

# Plant Biology 2020 Workshops

*As of January 21, 2020*

**Saturday, July 25** 12pm - 1pm

## **Undergraduate Networking Session**

This free networking opportunity gives undergraduates an opportunity to discuss their research, posters, and career goals with other attendees in an intimate setting. All attendees are encouraged to come to this event to welcome the undergraduate students, many of whom may be attending a large conference for the first time. Light refreshments will be provided. \*No posters will be at this session. Undergraduates who submitted poster abstracts should put their posters in the main poster hall upon arriving at the conference.

**Saturday, July 25** 8:30am - 12pm

## **PUI Faculty Development Workshop**

This workshop is for faculty currently working at primarily undergraduate institutions (PUIs) or early career scientists who would like to get a job at a PUI. PUIs are defined as institutions that offer few or no PhDs in the sciences. While teaching is a large part of being a PUI faculty member, maintaining a successful research program is also critical for career advancement and for providing undergraduates with high-caliber research experiences. Given the high demand on faculty time at PUIs, research collaborations are an integral part of maintaining a productive research program. This workshop will include presentations and discussions on different types of collaborative projects and tools PUI faculty can use to build successful collaborations. This will include presentations by a panel of faculty on different types of collaborative projects as well as opportunities for small-group tool building among participants.

This workshop has a fee.

**Saturday, July 25** 8:30am - 12pm

## **Discovering the rules of life through computational plant biology – utilizing dynamical mathematical models at the molecular, organismal, and ecosystem levels**

At the workshop, participants will be put into groups and provided with 'toy problems' to solve. They will be tasked with reformulating of these problems to be more appropriate for discussion of mathematical frameworks, including differential equations, Markov Chains, and cellular automata. Participant groups will decide which of the presented methods would be best suited for their toy problems. The 'solutions' will be presented by our panel of experts, who will discuss their rationales with the participants. At the end of the workshop, participants will have the opportunity to receive real-

time consultation on their computational questions. Participants can display an A4-sized poster with a diagram of their system with a brief paragraph giving background information and research questions. The panel of experts will then give comments where appropriate on suggested next steps.

This workshop has a fee.

**Saturday, July 25** 8:30am - 12pm

### **Change the World with SciComm!**

Public policies can have far-reaching impacts on scientific research, and vice-versa. Policymakers, regulators, and the public need information about issues that relate to plant biology. Through invited speakers and hands-on activities, this workshop will help participants impact policy with the following strategies:

1. Communicate about science directly to lawmakers and other policymakers.
2. Contribute public comments on new or updated regulations that impact your research.
3. Communicate the impacts of science policies with the public through storytelling.

Our goal is to inspire participants to reach out and change the world through science communication!

This workshop has a fee.

**Sunday, July 26** 11:15 - 12:30pm

### **Perspectives in Science Leadership and Policy with Dr. Sharlene Weatherwax**

Are you a science leader? Should science policy matter to you? How can scientists at all levels of experience and interest in plant science contribute towards leadership and science policy? A successful and vibrant research enterprise depends on diversity, equity, inclusion, and perspectives from different contexts. Dr. Sharlene Weatherwax will present observations and lessons learned from a nonlinear path to a nontraditional career in science management and policy, highlighting some expected and unanticipated potholes and roadblocks. You will receive some practical tips to nurture and develop your inner leader, identify your policy interests and empower future actions.

Lunch is included.

This workshop has a fee.

**Sunday, July 26** 11:15 - 12:30pm

### **Get Your Message Across: A Guide to Artwork and Illustrations for Better Impact and Clarity**

**Sunday, July 26** 11:15 - 12:30pm

## **Plant Science Decadal Vision (2020-2030) Making the vision a reality**

**Sunday, July 26**            11:15 - 12:30pm

### **Allies 101: How to support and affirm the LGBTQ+ community in lab and the classroom**

LGBTQ+ students have reduced retention rates in STEM compared to their heterosexual peers. 30% of STEM professionals are not 'out' to their colleagues. Welcoming workplaces increase the likely of professionals to be out to their colleagues, while student LGBTQ+ supportive organizations decrease the odds of students encountering homophobic comments. In our workshop we will talk about ways to improve the lab and classroom environment for LGBTQ+ students and professionals for Allies. We will focus on easily changeable aspects of the classroom and lab culture to improve accessibility and support for LGBTQ+ folks. Other topics we will discuss include LGBTQ+ Vocabulary 101, how to find local LGBTQ+ resources and ways to bring them up for folks in need, and also discuss how to be a good ally for folks who are transitioning and coming out. This will be an interactive workshop, aimed to educate professionals and to also help them identify resources in their local communities.

What are pronouns and how do you know when to use which ones?

Someone just came out to me, what do I do?

Does my school/company have resources for LGBTQ+ folks?

Mental health resources for LGBT+ folks in my community?

**Sunday, July 26**            11:15 - 12:30pm

### **How FDA can help you bring new plant varieties to market**

This session will explain how you can use FDA's voluntary food safety consultation processes as part of new variety development. Discussion will include the types of data and information that are typically considered as part of a consultation. Emphasis will be placed on how these processes may be used by small and medium-sized entities (including universities). This session will also discuss FDA's view of foods from genome edited plant varieties.

