PURDUE UNIVERSITY
Institute for Digital and Advanced Agricultural Systems
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IDAAS HIGHLIGHTS

Summer Edition

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Website: ag.purdue.edu/idaas/

Dr. Katy Martin Rainey

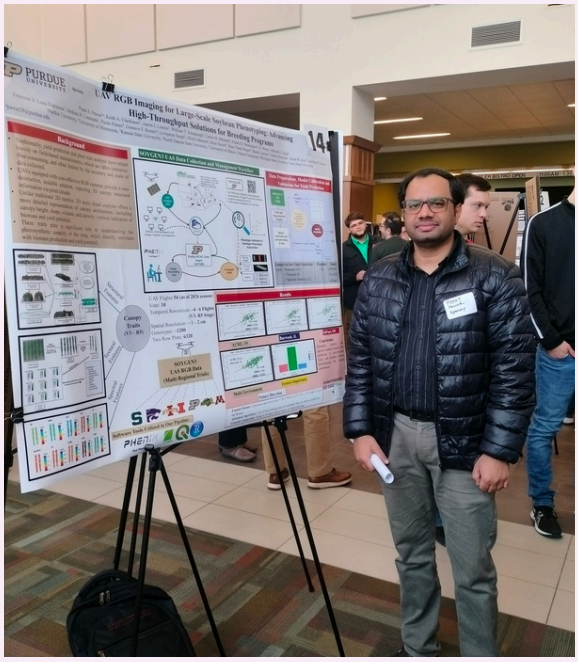
Professor

Purdue University - Agronomy

PURDUE UNIVERSITY | Agronomy

Katy Martin Rainey is a Professor of Agronomy at Purdue University with two decades of experience leading a public soybean breeding program. Dr. Rainey holds a Ph.D. in Plant Breeding from Cornell University and a B.S. in Botany from the University of Georgia. She has released eight soybean varieties, holds three Plant Variety Patents, has two patents granted, and has >55 research publications and dozens of invited lectures on the breeding, genetics, quality, phenomics, agronomy, physiology, and pathology of soybean, and she teaches introductory to advanced topics in genetics and crop improvement. She co-founded Progeny Drone, Inc., a Purdue startup specializing in image analysis tools for crop research, and served as its Chief Technology Officer until the company was acquired by Corteva Agriscience in 2024. She advises with and consults for the soybean seed industry on the use of drones in soybean yield prediction. Dr. Rainey is notable for her extensive private-sector engagement, especially breeding organizations and commodity boards, leadership extends to various advisory councils, including the Foundation for Food and Agriculture Research and she is currently a member of the Executive Committee of the National Association for Plant Breeding.

Driving Discovery: Postdoc Popat Pawar Pushes the Boundaries of Agronomic Innovation



My name is Popat Shiavji Pawar, and I am originally from India. I hold a PhD in Agricultural Engineering and currently serve as a Postdoctoral Research Assistant in the Department of Agronomy at Purdue University. My academic and professional journey has focused on integrating agricultural sciences with technologies like remote sensing, GIS, and data science to address challenges in agriculture. Before joining Purdue, I worked on a national project in India dedicated to building skills in using geospatial data for agriculture. This experience allowed me to develop strong expertise in geospatial data analysis and its application for managing natural resources, further fueling my passion for data-driven solutions in sustainable agriculture.

In 2024, I took my next giant leap by joining Purdue University as a postdoctoral research assistant on the SOYGEN3 (Science Optimized Yield Gains across Environments) project—a collaborative effort uniting eight leading U.S. universities to accelerate genetic gains in soybeans. The Rainey Lab at Purdue is at the forefront of this effort, using high-resolution UAS imagery from SOYGEN3 sites to extract detailed canopy traits from soybean crops. I work closely with Dr. Katy Rainey and Dr. Keith Cherkauer, developing automated image processing pipelines that transform drone imagery into valuable insights for crop phenotyping. This work helps to advance our understanding of how different soybean varieties perform across diverse environments, ultimately supporting more efficient and data-driven breeding strategies.

My work extends beyond the lab, as I collaborate with researchers across multiple states to coordinate drone data collection, streamline data management, and create interactive visualizations. I also explore predictive modeling approaches to better understand how soybean varieties perform in diverse environments. Using advanced image processing workflows, I extract key crop features—such as canopy cover, plant height, color, structure, and texture—from drone imagery collected on more than 1,200 soybean varieties planted across the U.S. north-central region.

I am passionate about bridging the gap between technology and fieldwork, making agricultural research more open and collaborative. Outside the lab, I enjoy sharing insights from drone imagery and innovative data visualizations to promote the wider adoption of geospatial technologies in agriculture. My commitment to open science includes developing open-source tools for processing and analyzing UAV imagery from agricultural field trials, empowering researchers and practitioners worldwide. Ultimately, my goal is to advance global agricultural sustainability by driving innovation through data-driven solutions.

Celebrating IDAAS Excellence 2024-2025

Purdue University and IDAAS proudly honors the outstanding achievements of its students and faculty for the 2024–2025 academic year. These individuals exemplify the university's commitment to innovation, leadership, and academic excellence.

