



DONALD DANFORTH  
PLANT SCIENCE CENTER



the  
**Leaflet**

VOLUME 23 • ISSUE 2 • FALL 2021

THE ROAD TO GREATER FOOD  
SECURITY FOR ALL PEOPLE

*The Leaflet is a publication for partners,  
friends, and supporters of the Donald  
Danforth Plant Science Center.*



## DONALD DANFORTH PLANT SCIENCE CENTER

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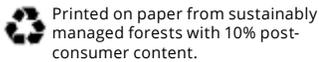
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The Leaflet, spring 2021, vol. 23, issue 2

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photography: Adobe Stock (cover, 3, 8, 10, 12, 20);  
Alamy Stock (3 upper right); ASPB (13); Advanced  
Bioimaging Lab (13); courtesy Benson Hill, Inc.  
(11 top); Bruton Stroube Studios (5); Cavan (3  
lower left); courtesy Danforth family (18 left  
and center); Devon Hill (12, 19); courtesy IRRI (8);  
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### Mission

To improve the human condition through plant science

### Vision

As a world center for plant science research, our discoveries will help feed the hungry and improve human health, preserve and renew our environment, and enhance the St. Louis region.

### Values

Collaboration • Diversity and Inclusion • Innovation • Integrity and Respect • Environmental Sustainability • Stewardship





## Feed the World

Cassava, quinoa, teff, fonio, sorghum—these names may not be as familiar to Western audiences as rice, corn, wheat, soy, potato, but they are important. Eleven thousand years ago, humans began selecting plants for domestication, a shift that brought about civilization as we know it. Today staple crops are still the basis of that stability. Food security means ensuring that all people have access to sufficient, safe, and nutritious food. At the Danforth Center, **we believe that food security is a basic human right.**

Our world is changing: the climate, the population. Already hundreds of millions of people lack a sufficient, nutritious diet. With current farming methods, there simply is not enough soil and water to grow the food we need while preserving a livable planet. We must find new, innovative ways to make agriculture more productive and sustainable.

Doing something larger, systematically, and sustainably takes longer, but ultimately has greater potential to improve more lives. The Danforth Center's many talented scientists are working to discover the underlying mechanisms of plants and to use those mechanisms to produce more helpful, fruitful, and resilient crops. We are proud to report in this issue on recent leaps forward in our work to *feed the hungry and improve human health.*



# News & Events

## DANFORTH CENTER NAMED “TOP PLACE TO WORK”

The Danforth Center is proud to announce that we have been named a 2021 Top Workplace by the *St. Louis Post-Dispatch*. This honor is a reflection of our community, the work we do together, and the values we uphold. We strive to foster an environment characterized by excellence, trust, and interdependence, where contributions and achievements by every person are recognized, appreciated, and valued. Visit our website to hear what community members have to say—or to view our open positions.



## CELEBRATING BLACK SCIENTISTS

For the second annual #BlackBotanistsWeek, a celebration of Black scientists on social media, the Danforth Center highlighted the important work of Black scientists at the Center, including **Kevin Cox, PhD; Seth Polydore, PhD; Kiona Elliott, Taylor Harris, and Tira Jones**. Diversity and inclusion are core values of the Danforth Center. Through their research and their dedication to making plant science more inclusive, Kevin, Kiona, Seth, Taylor, and Tira are making the Danforth Center and the entire plant science community a better place. Visit the Danforth Center blog to read their stories.

## UNITING TO FIGHT CLIMATE CHANGE

The Danforth Center has joined the Decade of Ag, a movement of the U.S. Farmers and Ranchers Alliance to unite the agriculture sector around a shared vision for a more sustainable future. The Danforth Center joins more than sixty other companies and organizations in this effort, as momentum grows to take bold, unified action to mitigate the effects of climate change. "It's going to take all of us – industry, NGOs, scientists, farmers, academia, and a committed public – to move the needle on climate change," said **Stephanie Regagnon**, Executive Director of Innovation Partnerships, at the Danforth Center.

• Taylor Harris



• Top Place to Work



### TIKTOK SCIENCE FOR THE MASSES

Like many people these days, **Katie Murphy, PhD**, is spending a lot of time on TikTok. But Katie comes to the platform with a mission: to help more young people see themselves as scientists.

