses at Moore Farm to develop both GMO and non-GMO varieties for animal feed and human consumption. Photo by Jordan Bass.

Dr. Bo Zhang, Associate Professor in the School of Plant and Environmental Sciences. Photo by Jordan Bass.

Q&A An Interview with Bo Zhang

What is the focus of your current research?
My research focuses on soybean breeding and genetics, with an emphasis on improving seed quality, agronomic performance, and market-relevant traits. I integrate field-based breeding, genomics, gene editing, high-throughput phenotyping, and data-driven forecasting to develop soybean varieties that meet the needs of growers, processors, and consumers.

In what way is your work "translational"?
My work is highly translational, bridging lab and field research with the development of commercial seed products. We translate emerging technologies such as gene editing, drone-based phenotyping, and predictive data modeling into improved soybean varieties that can be released, licensed, and widely adopted by seed companies and growers in the Mid-Atlantic region.

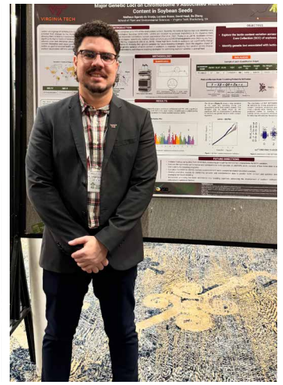
Above: Ph.D. student Yaojie Zheng operates a drone to collect phenotypic data from soybean parent lines. Photo by Jordan Bass.

Ph.D. student Yaojie Zheng preparing a drone for flight at Moore Farm. Photo by Jordan Bass.

What advice do you have for prospective graduate students?
Explore broadly to find what genuinely excites you, then fully commit to developing those skills. Be proactive, pursue hands-on research, and strengthen your resume through leadership, collaboration, and communication, because strong soft skills matter just as much as technical expertise.

What has been your most memorable experience since joining Virginia Tech and moving to Blacksburg?
One of my most memorable experiences has been sharing my research with the broader Virginia Tech community, particularly through opportunities like the Faculty Nutshell Talk and receiving research and innovation awards. These moments

Dr. Bo Zhang won the 2025 Faculty Nutshell Talks, hosted by the VT Center for Communicating Science.



Left: Dr. Luciana Rosso received the 2025 School of Plant and Environmental Sciences Outstanding Research Faculty Award. **Right:** The Zhang Lab attended the 2025 Soybean Breeder's Workshop: Pathology and Breeding Innovation in St. Louis, MO, where Ph.D. student Matheus Ogando do Granja presented his research poster "Major Genetic Loci on Chromosome 9 Associated with Lectin Content in Soybean Seeds."

reflect Virginia Tech's strong culture of collaboration, support, and appreciation for applied research.

Why did you choose to continue your career at Virginia Tech and become an affiliated faculty member with TPSC?
Virginia Tech offers a highly collaborative and supportive professional environment, with outstanding students and administrators who value translational science. TPSC is especially unique in enabling individual investigators to work within a truly multidisciplinary team. The openness, collegiality, and shared mission within TPSC make collaboration both productive and rewarding.

Do you teach? If so, how does teaching inform your research, and vice versa?
Yes, I teach Plant Breeding and Genetics. Teaching challenges me to distill complex concepts into clear, practical ideas, which strengthens both my research and mentoring. In turn, integrating real-world research questions, data, and technologies into the classroom keeps my teaching current, applied, and directly connected to the challenges students will face in their careers.

Every fall, the Virginia Tech Soybean Breeding Program harvests soybeans from Kentland Farm and other core research sites spread across the Mid-Atlantic. The program manages over 6,500 soybean research plots each year.

New International Research Experiences Program Sends Students to Austria

From left to right: 2025 IRES Austria program participants Julia Lane, Regina Hanlon, Jordan Lavey, Lucie Farrell, Jasper Cameron, and Dr. David Schmale.

Jordan Lavey piloting a drone for sampling bioaerosols in the atmosphere at a field site in Mauerbach, Austria.

From 2025-2027, undergraduate students will embark on a transformative journey to Austria, where they will conduct cutting-edge research on ice nucleation, the process by which water freezes at higher temperatures.

This International Research Experiences for Students project, funded by a $450,000 National Science Foundation grant, is led by David Schmale, professor in the College of Agriculture and Life Sciences and director of the Translational Plant Sciences Center.

"These students will be climbing alpine valleys, visiting glaciers, sampling pristine lakes, and flying drones above dense forests," Schmale said. "They'll collect data that could transform our understanding of ice nucleation processes in natural and managed ecosystems."

The program's interdisciplinary nature — merging chemistry and biology — equips students with unique perspectives on climate science. In previous years, students in similar programs led by Schmale gathered samples, collected data, and prepared presentations to summarize their research. For many, such as alumni Hamilton Crockett '20 and Jamie Benson '19, these experiences shaped their career paths.