🎓 Graduate Student Honors

Jude Dachi - Scholarship Award Winner
Ph.D. candidate in Agronomy, Jude focuses on soil and water conservation, watershed hydrological modeling, and nutrient management. His research at Purdue's SEND Lab emphasizes nutrient management and cover crop strategies to reduce nutrient loss at the watershed scale. The scholarship he received supports his participation in the Indiana Watershed Leadership Academy, enhancing his skills in watershed science, stakeholder engagement, and conservation leadership.

Harsh Pathak - IoT4Ag Shark Tank competition with his AHA: American Heartland Analytics
Harsh was awarded the IoT4Ag Shark Tank competition at the AHA annual event where startups and innovators pitch their solutions to enhance precision agriculture through Internet of Things (IoT) technologies.

Hui Wen - 2024 Lauren Christian Graduate Student Award
Under the mentorship of Dr. Luiz Brito, Hui received the 2024 Lauren Christian Graduate Student Award from the National Swine Improvement Federation (NSIF), recognizing her significant contributions to swine genetics and breeding.

Md. Samiul Basir - 2025 Outstanding Graduate Service Scholarship & Fredrick N. Andrews Environmental Travel Grant
Samiul was honored with the 2025 Outstanding Graduate Service Scholarship from the College of Engineering's School of Agricultural and Biological Engineering (ABE) on April 16, 2025. He also received the Fredrick N. Andrews Environmental Travel Grant of $1,500 in March 2025.

Amiya Kalra - 2025 Indiana View Student Scholarship
Amiya was awarded the 2025 Indiana View Student Scholarship, recognizing her contributions to geospatial science and technology.

Isabela Santos - Tri-State Dairy Nutrition Ph.D. oral competition
Isabela, a Ph.D. student in Animal Sciences, secured first place at the Tri-State Dairy Nutrition Ph.D. oral competition. Her presentation, "Video analytics as a tool for measuring total mixed ration uniformity on dairy farms," highlighted innovative approaches in dairy nutrition.

Adeayo Adewumi - College of Agriculture Pathmaker - Ph.D. Award/Bayer Crop Science University Mentoring Program
Adeayo received the College of Agriculture Pathmaker - Ph.D. award and was selected for the Bayer Crop Science University Mentoring Program, acknowledging his leadership and research in agricultural engineering.

Celebrating IDAAS Excellence 2024-2025

Sneha Jha - 2025 College of Engineering Outstanding Research Award
Sneha was honored with the College of Engineering Outstanding Research Award and the prestigious Bilsland Dissertation Award, reflecting her exceptional research contributions in agricultural and biological engineering.

Harsh Pathak - ABE Outstanding Graduate Student - Ph.D. Award
Harsh received the ABE Outstanding Graduate Student - Ph.D. award, recognizing his academic excellence and research achievements in agricultural and biological engineering.

Jayoung Lee - 2025 Journeyman Fellowship from the Department of Defense
Jayoung was awarded the Journeyman Fellowship from the Department of Defense (Army Research Lab), supporting her advanced research in engineering.

Joseph Pappas - 2025 NIFA National Needs Fellow
Joseph was named a NIFA National Needs Fellow, supporting his research in agricultural sciences and addressing critical national needs.

Kwanbena Bayity - 2025 FFAR Fellow & AGSERS Award-Third Place for Completed Posters, College of Education
Kwanbena was named a FFAR Fellow through 2028, supporting his professional development and career guidance to the next generation.

Josh Bailey - 2025 USDA NNF Fellow
Josh was named a USDA NNF Fellow, supporting his graduate training initiatives at Purdue University.

👩‍🏫 Faculty Accolades

Dr. Margaret Gitau - 2025 ASABE Presidential Citation
Dr. Gitau received the ASABE Presidential Citation, recognizing her leadership and contributions to agricultural and biological engineering.

Dr. Yaguang Zhang - 2025 ASABE Superior Paper Award for his publication
Dr. Zhang was honored with the ASABE Superior Paper Award for his publication on combine performance analyses in wheat harvests using GNSS data.

Dr. Dennis Buckmaster - 2025 Learning Community Instructor of the Year
Dr. Buckmaster was named Learning Community Instructor of the Year, acknowledging his dedication to student learning and engagement.

Dr. Luiz Brito - 2025 Purdue University Faculty Scholar
Dr. Brito was recognized as a 2025 Purdue University Faculty Scholar, highlighting his outstanding research and mentorship in animal sciences.

Celebrating IDAAS Excellence 2024-2025

👩‍🏫 Faculty Accolades (continued)

Dr. Songlin Fei - 2025 Award in Forest Science, Society of American Foresters
Dr. Fei received the award in Forest Science, for his distinguished research contributions in the quantitative, managerial, and/or social sciences, leading to the advancement of forestry.

Dr. Bryan Pijanowski - 2025 Fellow, American Association for the Advancement of Sciences
Dr. Pijanowski was named the 2025 fellow for his scientifically or socially distinguished efforts to advance science or its applications.