As recently profiled in the *Washington Post*, Postdoctoral Associate Katie Murphy, PhD, wants to show that “science is for everyone.” She is documenting her work in the Gehan lab at the Danforth Center in hopes of making science and scientific careers more accessible. Follow her on Instagram and TikTok as @Real\_Time\_Science.



### RHYTHM RESEARCH

The National Institute of Health (NIH) is seeing the connection between plants and human health. In March, the NIH awarded a grant to Danforth Center Principal Investigators **Sam Wang, PhD**, E. Desmond Lee Endowed Professor at the University of Missouri–St. Louis, and **Dmitri Nusinow, PhD**, for a project that could uncover secrets about the way our bodies work. Through their research, Wang and Nusinow hope to discover the molecular mechanism of interplays between the circadian clock and lipid metabolism. When there is a misalignment in these systems, humans develop metabolic dysfunctions, such as obesity and diabetes.

### CORN SUSTAINABILITY

There are more seeds of corn planted each year in the United States than stars in the Milky Way, so it stands to reason that any advances in sustainable ag must include corn. A new grant from Foundation for Food & Agriculture Research and Bayer Crop Science is allowing Danforth Center Principal Investigator **Chris Topp, PhD**, to study the effects of corn breeding programs on the crop’s root systems with the goal of making them more sustainable. Maize breeding programs have increased corn yields, but our knowledge on their impact on sustainability is relatively unknown. The Topp lab is working to change that.

### MEET THE FARM MANAGER

**Eli Isele** recently joined our community to manage the Danforth Center’s new Research Field Site at Planthaven Farms. As farm manager, Eli’s role aligns with his personal passion for working with smallholder farmers. After living with farmers in Malawi in the Peace Corps, he experienced firsthand how a lack of access to agricultural technology can impact families and their communities. “I feel really good knowing that I am helping research move forward and creating an environment that will help produce good results,” says Isele. Visit the Danforth Center blog to read about his work.

• TikTok Science



• Eli Isele



• Sam Wang, PhD





Farmers harvesting cowpeas. Cowpeas, or black-eyed peas, are an important staple crop in Africa. The Danforth Center recently helped bring a pest-resistant variety to market in Nigeria, where it has potential to improve farmers' livelihoods and health. (Credit: Panos)

## Now in Farmers' Hands

**HISTORY MADE AS IMPROVED COWPEA, FIRST GM FOOD CROP, IS DISTRIBUTED IN NIGERIA**

KANO, NIGERIA – June 29—In a historic first, pod-borer-resistant cowpea has been released to farmers in Nigeria. This marks the first commercial launch in Africa of a wholly public-sector developed biotech food crop and is a major achievement in delivering plant science innovation to smallholder farmers.

On June 29, improved cowpea was released at a special ceremony in Kano, Nigeria, attended by **Don MacKenzie, PhD**, executive, executive director of the Danforth Center's Institute for International Crop Improvement (IICI). The IICI was instrumental in securing final approval from the Nigerian government, moving a decades-long project over the finish line.

"Seeing that innovation in the seed bag, ready for delivery to farmers, is the ultimate reward," said MacKenzie. "Now our job is to ensure that farmers have a good experience and that the benefits are sustained."

### "MEAT FOR THE POOR"

Cowpeas (*Vigna unguiculata*) are a member of the protein-rich legume family known in the United States as black-eyed pea. It is an important crop in semiarid regions across Africa, and more than 200 million people depend on it for their daily dietary protein. In Hausa, the name for cowpea is literally "meat for the poor."

### THANKS TO OUR PARTNERS

The Danforth Plant Science Center is thankful to be a partner in bringing improved cowpea to Nigeria with: African Agricultural Technology Foundation (AATF); Commonwealth Scientific and Industrial Research Organisation (CSIRO); Institute for Agricultural Research (IAR) of Ahmadu Bello University, Zaria; Savanna Agricultural Research Institute (SARI), Ghana; Institut de l'Environnement et de Recherches Agricoles (INERA), Burkina Faso; National Agricultural Seeds Council (NASC), Nigeria; and the National Biotechnology Development Agency (NABDA), Nigeria. AATF facilitated the development with funding support from the United States Agency for International Development.

Nigeria is the world's largest producer and consumer of cowpeas, yet more than 40 percent of cowpeas consumed in Nigeria are imported. Cowpea tolerates drought and poor soils, and like many legumes, fixes its own nitrogen. However, the crop is susceptible to pod borer insects with losses up to 80 percent when attacked. To keep the insects at bay, Nigerian farmers spray pesticides six to ten times throughout the growing season, often with no protective gear, at substantial expense and risk to their health.