"I gained not only research skills but also a deep appreciation for international collaboration," Crockett said. "These skills helped me excel in my role at the USDA, where promoting multicultural and international cooperation is essential."

"I feel incredibly fortunate that I was offered the opportunity to be part of a research project studying Austrian Alpine lakes as an undergraduate," Benson said. "The experience traveling to a different continent to work with a team of international collaborators gave me valuable experience implementing my Virginia Tech courses in a real-world setting."

Funding provided by the Institute for Critical Technology and Applied Science at Virginia Tech played a pivotal role in establishing the groundwork for the 2018 program in which Benson and Crockett participated.

"Programs like this shape the future of research by providing students with early exposure to the benefits of global scientific partnerships."

Broad impact on climate science and industry

The students' research will have implications far beyond academia, as ice nucleation research has the potential to inform climate prediction, environmental preservation, and commercial sectors worldwide. It is important for precipitation, the preservation of water-containing food products, the freeze protection of infrastructure, and the potential modulation of weather.

"A big part of this program is about helping students see the connection between their work and larger climate issues," said Regina Hanlon, a research associate at the School of Plant and Environmental Sciences who has previously accompanied students on similar journeys. "It's fulfilling to help students answer real-world questions and see the impact of their contributions to broader climate models and environmental management."

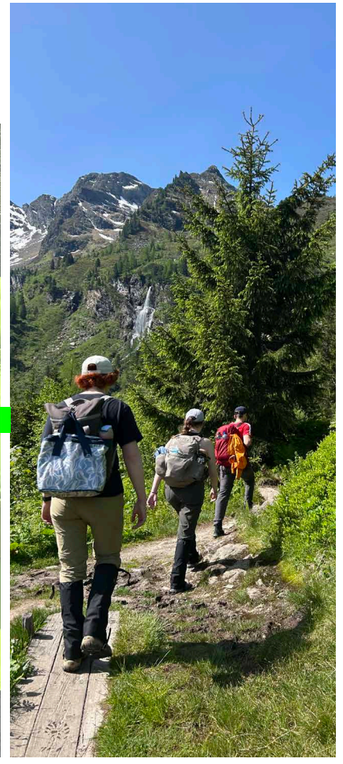
"It's rare to gain such comprehensive field experience at an undergraduate level," said Hinrich Grothe, a professor at the Technical University of Vienna. "The program will provide an unparalleled opportunity for undergraduates to acquire skills typically reserved for advanced researchers."

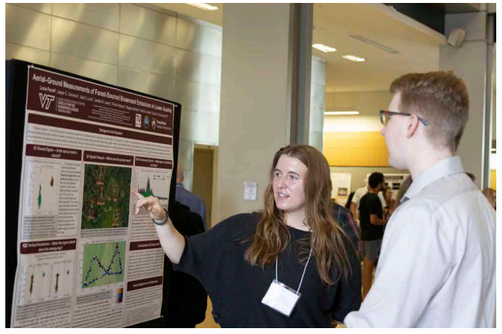
The program will actively recruit students from partner universities such as Morehouse College, Morgan State University, and Hampden-Sydney College.

"One of our primary goals is to provide research opportunities to undergraduates that may not have access to international experiences," Schmale said.

Beyond scientific development, the program fosters intercultural understanding by immersing students in Austrian history, culture, and daily life, as they work alongside Technical University of Vienna students and researchers.

"Programs like this shape the future of research by providing students with early exposure to the benefits of global scientific partnerships," said Keri Swaby, director of undergraduate research at Virginia Tech. "As our world becomes more interconnected, these collaborations are essential to solving some of the most pressing global issues."





Group hiking up Bodensee trail to lake systems in Schladming-Dachstein, Austria. **Left to right:** Jasper Cameron, Jordan Lavey, Florian Wieland (TU Wien PhD student), and David Schmale.

Above: Lucie Farrell at the Office of Undergraduate Research Summer Research Conference. **Top photo:** Group picture at Mauerbach campaign site in Mauerbach, Austria. **Left to right:** David Schmale, Julia Lane, Florian Wieland (Ph. D. student at TU Wien), Matthäus Rupprecht (Undergraduate, TU Wien), Jasper Cameron, and Jordan Lavey.

As students contribute to this global research effort, they'll not only gain technical expertise, but also emerge as global citizens prepared to tackle the world's most complex climate challenges.

Students can apply for the program online and receive a stipend, funds for travel to Austria, free housing and meals during the trip, and the opportunity to participate in cultural activities.

Learning in real-world environments

Each summer, students will spend seven weeks in Austria, working closely with Schmale, Grothe, and other mentors to conduct ice nucleation research in unique field and laboratory settings.