Dr. Mohit Verma - 2025 Showalter Faculty Scholar
Dr. Verma was named the Showalter Faculty Scholar for his exceptional research achievements in the life sciences.

Dr. Robert Stwalley - 2025 Outstanding Teacher Award for Clinical Faculty & Continuing Lecturers
Dr. Stwalley was recognized for having demonstrated a strong commitment to teaching, the ability to engage and motivate students.

Dr. Darcy Telenko - 2025 PUCESA Leadership Award
Dr. Telenko was awarded for her exceptional leadership and significant contributions to a specific and highly effective Extension program.

Dr. Ankita Raturi - 2025 Maxwell/Hanrahan Award in Food, Maxwell/Hanrahan Foundation
Dr. Raturi was awarded for her hands-on innovative work that significantly impacts areas such as nutrition, food access and education, environmental sustainability, and the preservation of cultural food traditions.

Dr. Michael Langemeier - 2025 Distinguished Extension/Outreach Program Award, Agricultural & Applied Economics Association
Dr. Langemeier was awarded for his excellence in extension and outreach programs within the field of agricultural and applied economics.

Dr. Trey Malone - The Scoop's 40 Under 40 List, Farm Journal; AEPP Outstanding Article Award, Agricultural & Applied Economics Association
Dr. Malone was recognized for his innovation, leadership, and commitment to advancing ag retail and supporting farmers.

Dr. Roberto Gallardo: 2024 Acorn Award on behalf of PCRD for the READI 1.0 Evaluation, The Caterer
Dr. Gallardo was awarded for his secured external research funding of $1 million or more for a single proposal.

Dr. Valerie Kilders - Teaching Early Career, Agricultural Economics Department
Dr. Kilders was awarded for her strong commitment to teaching and student engagement.

INSIDE IDAAS

Throwing Ideas and Discs

The Institute for Digital and Advanced Agricultural Systems (IDAAS) knows how to balance groundbreaking research with good old-fashioned fun. The IDAAS team took a break from the lab and laptops to hit the Purdue campus disc golf course for a mid-day recharge—and a few well-aimed throws.

IDAAS champions innovation at every level, and moments like this serve as a reminder that creative breakthroughs often start with shared experiences—and maybe a little friendly competition.

Field Notes: Voices of Innovation

Are you working on something amazing in digital agriculture? Whether you're testing the latest tech in the field, mentoring students through hands-on research, exploring sustainable solutions, or developing tools that transform how we grow and manage crops—we want to hear your story!

At the Institute for Digital and Advanced Agricultural Systems (IDAAS), we're building a new way to showcase the real innovation happening in our community. That means YOU—students and faculty—can be featured across our newsletter, social media, podcasts, and more. Your work could inspire future collaborators, attract funding, or just get the spotlight it deserves.

🚀 Share Your Projects, Ideas & Impact

We've made it easy: fill out a quick Airtable form and tell us what you've been working on—whether it's a class project, thesis research, outreach event, or a major research breakthrough. It only takes a few minutes, and you can even upload files like a paper, presentation, or flyer. Got a link to a cool website or video? Drop that in too!

We may reach out to help shape your story for different platforms—but don't worry, we'll make it quick and easy. We know you're busy. 🙌

🎯 Click here to share your story

Whether you're a student just starting out or a faculty member leading the charge, your voice matters. Your work is shaping the future of ag—and we want the world to see it. Let's elevate the incredible research, teaching, and outreach happening in our fields, labs, and classrooms.

RESEARCH ROUNDUP

Trends in Agricultural Technology: A Review of US Patents Priscila B. Cano et al., Precision Agriculture (June 2025)

🔍 Quick Summary:

This open-access review analyzed 32,365 U.S. patents (2014–2024) across eight technology categories important for precision agriculture: Robotics & Automation, Biotechnology, Computing & Cloud, Communications, AI/Data Science, Information Systems, Manufacturing Equipment, and Resource Tech.

📈 Why It Matters

The study maps where agricultural tech innovation is concentrated—and where there's untapped potential. It guides policymakers, researchers, and industry toward future investment hotspots, especially within identity-centered data systems and digital frameworks in AgTech.

Read the full paper here: https://link.springer.com/article/10.1007/s11119-025-10257-x

Opportunities & Challenges in Combining Optical Sensing with Epidemiological Modeling

Featuring IDAAS member and corresponding author Dr. Cruz

🔍 In Brief:

This latest Phytopathology paper explores how optical sensing (multispectral, hyperspectral, thermal, LIDAR) can feed into epidemiological models to improve plant disease detection, mapping, and parameter selection—and vice versa. The authors highlight key challenges including sensor standardization, data quality, disease identification, and creating open-access databases.

📌 Why It Matters:

By bridging remote sensing and disease modeling, this work advances data-driven plant-health monitoring—a crucial step for precision agriculture.

🔗 Read the full open-access paper: https://apsjournals.apsnet.org/doi/10.1094/PHYTO-11-24-0359-FI