#### HOW (WELL) IT WORKS

Pod-borer resistant (PBR) cowpea relies on a gene from *Bacillus thuringiensis* (Bt), a naturally occurring, soil-borne bacteria long used in organic agriculture to control certain insect pests. The initial research was done by TJ Higgins of the Commonwealth Scientific and Industrial Research Organization in Australia working with Mohammad Ishiyaku of the Institute for Agricultural Research, Ahmadu Bello University, in Zaria, Nigeria. The improved cowpea has been field-tested in Nigeria since 2009. Research and regulatory work demonstrate nearly complete protection against the pod borer. It is expected to increase yield by 20 - 80 percent and reduce Nigeria's reliance on imported cowpea.

"With PBR cowpea, not only will yields increase dramatically, but farmers can significantly reduce pesticide use, which will benefit farmers' health, as well as the environment," said MacKenzie.

#### NIGERIA LEADS, MORE TO COME

Nigeria has demonstrated substantial leadership in embracing technology for the benefit of its farmers, first with Bt cotton in 2018 and now with cowpea. A market-based approach to crop improvement has been essential to gaining acceptance and creating sustainability. PBR cowpea exemplified this approach by ensuring that farmers' voices were heard throughout the process.

"The distribution of PBR cowpea this June demonstrates that biotech food crops have a path to market with African farmers," said MacKenzie. Danforth Center partners in Nigeria have been working with colleagues in Ghana and Burkina Faso on field testing PBR cowpea and regulatory applications in those countries are anticipated soon. Dialogue continues with Nigerian farmers to determine the next generation of cowpea innovations, whether they be expanded pre- and post-harvest pest resistances, increased yield, or improved weed control.



*Nigerian farmer purchasing improved cowpea. SAMPEA 20-T, as the variety is known, is resistant to the devastating pod borer insect, increasing yields and minimizing pesticide use.*



*Danforth Center IICI Executive Director Don MacKenzie, PhD (center), at the unveiling of improved cowpea in Kano, Nigeria. (Images courtesy of NABDA)*



**"A huge milestone for a superfood"**

*St. Louis Public Radio, "St. Louis on the Air," August 4, 2021*

*Golden Rice enriched with beta-carotene alongside standard basmati. Golden Rice has the power to help combat childhood blindness due to vitamin A deficiency. The crop cleared an important regulatory hurdle in the Philippines this summer. (Credit: International Rice Research Institute).*

## Golden Rice One Step Closer

### COMMERCIAL PROPAGATION APPROVED IN PHILIPPINES

A major milestone has been reached in the journey toward improving the health of millions of people: Golden Rice was approved for commercial propagation in the Philippines in July 2021. The Danforth Center's **Institute for International Crop Improvement (IICI)** is working closely with the Philippine Rice Institute (PhilRice) and the International Rice Research Institute (IRRI) to help bring this crop to market.

"Hard work and diligence over the past six years by our regulatory partners at PhilRice and IRRI have now positioned Golden Rice to achieve impact," said Don MacKenzie, executive director of the IICI (formerly with the IRRI).

This is the first authorization for commercial propagation of a genetically engineered rice in South and Southeast Asia. The rice still requires varietal registration based on consistent good field performance prior to release to farmers in the Philippines. Golden Rice has previously been approved for use in food by the US, Canada, Australia, and New Zealand.

### SEEING IS BELIEVING

Golden Rice was developed as a humanitarian project to help treat vitamin A deficiency, a condition which kills or blinds more than one million children each year. At present, only 2 out of 10 Filipino households meet the estimated average requirement for vitamin A intake in their daily diet. Golden Rice has the potential to provide a significant amount of the nutrient and is considered an effective complementary approach to existing nutritional interventions such as diet diversification and oral supplementation.



*Child harvesting rice. Only 2 out of 10 Filipino households meet the estimated average requirement for vitamin A intake in their daily diet. Golden Rice could become part of the standard suite of interventions there in coming years.*

**"A potential key to feeding large swaths of Africa" -**  
*St. Louis Post-Dispatch, June 23, 2021*

Visit [danforthcenter.org](http://danforthcenter.org) and click "In the Media" to read the article.