With Grothe's guidance, students will apply advanced techniques in aerosol sampling, microscopy, and spectroscopy, including the use of drones and cryotechnology to track particle formation and measure ice nucleation at a granular level. These insights are critical for refining climate models and exploring commercial applications, such as the production of artificial snow.

Hanlon described how her team has adapted spaces such as Airbnbs into makeshift labs for on-the-ground sample analysis.

"The students work through hands-on processes, such as aerosol sampling and data interpretation," Hanlon said. "This program turns young students into scientists, helping them to see the real-world value of their contributions."

The first cohort of students from 2025 (Jasper Cameron, Pacific University; Julia Lane, Virginia Tech; Jordan Lavey, Virginia Tech; and Lucie Farrell, Penn State) are highlighted in the pictures shown here.

Group Picture at Karlskirche (Vienna, Austria). **From left to right:** Jasper Cameron, Jordan Lavey, Lucie Farrell, and Julia Lane.

Career Exploration Initiative Cultivates Student Success

Participants of the 2025 Career Exploration Initiative. All Photos on these pages by Kathryn Liu.

Above: The first stop was Bayer, an industry working to increase crop production and find innovative solutions to restore natural resources through regenerative agriculture.

For 15 years the TPSC's Career Exploration Initiative has planted seeds of diverse opportunities in future agricultural professionals.

This year, 14 graduate students and postdoctoral fellows took part in the initiative's annual industry tour. They visited agricultural businesses in St. Louis, Missouri, with the goal of expanding the emerging professionals' mindsets related to future careers and collaborations.

"St. Louis has become a major hub for innovation in food, farming, and sustainability," said Kathryn Liu, a Ph.D. student in the School of Plant and Environmental Sciences in the College of Agriculture and Life Sciences and an organizer of this year's excursion. "The Center felt it was important to take the graduate students there to expose them to something different, to broaden their perspective, and to spark ideas by seeing what's possible when industry, research and technology all come together."

With financial support from the Virginia Tech TPS IGEP and FLSI, students toured Bayer Crop Science, Donald Danforth Plant Science Center, KWS Gateway Research Center, and 39 North. Several participants also took part in flash talks at Bayer and Danforth, lunch with Bayer employees, and panel discussions at KWS and Danforth.

"We weren't just there to observe, we wanted to engage meaningfully with the people in these companies," said Adam Sumner, Ph.D. student in the School of Plant and Environmental Sciences and one of this year's organizers. "By presenting our research and sharing our interests, we were able to introduce ourselves in a professional but personal way. It created a space for real conversations, and, hopefully, it laid the groundwork for future opportunities in industry."

"By presenting our research and sharing our interests, we were able to introduce ourselves in a professional but personal way."

Since 2005, the TPSC's graduate education — out of which the initiative grew — has helped students and postdocs branch out from the traditional agricultural career path.

"I always wanted to be part of product development and be part of something in innovations that becomes utilized in the world, and I guess I'm technically living the dream," said Ryan Anderson '11, who earned his Ph.D. in plant pathology, physiology and weed science and was in the first TPS program in 2005, then called the Molecular Plant Sciences program.

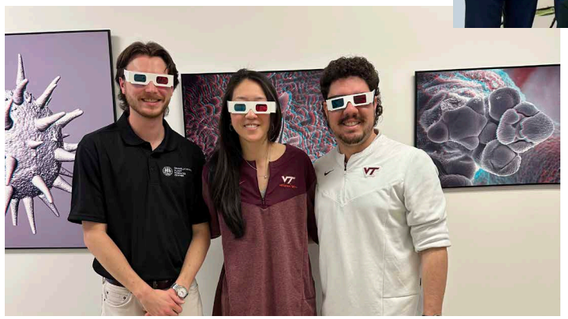
Anderson has helped cultivate the deeply rooted support system for current affiliates. Now working in North Carolina at the Swiss-based agriculture company, Syngenta, Anderson serves on the Fralin Life Sciences Institute's TPSC external advisory board and participated in a panel discussion as part of last year's CEI.

"It was cool because we're all from the same program," Anderson said. "I've connected with a lot of the students over LinkedIn now, and I've offered to look at their resumes to give them some advice."

Likewise, Nina Wilson '17, who earned her Ph.D. in plant pathology, physiology, and weed science, participated in the CEI's tours as a graduate student and recently established roots at Verb Biotics, a small start-up company that the group toured last year.

"The industry tour came at a great time for me because entering graduate school I wanted to be a professor, and then I realized in my third year that that was not what I really wanted to do anymore," Wilson said. "I loved going on the industry tour. I didn't have an idea of what it actually looked like, and it was really beneficial to speak with people that were in industry and get their perspective."

On the second stop of the 2025 Career Exploration Initiative, TPSC graduate students and postdocs visited KWS Group in St. Louis, MO.



