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Research and education for the next generation
HONORING A FATHER’S LEGACY

Herman Cohen was an accomplished horticultural professional whose life and career touched almost all areas of horticultural science, gardening, plant breeding, landscapes, floriculture, and plant and soil relationships. His son, Jerry Cohen, a professor in the Department of Horticultural Science, is keeping his father’s legacy and love of horticulture alive by establishing the Herman Charles Cohen Fund for Graduate Education. Professor Cohen credits his father with instilling a passion for education in him and celebrating his successes. When he would visit his father’s place of retirement in Arizona, Professor Cohen’s 2013 Award for Outstanding Contributions to Graduate and Professional Education would be sitting where it couldn’t be missed—right atop the television set. For Herman, the award was not only a great point of pride in his son, but a welcome reminder of the importance of higher education and dedicated teachers.

From a student job with the melon breeding program at the College of Agriculture in Davis, California, to being the first college graduate in his immediate family, to retiring as the Vice President of the California Soil and Water Conservation Society, Herman Cohen’s professional life was filled with incredible variety and distinction. He served in the US Navy, established one of the first flower farms south of San Francisco, and eventually held several important positions in the USDA’s Soil Conservation Service. He was an early leader in ecosystem services and an award-winning public servant. Moreover, Herman was an active community member, a 4H instructor, and the winner of numerous blue ribbons for his landscape exhibits.

This year, in honor of his father’s lifelong interest in supporting higher education, Professor Cohen has worked with the University to establish an endowment fund with an initial gift of $100,000 in his father’s name. The Herman Charles Cohen Fund will be used to provide dissertation improvement funds to a worthy Ph.D. student in the Department of Horticultural Science each year. The award will be used for the “behind-the-scenes” activities that go into crafting an outstanding dissertation, including conference travel and lab testing expenses. “It’s a fitting way for an instructor to give back,” noted Professor Cohen, adding that while this particular gift fills a very specific need for graduate students, there are many ways to support graduate and undergraduate education at the department level. One-time or recurring gifts to support scholarship and fellowship funds are a great way to make a big difference in a student’s life, and any gift can be made in memorial of a loved one.

Please join us in thanking Professor Cohen and honoring his father Herman. We couldn’t be more excited to start putting these funds to good use by awarding them to a deserving student each year.

To learn more about graduate education in the department, visit horticulture.umn.edu/students/graduate-studies
To find a graduate fund to support or to start a new fund, visit horticulture.umn.edu/support

TRANSITIONS IN TEACHING PLANT PROPAGATION
Saying goodbye, saying hello

It’s hard to think about learning horticulture without first learning how to propagate plants. HORT 1001 (informally known as “Plant Prop”) has been around as long as we have been teaching horticulture at the University. Many faculty have taught the course over the years, but the glue that has always held the course together is the lab. That is where the magic happens—where students who thought they had a brown thumb begin to understand how plants “work.” Watching roots grow from cuttings in a short period of time still leaves students in awe and gives them confidence that they can grow plants.

In the late 1990s, Professor Peter Ascher brought forward the idea to restructure HORT 1001 so it would meet liberal education requirements for a lab-based science course that all University students have to complete before they graduate. This change boosted enrollment and introduced thousands of students to the study of horticulture. Today, plant propagation remains our highest enrollment course and a major avenue to attracting students into the Plant Science major.

Energetic laboratory instructors and support staff have been key in bringing horticulture to life for students. Many may remember Bill Peters, who for over 15 years brought understanding and enthusiasm, patience and joy to each and every lab section. And if you spent any time in the greenhouses, you may remember Roger Meissner, who worked tirelessly to make sure plants were ordered and cared for and that classes and research projects had what they needed to be successful. Believe it or not, both Bill and Roger chose to retire in 2018. As we thank Bill and Roger for their dedication and congratulate them on graduating to a new phase in life, we welcome a new chapter in Plant Prop.

We are trying hard to not call Laura Irish “the new Bill” but I am sure we slip sometimes. Laura completed a Master’s degree in Horticulture at Iowa State University in May 2018 and joined us soon after to oversee the Horticulture Garden and our two garden interns. Laura is a high-energy instructor who has a fierce passion for engaging students. Fall semester is well underway, and she has already taken on mentoring our undergraduate Hort Club while teaching five lab sections and helping put the garden to bed—she’s a busy person! We look forward to breathing some new excitement into our Plant Prop labs and continuing the tradition of inspiring students to consider horticulture as a career.
CREATIVITY

THE HEAT IS ON
Researching critical temperatures for roots in potted plants

You can’t visit a nursery, greenhouse, or your neighbor’s back porch without seeing them: black plastic pots. Why repot your new snake plant when the nursery was nice enough to supply a free one? Department of Horticultural Science graduate student George Guenthner takes issue with that blind acceptance in defense of an unsung hero – the root system – and he’s willing to spend hours meticulously cleaning root masses and monitoring sensor systems to find a solution to a burning question: just how much heat a root system can take?

Heat stress isn’t a new concept. Previous heat stress research has focused on the above-ground portion of the plant, like leaves and buds, but has rarely addressed what’s below the surface. Strong root systems provide a foundation for plant health, but they’re also quite sensitive to their environment.

“Root cell membranes are destroyed by high temperatures.” Think of it like little holes in a water balloon. More heat means more holes, and eventually the balloon is leaking everywhere. Heat stress also affects root respiration – a component of metabolic activity and growth. When temperatures get too high, respiration starts to break down and the roots stop ‘breathing’. And those black plastic pots can absorb impressive amounts of heat and exacerbate heat stress.