## Improved Cassava Clears Another Hurdle

### KENYA APPROVES NATIONAL PERFORMANCE TRIALS FOR VIRCA PLUS CASSAVA

In another historic milestone this year, disease-resistant cassava was approved for national performance trials in Kenya. It is the first product developed by public sector researchers to reach this stage in East Africa. This is the final step in testing new varieties before they can be registered and released to farmers.

Cassava is a staple food for 500 million Africans. It is a hardy crop that can withstand conditions of heat, drought, and poor soils, but it is threatened by cassava brown streak disease (CBSD). CBSD rots the starchy storage roots and often goes undetected until harvest, when the entire yield can be destroyed by this virus-caused disease.

To develop resistant varieties, researchers used modern biotechnology to introduce a small part of two viruses that cause CBSD into the genetic makeup of the cassava plant. This triggered naturally occurring defenses present in the plant, enabling it to activate its defense mechanisms prior to arrival of the pathogen. The plant is then primed to recognize and resist development of the disease.

Improved cassava shows high and stable defense against the disease. It has been evaluated for more than five years in 20 confined field trials across six different locations in Kenya and Uganda. It is now also under testing in Rwanda.

Virus Resistant Cassava for Africa Plus (**VIRCA Plus**) is a multi-institutional collaboration with partners in Kenya, Uganda, Rwanda, and Nigeria. **Nigel Taylor, PhD**, Dorothy J. King distinguished investigator at the Danforth Center has been working on the project for nearly 15 years.

*A shopper selects from unblemished cassava roots in the market. The Danforth Center's VIRCA Plus project has cleared another regulatory hurdle in Kenya. (Credit: Sticks & Stones)*



*"Today, we are one step closer to bringing about better lives and livelihoods for Kenya's farmers."*

*-Nigel Taylor, PhD, Dorothy J. King Distinguished Investigator*

#### THANKS TO OUR PARTNERS

*The Danforth Plant Science Center is grateful to be a partner in bringing improved cassava to Kenya with: Kenya Agricultural and Livestock Research Organization (KALRO); the National Agricultural Research Organisation (NARO) in Uganda; National Root Crops Research Institute (NRCRI) in Nigeria; and the Rwandan Agriculture Board (RAB), with ISAAA AfriCenter and SCIFODE providing communication and policy outreach support. This work was funded by Bill + Melinda Gates Foundation, USAID Feed the Future, Bayer Crop Science, and by donors like you. To learn more about supporting work like this, visit the Get Involved section of [danforthcenter.org](http://danforthcenter.org).*



*Danforth Center's partnership with Wells Fargo Innovation Incubator is helping bring greater sustainability to agriculture faster than ever before. This year's cohort of agtech startups focuses on indoor agriculture.*

*The 39 North innovation community is a 600-acre district anchored by the Danforth Center, BRDG Park, Benson Hill, Bayer Crop Science, Helix Incubator, Yield Lab, and others. For the latest news, visit [39northstl.com](http://39northstl.com).*



## Jumpstart the Food Security Revolution

WELLS FARGO IN<sup>2</sup>, DANFORTH CENTER HELP SPEED PROMISING TECH TO MARKET

Today one in eight people is food insecure, meaning they don't have access to sufficient, safe, nutritious food. By 2050, the world's population is projected to be 9.7 billion. To feed everyone, we will need to produce more than double the current amount of food—and do so with less land, less water, and subject to an unpredictable climate. Danforth Center scientists are chasing answers to potentially transformative questions—and they are helping speed promising tech to market through an ongoing partnership with **Wells Fargo Innovation Incubator (IN<sup>2</sup>)**.

The IN<sup>2</sup> sustainable agriculture initiative pairs agtech startups with Danforth Center principal investigators to validate their technology and accelerate their progress. Companies are selected for their potential to positively impact the environment and receive financial support and access to investor networks. Recently, the third agtech cohort was announced. With a focus on indoor ag, they include:

- Atlas Sensor Technologies (El Paso, TX) – Real-time water hardness monitoring to reduce cost and waste
- GrowFlux (Philadelphia, PA)— Intelligent horticulture lighting, up to 30% more efficient
- Motorleaf (Montréal, Québec)—Automated AI yield predictions for indoor growers
- New West Genetics (Ft Collins, CO)—Genomics-assisted breeding for the hemp industry
- SunPath (Louisville, CO)—Fiber optic indoor lighting for efficiency

“Indoor agriculture provides several environmental and operational benefits, but these processes typically produce more greenhouse gas emissions than field-grown systems,” said Trish Cozart, IN<sup>2</sup> program manager at National Renewable Energy Lab, another IN<sup>2</sup> partner. **“It’s critical to make indoor agriculture more sustainable.”**

"Ingredients are key for plant-based meat alternatives... Benson Hill expects last year's sales of about \$100 million to surge."

