

2018 MPS Stories

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MSU hosts second Fascination of Plants Day

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Igor Houwat



Figure 1 Photos by Harley J Seeley

Michigan State University plant biologists hosted the second **Fascination of Plants Day** on Saturday, May 19th at the **Molecular Plant Sciences Building** on main campus.

The event invited the general public to explore the world of plants and algae, including fun hands-on activities for kids and adults. Around 50 volunteers – grad students, post-docs and faculty – from various departments in the College of Natural Sciences and the College of Agriculture and Natural Resources led the demonstrations.

“We proposed general themes of interest, from the germination of seeds to the production of specialized metabolites and their uses, to cover broadly what plant science research is about,” said Anne-Sophie Bohrer-Cognon. Anne-Sophie, a post-doc in the BMB Department at MSU, was the event coordinator.

"From there, the volunteers came up with ideas to illustrate each theme and developed fun hands-on activities and visuals to explain in simple ways what the science was about."

The event drew 200 participants, double the number of attendees last year.



Figure 2 Toddler enjoying extracting DNA from strawberries

“The kids had a lot of fun extracting DNA from fruits and simulating the dispersion of fungal spores while the adults could really take time to discuss and learn more about the plant-related research we have here at MSU,” Anne-Sophie added.

The organizing team is looking to build on the success of the event to continue growing it over the upcoming years.

The Fascination of Plants Day is a world-wide event taking place under the umbrella of the [European Plant Science Organisation \(EPSO\)](#). The goal is to get as many people as possible around the world enthused about the importance of plant sciences for agriculture, forestry, non-food products (paper, timber, chemicals, and energy) pharmaceuticals, and environmental conservation.

The organizing committee included Anne-Sophie, in addition to [Dr. Bjoern Hamberger](#) and Aparajita Banerjee, also a BMB post-doc, who was the volunteer coordinator.

MSU team wins bronze at 2018 synthetic biology competition

11/27/18

Julian Liber, Igor Houwat



Figure 1 Banner: iGEM Great Jamboree event, by iGEM Foundation and Justin Knight

MSU's 2018 iGEM has won a Bronze Medal from the International Genetically Engineered Machines (**iGEM**) global competition. iGEM brings together students from around the world to design synthetic biology solutions for some of humanity's toughest problems. The teams also contribute to the synthetic biology community by adding new parts to the growing 'Registry of Standard Biological Parts,' a physical and digital library of DNA sequences with well characterized functions.

The highly diverse MSU team was made up of eight undergrads, a grad student, a post-doc, and four faculty from Chemical Engineering, Environmental Studies, Biochemistry and Molecular Biology, and Genetics, to name a few.



Figure 2 MSU's iGEM team

The team focused on the challenge of how to improve plant health under stressful situations, but without making the plant a genetically-modified organism (GMO), which often is subject to disapproval by many consumers in the US and globally.

“We conducted surveys and held a public forum with an expert panel,” says Julian Liber, a Plant Biology undergrad in the lab of Greg Bonito. “We found that people do not like the idea of GMO crops or spraying crops. That sentiment guided our project design process.”

The team examined the plant microbiome: all the bacteria and fungi living in, on, and around the plant. The most intimately associated microbes are called endophytes. Endophytes live within a plant, without causing disease, and they communicate with their hosts, consume products made by the plants, and even help ward off harmful plant pathogens.

“We wanted to isolate, study, and engineer endophytic bacteria found in grasses, like wheat, rice, and corn, that account for much of the world’s food production,” says Julian. “If we could add traits for stress tolerance to the bacteria themselves and have them live in the roots of these crops, the plants might better deal with drought or soil salinization, without the need to produce a GMO food product.”

Making bacteria glow

As a proof-of-concept, the team added a fluorescent gene to an endophytic bacterium. They then removed it from one plant, where it naturally lives, and introduced it into another plant.

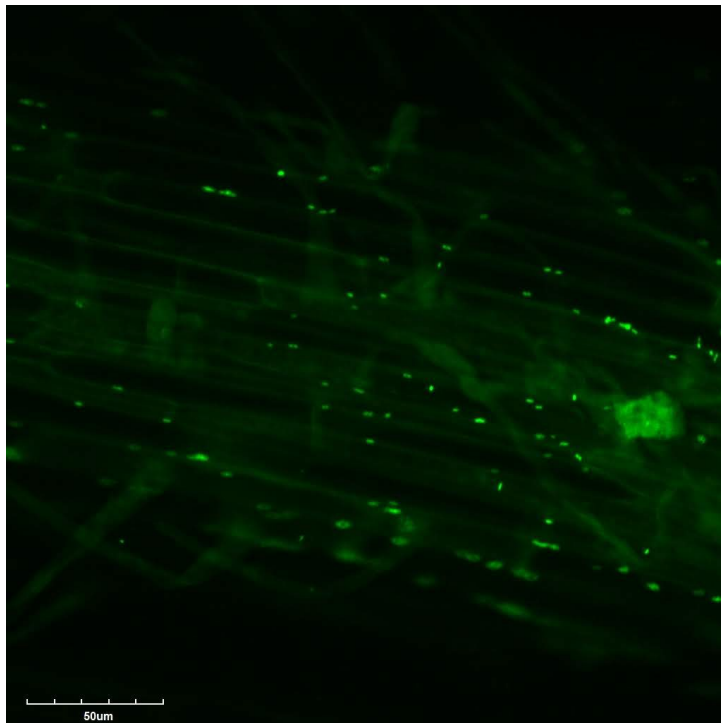


Figure 3 Bacteria glowing green in the plant root

“With this genetic addition, the bacteria glow green when we shine blue light on it. It is an easy way to track their location,” Julian says. “We tracked the bacteria for weeks and showed that it could enter the new plant root system and live there for at least 4 weeks.”

The successful proof-of-concept paves the way for more concrete applications. In place of a gene that lights the bacteria up, the scientists want to engineer the bacteria to produce an enzyme that turns down plant production of the gas, ethylene.

“Plants produce ethylene when they are under stress,” Julian says. “As the climate continues to change, plants will increasingly deal with stresses like drought or increased soil salinity from rises in sea level. The right endophyte, with the added enzyme, could live in plant roots and potentially help them to reduce that ethylene production.”

The iGEM guidelines include educating kids and college students about synthetic biology. The team took the project on the road, with events at the Impression 5 science center and the Lansing Public Library.

“I think iGEM is unique, because in addition to doing science, we have to think and communicate with others about the legal and ethical ramifications of our work,” Julian says. “But we also are encouraged to try ambitious ideas. Not all of them work, of course, but those efforts lay the foundation for future iGEM teams to build on our work and come up with innovative work.”

This year’s professor mentors were: Bjoern Hamberger, Danny Ducat, Tim Whitehead, Michaela TerAvest, in addition to Greg Bonito.