**Monday, July 27**            7:00-8:30am

### **Implicit Bias & Conscious Inclusion Workshop (breakfast) organized by the Minority Affairs and the Women in Plant Biology Committees**

We are all guilty of being implicitly bias, and acknowledging this is not always easy, especially when we are not equipped to address this and do not always know what to do. Join us for an in-depth understanding of what unconscious bias is, how it effects our decisions and the harm that can result from it. In this interactive workshop, we will learn to identify the ways that bias shows up in our own

lives, different strategies to limit its effects in our decision making, and finally how to be more conscious about inclusion.

This workshop has a fee.

**Monday, July 27** 11:15 - 12:30pm

**Equity, Diversity, Inclusion: Effecting Institutional Change (Lunch with Guest Speaker)**

Organized by the Minority Affairs Committee – more details coming soon

This workshop has a fee.

**Monday, July 27** 11:15 - 12:30pm

**Inclusive Pedogogy**

**Monday, July 27** 11:15 - 12:30pm

**Seed exchange, the balance between scientific advancement, food safety, intellectual property and genetic resources**

The act of exchanging seed is as old as agriculture itself and without it crops as we know them would not have expanded across multiple continents because one of the main effects of plant domestication is limiting seed dispersal by natural means of wind etc. Today, seed exchange between countries, companies, universities etc is a highly regulated process that tries to balance a number of different interests ranging from protection of local genetic resources, intellectual property protection of seed companies, proper sanitary controls preventing the spread of diseases with potentially huge impact on agriculture to the exchange of materials for research in model and non-model plant species. In this workshop we will bring together experts from different areas working directly on different areas related to seed exchange including curators of germplasm banks, specialists of indigenous genetic resources, seed industry reps, APHIS etc. We will discuss the unique challenges involved in the different aspects of seed exchange, the regulations involved in the processes and the impact they ultimately have in plant biologist researchers. Workshop speakers will include seed bank curators, seed company representatives, APHIS workers and members of organizations involved in protecting indogenous people's rights.

**Monday, July 27** 11:15 - 12:30pm

**Communicating for Impact: Workshop on engaging meaningfully with your neighbors, your elected officials, funders and the broader public about plant science**

This workshop, led by James Carrington, President of the Donald Danforth Plant Science Center, provides guidance and real-world examples of how to meaningfully engage with the public—ranging

from your local community to policy makers. Communicating the promise of plant science is the foundation from which public demand and funding (both government and philanthropic) for plant science will grow. Workshop participants will hear from experienced communicators about their successes and failures and how to:

- Communicate with the Public with Purpose
- Communicate with Elected Officials and Policy Makers
- Communicate with Government Agencies and Philanthropies

**Monday, July 27** 11:15 - 12:30pm

### **Careers beyond academia: DC addition**

Graduate training of plant biologists occurs primarily in universities, and students have little exposure to plant biology careers apart from the academic path. This workshop will provide discussion of a diversity of career options available to those with graduate degrees in plant biology. Panelists will be selected to represent a variety of careers including in those in large and small private companies, government, etc. The workshop format will include introduction of career options by the panelists followed by small group discussions.

**Monday, July 27** 11:15 - 12:30pm

### **How machine learning can be used to solve plant biology problems**

More and more data are available in plant science that have fueled ground breaking discoveries. Beyond the original intents of the experiments, these data can be used to discover even more. This is where machine learning come in - using computers to learn from data and generate models that can predict a biological phenomenon of interest - e.g. will this gene be lethal when it is knocked-out, or which genetic variants can meaningfully predict a phenotype of interests. Specifically, this workshop will touch on the following topics: What is machine learning and why is it useful? How does machine learning work? What are some example machine learning applications in plant science? How can we feed data into machine learning tools to make discoveries? What are the best practices when doing machine learning? Where to go to learn more? The workshop will include presentations, discussions, and a short hand-on section using online machine learning resources.

**Tuesday, July 28** 1:30 - 2:45pm

### **Bridging the gap between lab and field: designing and using fabricated ecosystems to explore plant-soil-microbial interactions.**

Plant growth is a function of many interlocking abiotic and biotic factors that are at play above- and belowground. The impact of each of those factors and their combined effect on plant growth has been challenging to quantify because of the lack of complexity in simple laboratory settings and because of

the lack of control in field experiments. Recently, new experimental platforms are being developed which aim to bridge these gaps. We propose a workshop that would discuss the experimental and technical considerations required to build micro- and mesocosm-scale laboratory ecosystems and the technological advancements that can be integrated into such systems. Recent large reductions in the cost of genetic and chemical analysis make their application to complex environments such as soils feasible. Simultaneously, non-destructive probes have become smaller, more available and cheaper, and artificial lighting has improved. The combination of these technological approaches provides researchers with the opportunity to study plants in a controlled, replicated manner, resolving responses across both temporal and spatial scales. In this workshop, we propose to invite short talks from developers of these systems across all scales, followed by a community discussion about existing and missing capabilities. Due to the necessarily multi-discipline nature of these experiments, we believe it will provide a good opportunity for participants to initiate collaborations which could then apply to use these systems. We propose to publish a short report which could be shared with funding agencies, researchers etc.