- Wall Street Journal  
May 9, 2021



## Danforth Center Spinout Benson Hill Goes Public

VALUED AT \$1.35B—ONLY THE SECOND "UNICORN" IN ST. LOUIS

They are called "unicorns" because they are rarely seen. In Silicon Valley slang, a "unicorn" is a privately held startup company valued at over \$1 billion. St. Louis witnessed its first two unicorns in rapid succession this September: Nerdy, then Benson Hill.

Benson Hill, Inc., a food technology company co-founded by Danforth Center Principal Investigator **Todd Mockler, PhD**, went public in late September. After merging with Star Peak Corp. II, a special-purpose acquisition company, in a deal that offered a pre-money valuation of \$1.35 billion, Benson Hill began trading on the New York Stock Exchange under ticker symbols "BHIL" and "BHIL.WS." We caught up with Dr. Mockler on his way to New York to ring the bell:

**1. How do you feel about the fact that Benson Hill just went public as a "unicorn," only the second unicorn in St. Louis?**

"We knew this direction held so much potential, so it's a great validation. I could not be prouder of everything Matt and the Benson Hill team have accomplished. This is a win for St. Louis and for the planet."

**2. When did you first realize Benson Hill was going to be big? How did your work at the Danforth Center prepare you to spinout a company?**

"We knew the idea to apply genomics and data science to agtech was big, even back in 2012, but we had to move quickly. The Danforth Center actively encourages the acceleration of big ideas into the marketplace. I don't know if we would have succeeded to this level without the Danforth Center's culture of innovation."

**3. Do you see another startup in your future?**

"I am currently working on a new startup called Lone Wolf Genetics. We're applying some of the same technologies and approaches—genome analysis, predictive breeding, gene editing, high-throughput phenotyping—all driven or enabled by AI—to cannabis, including industrial hemp."

On October 5, Benson Hill co-founders rang the bell on the floor of the NYSE. From left: CEO Matt Crisp and Danforth Center Principal Investigator Todd Mockler.

**BENSON HILL™**



### BENSON HILL TIMELINE

**2012** – Co-founded by Todd Mockler (Danforth Center) and Matt Crisp

**2018** – Obtains series C financing from Google Ventures (GV), first in St. Louis

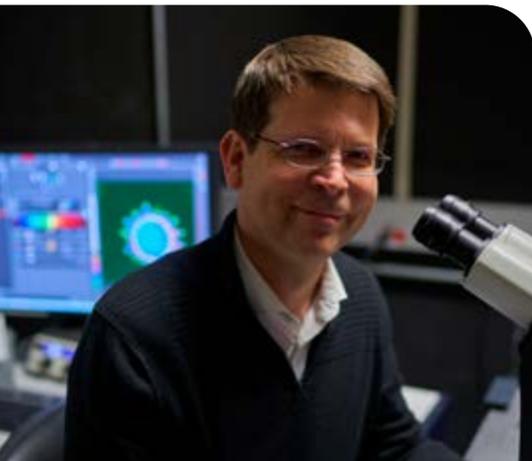
**2019** – Names St. Louis as HQ, breaks ground on new building

**2020** – Opens EDGE@BRDG on Danforth Center campus

**2021** – Goes public with a valuation of \$1.35B, only the second "unicorn" in St. Louis



*New technology in the Advanced Bioimaging Lab is helping attract new business and innovation to St. Louis, while advancing the Danforth Center mission.*



*“Our goal is to have the world’s best imaging capacity for plant research and to become a center of collaboration for the Danforth Center and far beyond.”*

*-Kirk Czymmek, PhD,  
Director of the Danforth  
Center Advanced  
Bioimaging Laboratory*

## Looking into the Future of St. Louis

**HOW TOP TECH AT THE DANFORTH CENTER IS ENABLING THE WORK OF GROUNDBREAKING RESEARCHERS**

Want to see something unique?

Plant communication channels called plasmodesmata (PD), such as those studied by new Danforth Center Principal Investigator Tessa Burch-Smith, PhD (see profile p. 15), cannot be seen in detail without the aid of advanced electron microscopy. That’s why Dr. Burch-Smith collaborates with **Kirk Czymmek, PhD**, director of the Danforth Center’s Advanced Bioimaging Laboratory (ABL).