Pictured with 3D glasses are members of TPSC's Graduate Student Organization who are involved in planning the CEI. **From left to right:** Adam Sumner, Kathryn Liu, and Matheus Ogando do Granja.

This year's tour followed suit, opening many participants' eyes to both the diverse possibilities in the field and the supportive nature of

Graduate students and postdocs gave flash talks at the Donald Danforth Plant Science Center.

Participants toured Bayer's greenhouses, engaged in a career panel, and shared flash talks with Bayer employees.

On the last stop, participants had the opportunity to speak with leaders at 39 North in St. Louis, MO.

Hokies who'd come before them.

"We had support from Virginia Tech alumni who now work at the Donald Danforth Plant Science Center. They were instrumental in helping us make connections and set up parts of the tour," said Matheus Ogando do Granja, a Ph.D. student in the School of Plant and Environmental Sciences. "They really wanted to give back and help create opportunities for current students."

Industries and Facilities Toured in 2025

BAYER Crop Science

DONALD DANFORTH PLANT SCIENCE CENTER

39°N

KWS

Virginia Tech researcher Tackles Corn Disease with Data

Kamal Chhetri received an American Phytopathological Society Student Travel Award to support his attendance at Plant Health 2025 in Honolulu, Hawaii. Photo courtesy of Kamal Chhetri.

Kamal Chhetri loads a DNA library into a nanopore sequencing platform in the Zeng Lab at Southern Piedmont Agricultural Research and Extension Center. Photo by Ayodeji Bello.

Corn, the most widely grown crop in the United States, is increasingly affected by foliar diseases such as tar spot, which can reduce yield and quality. Researchers at Virginia Tech's Southern Piedmont Agricultural Research and Extension Center (AREC) are working on data-driven solutions to help producers monitor, detect, and manage these potentially devastating diseases.

Tar spot, caused by the fungal pathogen *Phyllachora maydis,* was first reported in the U.S. in 2015 and spread to Virginia in 2022, leading to significant yield and quality losses. Visible symptoms of the disease initially include flecking and mild chlorosis, or yellowing, on leaves, stalks, and husks followed by the appearance of small, raised black spots known as stromata.

Traditional fungicide treatment practices depend on calendar-based applications rather than real-time disease monitoring. This approach involves applying fungicides at specific growth stages of a crop without assessing the actual presence of foliar diseases. Consequently, this leads to higher fungicide application costs, environmental issues, and the potential development of fungicide resistance in pathogens.

Ph.D. student Kamal Chhetri joined the Zeng Lab at the Southern Piedmont AREC in 2023 and has been making strides in sustainable disease management for crops with a particular focus on corn foliar disease epidemiology.

"My enthusiasm for plant pathology, technology, and data science inspired me to explore data-driven solutions by integrating pathogen monitoring with environmental data to improve current management practices in support of growers," Chhetri said.

Under the guidance of his advisors, TPSC faculty affiliate Dr. Yuan Zeng and plant pathologist Dr. David Langston, Chhetri uses do-it-yourself, low-cost, solar-powered spore trap samplers and a high-throughput sequencing approach to monitor airborne fungal pathogens in corn fields. High-throughput sequencing enables scientists to quickly and efficient read the DNA sequences of numerous samples simultaneously.

The data obtained from airborne microbial samples captured by the spore traps have effectively detected key corn fungal pathogens before disease symptoms were observed in growers' fields.

"The end goal is to develop an optimized fungicide application decision-support system for growers to better manage emerging and reemerging foliar fungal diseases in corn and other economically important crops," Chhetri said.

Funded by the Virginia Corn Board, Chhetri's study holds significant potential for the development of more innovative tools for pathogen monitoring, early disease warning, and informed fungicide decision-making.

"This innovative approach empowers farmers to predict plant disease outbreaks and optimize fungicide application timing, advancing the Zeng lab's mission to support sustainable crop production and enhance plant health in the face of climate change," said Plant Pathologist , Yuan Zeng.

Since joining Virginia Tech, Chhetri has deepened his understanding of plant pathology and gained valuable experience in conducting and managing field trials. He has also acquired practical skills in wet and dry lab techniques, including DNA extraction from environment and plant samples, and DNA library preparation.

"By merging airborne pathogen data from solar-powered spore traps, weather patterns, and disease severity trends, I aim to generate machine-learning models that predict plant disease outbreaks," said Chhetri. "Although focused on corn, the framework of my research can be applied to other crops."

Chhetri hopes his work at Virginia Tech will lead to more effective and sustainable disease management practices that will reduce crop losses and lower fungicide application rates, ultimately benefiting both farmers and Virginia's agricultural productivity.

A do-it-yourself, low-cost, solar-powered spore trap sampler. Photo courtesy of Kamal Chhetri.

Tree of Heaven Not so Heavenly

A tree-of-heaven covered in spotted lanternflies. Photo by Harrison Miles.