**Tuesday, July 28**

1:30 - 2:45pm

### **gRNA design and off-target minimization for genome editing with CRISPR/Cas9**

CRISPR/Cas9 is a relatively new genome editing technique which utilizes a short guide RNA (gRNA) sequence to direct an endonuclease into inducing a double stranded DNA break at a user selected location within a host genome. Innate cellular repair mechanisms are then activated, often resulting in the loss of gene function or incorporation of exogenous material. Successful genome manipulation requires an abundance of accuracy and precision. However, gRNAs with inefficient site recognition can result in disastrous off-target mutations and unanticipated downstream effects. Since gRNAs have the potential to target a myriad of sites within a single gene, determining the most efficient gRNA with minimum off-target effects is paramount. Evaluation of gRNA efficiency can be determined through the use of prediction models, gRNA sequence content, target location within host genome, and PAM site characteristics. Often determining the best gRNA candidates requires a balance between target efficiency and genomic location. This can be a daunting task, especially when working with a large number of gRNA candidates. Fortunately, public online resources, such as ChopChop and Benchling, have simplified the process of gRNA design by applying efficiency parameters in a user-friendly interface. My goal is to educate researchers on the fundamentals of gRNA design and walk them through examples of practical CRISPR/Cas9 applications using the available online resources.

**Tuesday, July 28**

1:30 - 2:45pm

### **Market driven innovation in plant science**

Plant Science researchers spend most of their careers developing an understanding of a particular biological system. While this work is essential in deepening our biological understanding of that system it does not always translate to an improvement in agriculture. In addition, the ability to translate this knowledge to an innovation that can be adopted by a grower is not always simple. There is huge opportunity in agriculture to better connect plant science research to the reality of the grower. While the difference is sometimes subtle, it offers the opportunity to accelerate ag innovation. This workshop

will address grower-focused innovation, exemplified by three case studies from industry. The workshop will increase awareness of the need and opportunity to define biological problems through the lens of modern agriculture.

**Tuesday, July 28** 1:30 - 2:45pm

**USDA, DOE & NSF Grant Information Session**

**Tuesday, July 28** 1:30 - 2:45pm

**How to manage all those plant transposable elements**

The vast majority of plant DNA is derived from repetitive 'jumping genes' known as transposable elements (TEs), which most researchers consider to be junk DNA. The era of genomics and CRISPR has allowed plant biologists to work on virtually any plant, including crops, but these large genomes are 50%-95% comprised of TEs. Although researchers try to ignore these non-genic regions, TEs consistently befuddle genomic, bioinformatic, mapping and single-gene analyses. Common mistakes include the complete masking of repetitive DNA, only using the unique fraction of deep sequencing reads, and ignoring the role of TEs in the regulation of a favorite gene. Each of these approaches are taken to avoid TEs, and each skews results and leads to false findings and a lack of data reproducibility. As a community, plant biologists need to be trained and have better tools to handle the TE-majority of plant genomes. This workshop will assemble a diverse set of key researchers who understand the problems that academic and industry researchers encounter due to TEs. They will fairly disseminate to the community best-practices to combat these problems and be successful in their research. The goal of this workshop is to empower the attendees to get the most and best out of their data.

# Plant Biology 2020 Workshops

*As of January 17, 2020*

**Either Sunday or Monday (Same day as concurrent)** 7:00pm-8:30am

**PUI Business Meeting**

**Monday, July 27** 7:00-8:30am

**EEEE Breakfast**

**Sunday, July 26** 11:15 - 12:30pm

## **CXL: Strategic Career Management: tips & tools for strategic career navigation**

Navigating post-secondary education can be scary. At each transition phase, we dread the question, “So, what’s next?” because, for many of us, we have no idea! It is difficult to know what our options are, much less how to overcome the hurdles that are outside of our control. Strategic Career Management (SCM) helps minimize this anxiety by giving us things we can control. Rather than trying to create a fixed path using a “one size fits all approach,” SCM provides a flexible road map towards a somewhat uncertain destination but in a purposeful direction. But we don’t have to do it alone! The Community of Minds (TheCOM) philosophy is that science – including the training phase – is best done in the context of community. Why struggle through this alone in survival mode when we can help each other to thrive?

This year at Plant Biology 2020, TheCOM, LLC is hosting an interactive workshop to facilitate early career scientists coming together to do just that: begin taking ownership of and strategically managing your education and training as an important step towards your desired career. Bethany Huot, Founder and Director of TheCOM, LLC, will introduce you to the steps involved in SCM and will share tips and tools for each step. Since there is no time like the present to get started, workshop participants should come prepared to build their communities and engage in activities designed to help you make strategic progress on your dream career path.

This workshop has a fee.