Scientists at the Danforth Center need access to the world’s most advanced technology to find solutions to some of the most critical problems facing our world. This technology can be found in Danforth Center core facilities, which include: the Advanced Bioimaging Lab, Data Science, Phenotyping, Plant Growth, Plant Transformation, and Proteomics and Mass Spectrometry. Cutting-edge tech attracts world-class scientists and researchers in a virtuous cycle that then yields new discoveries, new grants, and more new equipment.

### SEEING POTENTIAL

Just this year, the ABL added two new cutting-edge pieces, at a combined price tag of two million dollars. The new equipment includes a super-resolution microscope, which can capture not only extremely tiny features, but also dynamic events, such as a virus invading a living plant cell. Also new is a next-generation transmission electron microscope. This “cryo-TEM” allows scientists to study the sample at cryogenic temperatures of -229°F and below to better visualize tiny plant structures in 3D. Technologies like these, and the experts who run them, help entice researchers (like Dr. Burch-Smith) and partner companies to St. Louis.

See more photos and videos on our blog at [danforthcenter.org](http://danforthcenter.org).

#### ADVANCING THE SCIENCE

Already this year, the super-resolution microscope has been used to:

- study the effects of heat stress on quinoa pollen germination (Gehan lab) and in the model green algae *Chlamydomonas* (Zhang lab)
- witness the killing of fungal cells by small anti-microbial peptides derived from plants (Shah lab)
- localize small RNAs in plant reproductive structures (Meyers lab)
- understand the chemistry of the cell wall in the abscission zone of plants (Kellogg lab)
- multiplex label cell molecular pathways in plant tissues (Czymmek lab).

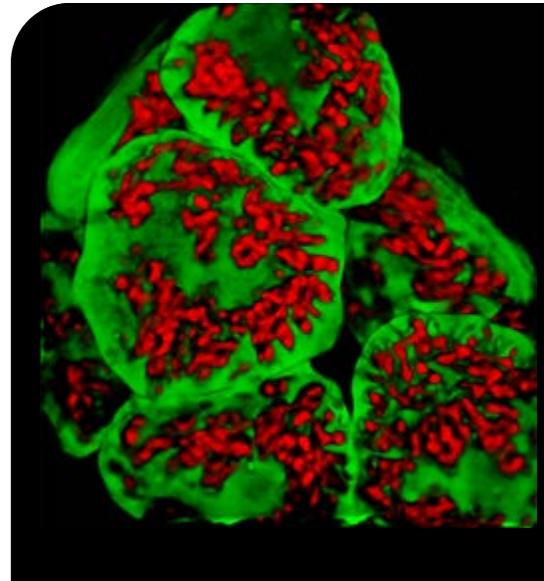
#### TOOLS OF THE TRADE

An external company that is utilizing the unique resources of the Danforth Center ABL is Plastomics, a startup in the Helix Incubator that is developing a trait delivery platform using the chloroplast of the cell. Because this technology relies on cell parts, being able to look inside a plant cell and see the process in live time is crucial.

“As a start-up company with limited resources, Plastomics has taken advantage of the cutting-edge technologies and facilities at the Danforth Center,” said Jeff Staub, the founder and chief scientist of Plastomics. “These facilities, which are unique in the region, provide resources and expert technical assistance that enables Plastomics to do research that would otherwise not be possible for us.”

#### WHY IT MATTERS

The ABL and the Danforth Center’s other core facilities are bringing new investors, jobs, and opportunities to St. Louis. Through our state-of-the-art infrastructure, expertise, and partnerships, the Danforth Center campus attracts businesses from around the world to our region—and provides local startups access to the latest technology. And through the top talent attracted, the Danforth Center continues to give rise to new, innovative spinout companies, like Benson Hill and RNAissance Ag, dedicated to improving the world through the power of plant science.



*Plastomics soybean leaves seen through the Danforth Center's new super-resolution microscope. Being able to study this process using the Danforth Center's unique facilities is crucial to the start-up company's success.*

#### THANK YOU

The purchase of new ABL instruments was made possible with funding from the National Science Foundation and through the generosity of donors to the Danforth Center Innovation Fund. To support these and other efforts to grow St. Louis as a world center for scientific research, visit [danforthcenter.org/give](http://danforthcenter.org/give).