TPSC faculty affiliate Dr. Carrie Fearer.

The devilishly invasive plant from Asia grows quickly in natural areas and backyards, taking over habitats intended for native species. Its ecosystem impacts go far beyond that of just plants.

The tree-of-heaven is the native host to the invasive and destructive spotted lanternfly, a visually striking insect that colonizes quickly and destroys just as fast.

Researchers in the College of Natural Resources and Environment and the College of Agriculture and Life Sciences at Virginia Tech are examining if a natural fungus that kills the tree-of-heaven could be spread to other trees-of-heaven by the spotted lanternfly.

Forest pathologist Carrie Fearer, assistant professor in the College of Natural Resources and Environment, is leading the nearly $900,000 grant from the U.S. Department of Agriculture's Agricultural Research Service Areawide Pest Management Program, which is a collaboration with Penn State, Rutgers University, the University of Georgia, and the University of Minnesota.

The goal of the grant is to develop a native fungus as a biocontrol for the tree-of-heaven. Researchers are investigating whether the spotted lanternfly could help transmit the fungus from tree to tree, reducing the need for human intervention. The team also is testing other pathogens and pests that could control the tree-of-heaven and prevent the spotted lanternfly from spreading into vineyards.

"The ideal scenario is that humans inoculate a tree with the fungus, and the spotted lanternfly, through its cluster feeding, picks up the fungus," Fearer said. "Then the fungus could be transmitted to another healthy tree-of-heaven through the spotted lanternfly's feeding or by spores on the insect's body."

By reducing the food source of the spotted lanternfly, this project could also help reduce the insect's population as well.

Research on the project from the College of Agriculture and Life Sciences are Scott Salom, Thomas Kuhar, Doug Pfeiffer, Stefan Jaronski, and Ben Aigner. Drew Harner of the Alson H. Smith Jr. Agricultural Research and Extension Center, is also part of the project.

"After inoculating the trees of heaven with *Verticillium,* spotted lanternflies are caged on infected trees to ensure they are exposed to the fungus. It is thought reducing populations of tree-of-heaven will reduce the prevalence of spotted lanternfly. If the lanternflies can vector the fungus to healthy trees-of-heaven, the population should naturally reduce."

"Spotted lanternfly in particular can triple insecticide costs and management costs for vineyards", said Harrison Miles, Ph.D student. "It's a big impact on their bottom line."

After inoculating the trees-of-heaven with *Verticillium,* spotted lanternflies are caged on infected trees to ensure they are exposed to the fungus. Photo by Harrison Miles.

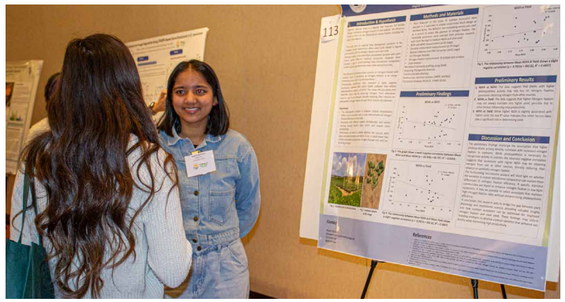
Symposium

On February 21, 2025, TPSC hosted a Symposium on Agricultural Resilience. This year's Symposium was organized by Drs. Courtney Leisner and Susan Whitehead and had over 125 registered attendees!

The Symposium highlighted 10 graduate students/postdocs who shared their current research in flash talks, a panel discussion focused on partnerships with growers with both Virginia Tech and external faculty members, along with 35 poster presentations from undergraduates, graduate students, and postdocs.

TPSC was honored to welcome two exceptional plenary speakers: Dr. Amélie C. M. Gaudin from the University of California, Davis, and Dr. Eric Von Wettberg from the University of Vermont. Additionally, faculty affiliates Dr. Maaz Gardezi, Dr. Allie Igwe, and Dr. Nicholas Santantonio delivered fascinating presentations.

Eight prospective graduate students participated in events throughout the week, including meeting with current graduate students, faculty, and the TPSC Director Dr. David Schmale. They also toured the university facilities and attended the symposium.



Top left: Dr. Amélie Gaudin presenting at the 2025 TPSC Symposium. **Bottom left:** Ph.D. student Gayatri Vanamala with her poster presentation.

Top right: Ph.D. student Aleks Halili discussing his research with Dr. Amélie Gaudin and Dr. Courtney Leisner. **Bottom right:** Ph.D. student Foster Agyei giving a flash talk.

Retreat

In late May, TPSC held its Annual Retreat at Mountain Lake Lodge, bringing together the community to celebrate recent successes and collectively envision the road ahead. The retreat emphasized mindfulness, science outreach, and impact, and the future of plant sciences.

Dr. Boris Vinatzer speaking with Dr. Song Li at the 2025 TPSC Annual Retreat.