# Education



Zoom meeting with this summer's REU interns.

## Fostering Tomorrow's Problem Solvers

DANFORTH CENTER REU INTERNSHIP PROGRAM PIVOTS TO VIRTUAL IN 2021

For eleven weeks each summer, a group of undergraduate students join the Danforth Center community as Research Experiences for Undergraduates (REU) interns. Funded by the National Science Foundation, the REU program had been a part of the Center for 17 years when the pandemic forced its temporary cancellation in 2020. But REU interns were back at the Danforth Center for an 18th season this year, with a pivot to virtual.

The organizing team includes Danforth Center Principal Investigators **Sona Pandey, PhD**, and **Ru Zhang, PhD**, Grants Manager **Cathy Kromer**, and Administrative Assistant **Judy Mitchell**. While at first the virtual format created headaches as the team scrambled to revise the curriculum, in the end, it also created one of the most robust summer programs ever with some of the most glowing feedback from participants.

"The virtual aspect opened some new opportunities," says Grant Manager Cathy Kromer who manages the program. "For instance, our

career panel in the past included professional scientists from the St. Louis area. This year, we were able to expand the geographical net and invited panelists from across the US. We also had interns who might not have been able to come to St. Louis in a traditional, non-virtual year."

Thirteen interns from around the country tackled a variety of scientific research projects, participating in a variety of workshops organized to further their development as scientists. At the end of the term, three interns were nominated to present at the national REU Symposium in late October. They are Mike McGrone (Bradley University, Gehan Lab), Angela Meyer (Purdue University, Eveland Lab), and Caroline Stuart (University of Maryland – College Park, Allen Lab).

Thank you to our organizing committee. And to all our fantastic REU interns, we wish you great success in your scientific careers!

### IN THEIR OWN WORDS

*"My REU mentor was very accessible and responsive, and I had a great time working on my research project. I felt like the work I was doing was relevant, and I learned a lot."*

*"Before my REU, I was planning to get an MA if I went to advanced education. Now, I am very interested in pursuing a PhD program."*

*"I now know for sure that I would be comfortable waking up and doing research as a scientist every day—which makes me feel more secure in my education and career path."*



- *New Danforth Center Principal Investigator Dr. Tessa Burch-Smith with graduate students from her lab (from left): Mohammad Azim, Amie Sankoh, and Samantha Nuzzi.*

## Danforth Center Welcomes New Principal Investigator

**DR. TESSA BURCH-SMITH IS AN EXPERT IN PLANT COMMUNICATION AT A CELLULAR LEVEL**

This August, the Danforth Center welcomed a new principal investigator, **Tessa Burch-Smith, PhD**. Dr. Burch-Smith's research focuses on how plants communicate with each other at the cellular level. She was previously an associate professor at the University of Tennessee, Knoxville. She received her PhD in Molecular, Cellular and Developmental Biology from Yale University, and her BSc in Biology and Chemistry from the University of the West Indies in Barbados.

### HOW CELLS COMMUNICATE

Dr. Burch-Smith and her lab work to shed light on two important plant biology topics: how different parts of a plant exchange signaling molecules and metabolites, and how viruses interact with their hosts to cause disease.

Plants are a vast network of interconnected cells that exchange essential molecules like sugars, proteins, and RNA through microscopic pores called plasmodesmata (PD). These pores are also important because viruses have evolved to exploit them.

"A better understanding of PD could allow scientists to control how plants distribute resources to their cells, resulting in improved crops," explained Burch-Smith. "By understanding how a virus moves through PD, it could be possible to slow that movement, eliminating the disease or preventing a more severe infection."

"We are excited to welcome Tessa Burch-Smith and her research team to the Danforth Center," said Danforth Center President and CEO Jim Carrington, PhD. "We believe that her research can lead in many directions that have impact."



*"I'm very excited about joining the Danforth Center and having access to all the cutting-edge technology and expertise available here."*

*-Dr. Tessa Burch-Smith,  
new Danforth Center  
Principal Investigator*

Learn more about  
Dr. Burch-Smith at  
[danforthcenter.org](http://danforthcenter.org).

## A Grandmother's Love:

THE FAMILY LEGACY OF DAVEY P. OETTING, JR.

Davey Oetting remembers when he first learned about the Donald Danforth Plant Science Center. "I heard about the Danforth Center from my grandma, of course."