Dr. Jim Tokuhisa and attendees at the 2025 TPSC Annual Retreat.

2025 TPSC Events

Attendees at the 2025 Agricultural Resilience Symposium at the Inn at Virginia Tech.

Agricultural Resilience Summit

On February 20, 2025, 28 faculty across campus along with key partners met at The Inn at Virginia Tech and Skelton Conference Center for a one-day Agricultural Resilience Summit, hosted by TPSC. With Dr. Katie Trozzo, serving as facilitator, the group explored ways to foster interdisciplinary collaboration and catalyze innovative and impactful initiatives that improve agricultural resilience for small farmers in our region and beyond.

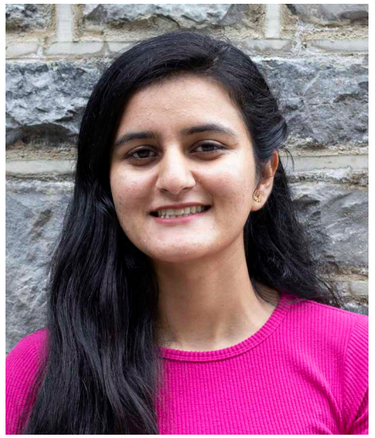
Attendees at the 2025 Agricultural Resilience Summit.

Dean of the College of Agriculture and Life Sciences, Mario Ferruzzi, gave the opening remarks at the Summit.

Honors and Recognitions (around TPSC)

Dr. Brenda Winkel, Professor of Biological Sciences

Brenda Winkel was appointed president-elect to serve as president of the Phytochemical Society of North America in 2025-26.



Sehgeet Kaur

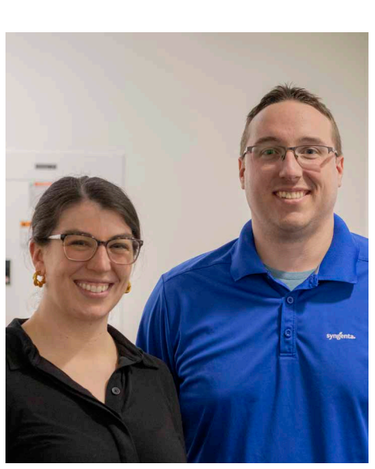
Ph.D. student Sehgeet Kaur from Dr. Boris Vinatzer's lab was selected for an American Society for Microbiology Future Leaders Mentorship Fellowship.

Lily Lefave

Graduate student Lily Lefave from Dr. John Jelesko's lab was awarded a TPSC grant, which went toward her travel to the 2025 Phytochemical Society of North America conference in Toronto, Canada.

Maria Paula Erazo-Garcia

Ph.D. candidate Maria Paula Erazo-Garcia received a Roundtable "Make a Difference" Scholarship for Graduate Study from the College of Science. She also received a Talk Excellence Award for her presentation at the 12th Aquatic Virus Workshop in Banyuls-Sur-Mer, France.



Dr. Rachel Egger and Dr. Stephen Rigoulot

On March 18, 2025, the TPSC Graduate Student Organization brought Rachel Egger and Stephen Rigoulot from Syngenta to campus, creating opportunities for meaningful dialogue and collaboration.

Dr. Sherif M. Sherif

Sherif M. Sherif received the 2025 School of Plant and Environmental Sciences Outstanding Extension Faculty Award. Sherif is dedicated to advancing the tree fruit industry through basic and applied research to develop sustainable crop production practices, innovative disease management approaches, and other strategies to optimize yield and quality while reducing environmental impact.

Matheus Correa Borba

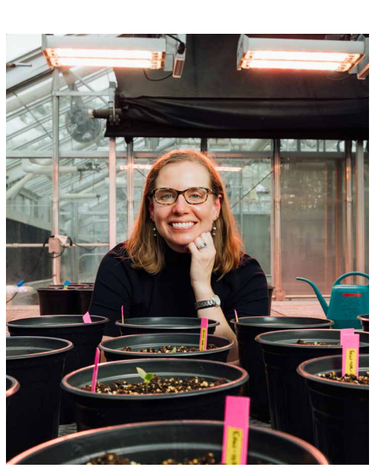
Ph.D. candidate Matheus Correa Borba received the 2025 School of Plant and Environmental Sciences Outstanding M.S. Student in Research Award. While completing his M.S. degree in Dr. Srđan G. Aćimović's lab, Matheus developed integrated disease management strategies for apples and pears, focusing on Fire Blight, Bitter Rot, and European Canker.

Dr. Caitlin Cridland and Dr. Kelsey Reed

Caitlin Cridland and Kelsey Reed taught middle school students about plant science and genetics as part of the Summer Enrichment Experience at VT.

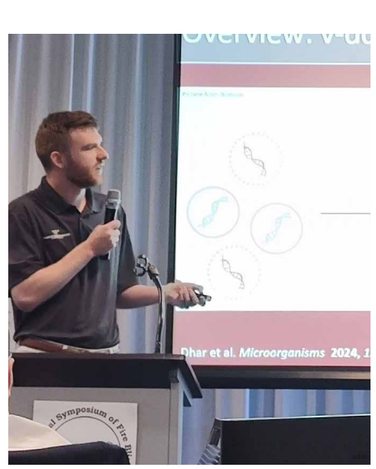
Dr. Song Li

Song Li hosted a summer coding workshop for plant single-cell data analysis at the Inn at Virginia Tech.



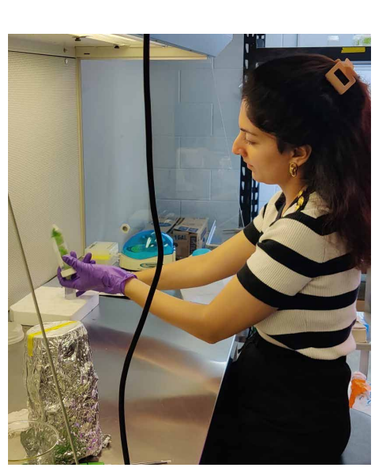
Dr. Courtney Leisner

Courtney Leisner received an $800K National Science Foundation grant to understand how plants fight pathogens with rising global temperatures.



Nathanial Boeckman

Ph.D. student Nathanial Boeckman from Dr. Srđan G. Aćimović's lab won first place in the graduate student oral presentation contest at the 4th International Symposium of Fire Blight on Rosaceous Plants.



Amolpreet Kaur Saini

Ph.D. candidate Amolpreet Kaur Saini from Dr. Sherif M. Sherif's lab was an invited speaker at the 2025 Mid-Atlantic Fruit and Vegetable Convention in January. She presented her work, "Rootstock Influence on Frost Tolerance and Bud Mortality in Apple: Key Genes for Germplasm Innovation."

Q&A with TPS IGEP Students

Daisy Cortes

What was the rotation process like?

DC: It gave me the opportunity to explore a range of research areas and knowledge gaps. Even though each rotation lasted a few weeks, I still felt like I was able to meaningfully contribute, learn new skills, and develop a small project in each lab. The process helped me better understand and experience different types of research environments and mentorship styles I thrive in, and it confirmed my interest in interdisciplinary plant science.

VCL: During each rotation, I worked on a small project, attended lab meetings, and spent time getting to know the research culture and mentoring styles. The process helped me understand not only the types of research questions that most excited me, but also the collaborative and supportive environment in which I could grow as a scientist.

What is your chosen lab and why?

DC: I decided to join the research collaboration led by Dr. Dorothea Tholl and Dr. David Haak because it offers an interdisciplinary approach to plant research that fits my career goals. I was excited by the opportunity to work at the intersection of biochemistry and bioinformatics, learning from two highly respected researchers with different expertise. During my rotation, I especially enjoyed building an RNA-seq analysis pipeline and learning volatile organic compound extraction followed by GC–MS analysis. The lab environment encourages both computational and experimental thinking, which is exactly how I want to approach plant science questions.

VCL: I chose to join the Zhang Lab because of its strong focus on translational applications in soybean breeding, its forward-thinking approach to aligning research goals with the future of agriculture, and its genomics-driven approaches to solving real-world agricultural challenges. I was especially drawn to the lab's integration of field and molecular research with computer science. Just as importantly, the collaborative lab culture and supportive mentoring style created an environment where I could both contribute meaningfully and continue to develop as a researcher.

What is your current research focus on?

DC: My research focuses on understanding genes and enzymes that control the formation of the phenylpropene volatiles myristicin and apiol in carrot. These compounds play an important role in carrot plant defense and bitterness, targeting both producers and consumers. Specifically, I am interested in identifying the biochemical route of myristicin synthesis and the enzymes involved in this pathway.

& Virginia Claire Lehmann

VCL: My current research focuses on developing superior legume microgreens using agronomic, nutritional, and sensory assessments. This is a collaborative project with the labs of Drs. Evans, Cladis, and Carneiro. This research aims to provide a basis for commercial recommendations on the top-performing variety.
I am also working on a soybean yield prediction model using Historical Southern Multi-State USDA Uniform Trial data with the You lab. This project aims to develop a soybean yield prediction model using environmental, management, and genotypic information to support breeding decision-making.

What are your career goals?

DC: My career goal is to work as a research scientist in applied research within the plant biotechnology sector, where I can contribute to the development of improved crop traits and technologies. I am particularly interested in roles that bridge data-driven discovery with experimental validation, where I will apply my graduate knowledge in bioinformatics and biochemistry. Ultimately, I aspire to lead my own research team to move discoveries from basic science toward real-world agricultural applications.