Davey's grandmother was Marie Prange Oetting ("Ree Ree" to her family). A graduate of Washington University in St. Louis, she was a close friend of Bill Danforth until her death in 2018. She was also a charter member of the Danforth Center.

"Ree Ree got me interested. After college, I joined the Young Friends of the Center, and we would run into each other at Danforth Center events. Even when she was 90, she was going out more than I was!"

Today, Davey is a vice president at Merrill Lynch Wealth Management and the current chair of the Danforth Center Young Friends. He took the reins from Logan O'Connor and just completed his first Grow Challenge Week of Giving. Davey says he is dedicated to the work of the Center where his grandmother invested so much of her energy.

"Really it goes back to the three pillars of the Danforth Center mission: I care about preserving the environment, I care about feeding the hungry, I care about the St. Louis region. I also care about Dr. Danforth and I care about my grandma. It strikes every chord for me."

Thinking about his grandmother, he added: "She planted a seed of how one should live one's life and give back to society. It grew into my lifelong commitment now that she's gone."



*"She planted a seed of how one should live one's life and give back to society. It grew into my lifelong commitment now that she's gone."*

*- Davey Oetting Jr, on his grandmother*

*Party with the Plants 2019; Davey was event co-chair with Logan O'Connor and Matt Plummer. The pandemic canceled the event in 2020 and 2021.*



# Thank You, Grow Challenge

The Danforth Center Young Friends have once again knocked it out of the park. The second annual **Grow Challenge Week of Giving** (Sept. 27 - Oct. 1) had a goal of \$50,000, and raised more than \$70,000! Thank you to everyone who contributed to help build a brighter future.

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## One Year On

### REMEMBERING BILL AND CONTINUING HIS LEGACY

On September 16, 2020, the world lost an extraordinary human: Dr. William H. Danforth. Known for his tenure as chancellor of Washington University in St. Louis, Dr. Danforth dedicated the final decades of his life to founding the Donald Danforth Plant Science Center. Since his passing one year ago, many of us have given thought to the legacy of Dr. Danforth. It is difficult to overstate the difference he has made, both for individuals in the St. Louis region and for millions around the world. His character continues to inspire us, and his remarkable humanitarian vision continues to guide us. He has left behind an enduring legacy—and a challenge to each of us to continue the work.

### TRIBUTES TO WILLIAM H. DANFORTH

*Gifts in memory of William H. Danforth received by September 30, 2021. The Danforth Center is grateful for donors who honor or memorialize their friends, loved ones, and colleagues with a gift to the Center. To make a tribute, visit [danforthcenter.org/donate](https://danforthcenter.org/donate).*

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*From left: Princeton grad, 1947. He would go on to Harvard medical school. With his wife Elizabeth "Ibby" Gray Danforth, 1960. Portrait at the Danforth Center, 2018.*

# Legacy

## THE WHD LEGACY SOCIETY

*The Danforth Center's planned giving group has been renamed the WHD Legacy Society in honor of Dr. William H. Danforth, our founder, who made the Center's first planned gift commitment. We are grateful to donors who have planned for future needs of the Center. To learn more, visit [legacy.danforthcenter.org](http://legacy.danforthcenter.org).*

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Our founder Bill Danforth once said:  
"A successful institution can carry forward our ideals and hopes long past our brief lifespans, evolving and building as new times and new challenges require." Help us find sustainable solutions for the future with your year-end gift to the Danforth Center. [danforthcenter.org/give](http://danforthcenter.org/give)





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## DON'T MISS...

**AgTech NEXT :: *The Consequences of Coming Up Short on Climate*, a discussion of climate change in the context of food security.**

### NOVEMBER 18, 2021

#### 1 - 2 PM KEYNOTE by Joe Cornelius, PhD.

CEO of Bill + Melinda Gates Agricultural Innovations (Gates Ag One). Gates Ag One exists to accelerate innovations that will improve agricultural outcomes for smallholder farmers with positive impacts for livelihoods, communities, and the environment.

#### 2:15 - 3:30 PM PANEL DISCUSSION

Don MacKenzie, PhD, executive director of the Danforth Center's Institute for International Crop Improvement, with representatives from other organizations working to bring agriculture technology solutions to smallholder farmers in Africa.

## THE CONSEQUENCES OF COMING UP SHORT ON CLIMATE



November 18, 2021



Reserve your space at [agtechnext.org](https://agtechnext.org).