VCL: My long-term career goal is to be involved in applied agricultural research, where I can contribute to the development of crop varieties that are productive, resilient, and adaptable to future production challenges. I'm particularly interested in a career path that will allow me to collaborate across disciplines and support innovation in sustainable crop improvement.

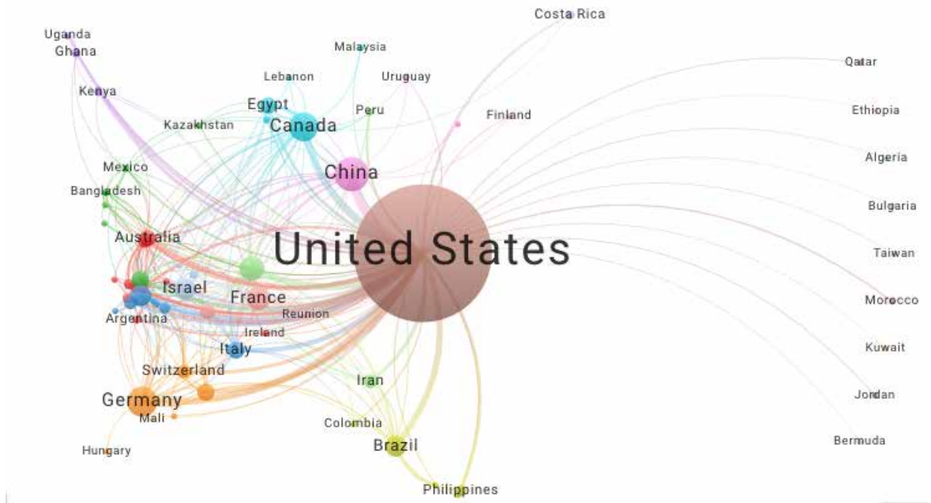
Why do you want to be a scientist?

DC: While growing up and visiting my grandparents' farm, I saw firsthand how plants could sustain families and communities, which sparked my early interest in plant biology. Later, working in industry for several years deepened that passion. I fell in love with the innovation process, especially seeing how long-term research can turn into practical tools that support agriculture and food security.

VCL: I want to be a scientist because I'm driven by curiosity and the opportunity to contribute research that has a meaningful impact on agriculture, for both breeders and consumers. I enjoy the process of asking questions, working through uncertainty, and the inspiration that comes with collaborating with others. I value how science challenges me to keep learning while contributing to something larger than myself.

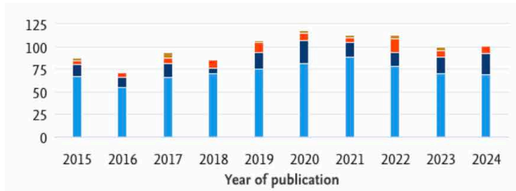
Global Partnerships

TPSC affiliates are publishing papers with co-authors from around the world. Figure below shows co-authors from 73 countries, representing 330 unique co-authorship links in 20 clusters over the last 10 years. Data extracted from Dimensions.ai for 'Translational Plant Science" on August 7, 2025.



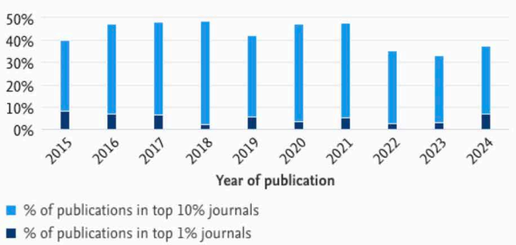
High-Impact Publications

TPSC affiliates are publishing high-impact papers. Figures below show that over 73% of our manuscripts are in the top 25% of cited publications (top) , 14% of our publications are in the top 10% most cited publications worldwide (middle), and 43% of our papers are in the top 10% of journals (bottom). Data extracted from SciVal for "Translational Plant Science Center" on August 7, 2025.



Quartiles	Publications	Publication share (%)
Q1 (top 25%)	719	72.6
Q2 (26% - 50%)	164	16.6
Q3 (51% - 75%)	80	8.1
Q4 (76% - 100%)	27	2.7

Cumulative shares	Publications	Publication share (%)
Q1 to Q2 (top 50%)	883	89.2
Q1 to Q3 (top 75%)	963	97.3



422 (42.6%)

number of publications in the top 10% journals by CiteScore

View list of publications

Translational Plant Sciences Center
Latham Hall
220 Ag Quad Lane
Virginia Tech
Blacksburg, VA 24061
Mail Code: 0390
https://translationalplantsci.fralinlifesci.vt.edu/
Jordan Bass, jordanb99@vt.edu
Program Coordinator (April 2024 - present)

@vt_tpsc

@VT_TPSC

Translational Plant Sciences Center