“We’ve recorded temperatures in Minnesota, when it’s an 85 degree sunny day, that are close to 130 degrees Fahrenheit in a pot,” Guenthner says.

Guenthner spends most of his research time monitoring the oxygen sensors paired with his custom-built sous vide heating system. It’s one of his proudest creations and how he solved the problem of generating high, consistent heat to stress root masses. Circulating carefully heated water, he subjects roots to increasing heat levels to identify critical temperature thresholds amongst his tomato varieties.

Guenthner wants to gather more data to better understand what the critical temperature thresholds are for various plants, and use that data to inform growing decisions. In the future, he plans to explore how living biological agents like microbes and fungi could be used to mediate the negative impacts of high temperatures and help plants survive and thrive under heat stress. He hopes his work can ultimately be passed on to the consumer. “I just want to see the average person succeed with their plants, that’s what it’s all about!”

He started out majoring in fisheries and wildlife, but quickly realized he was actually more interested in plants than animals and declared a double major in Plant Science and Spanish. Still, Ruha wasn’t really sure what to do with her newfound passion. Internships, scholarships, and study abroad opportunities helped to solidify her choice of majors and guide her career plans.

In summer 2018, Ruha completed an internship at the Minnesota Landscape Arboretum (MLA) as part of the George and Mary Lou Klacan scholarship program. She helped with grounds care while completing a research project on how using compost impacts pest management. One thing that stuck with Ruha from interacting with staff and visitors was the wide range of experiences that formed strong opinions people held about things like pest management. Her earlier study abroad in Spain taught her the importance of taking other cultures and ways of life into account—but the internship helped to apply that experience to her career goals.

The MLA internship really helped confirm that public horticulture is something I’m passionate about. Horticulture has so many applications and so much potential to bring people together,” says Ruha. “I hope to be able to make the horticultural world more inclusive.” Ruha hopes to maintain public plant collections and inspire younger generations to become interested in plants.

This fall, Ruha also became the inaugural recipient of a scholarship established in memory of Colin O’Neill, founder of Prescription Landscape, Inc. and a graduate of the UMN horticulture program. O’Neill was known in the industry as a big-picture thinker who kept environmental health in focus and made decisions based on evidence and careful research—a habit spouse and co-founder Paulita LaPlante referred to as “going into U of M mode.” It’s fitting, then, that the first scholarship be awarded to Ruha, who shares a broader vision for the impact of horticulture.

“Being chosen for scholarships has been an affirmation that people believe in what I’m doing and want me to succeed.”

Being chosen for scholarships has been an affirmation that people believe in what I’m doing and want me to succeed. I feel more confident that even if it’s only a small thing, I have the ability to make an impact. And knowing I won’t have to sit on debt for the rest of my life gives me the freedom to actually go after opportunities to make changes I want to see."

To contribute to the Colin O'Neill Scholarship fund or learn about other funds in support of student education in horticultural science, please visit or contact us horticulture.umn.edu/support or hort-tc@umn.edu
MORE THAN MEETS THE NOSE
Using metabolomics to uncover the links between aroma and fruit quality

When it comes to food, smell is almost as important as taste. It’s common to take a moment to smell a glass of wine, and there are whole sections of Target devoted to the scent of apples. It may come as no surprise that aroma is one of the factors considered when developing a new fruit variety—but did you know that aroma might also be related to other fruit qualities like texture? Until recently, it has been difficult for breeders to understand the complexities of how the molecular and genetic structure of a plant affect characteristics such as aroma, flavor, texture, and color. As the first Honeycrisp Chair for Fruit Crop Innovation, Professor Adrian Hegeman is leading a research team using a robust chemical and statistical analysis approach called metabolomics to understand the underlying mechanisms behind fruit quality.

With endowed chair support, Hegeman’s team hopes to complement fruit breeding programs in the department by pursuing research questions that might traditionally be considered out of scope for breeding programs but could lead to breakthroughs in the breeding process.

Traditionally, plant breeding involves crossing two plants with desirable traits and selecting offspring with the best combination of attributes inherited from the parents. For perennial crops like apples and grapes, it can be years before the selected offspring mature enough for fruit quality to be assessed—why is it that cultivar development can take decades?

Imagine if you could use something simple—like the fragrance of an apple blossom—to detect the potential of a plant to develop fruit that is sweet, crisp, and resistant to breakdown in storage. Used alongside genetic mapping, metabolomics could allow breeders to make better informed crosses earlier in the process, diminishing the time and resources it takes to bring new cultivars into production.

While we’re a bit far from that level of detail, the vision is clear and Hegeman’s team is well on their way to understanding the chemical linkages that may provide clues to the future of breeding.

Mark your calendar and join us for a half-day event celebrating horticultural science and the collective work of our community of supporters, researchers, students, educators, and graduates.

We are excited to announce Professor Phil Allen as our keynote speaker and winner of the 2019 Outstanding Alumnus award. Allen’s primary role is as a professor of landscape management at Brigham Young University. Allen is an active scientist whose research focuses on seed performance under adverse conditions. His current research projects include biological control of invasive species, restoration of sagebrush ecosystems, and simulation models for seed germination. He has been adorned with numerous teaching, service, and professional awards including the Educator of the Year award from the Professional Landcare Network (PLANET) and a Lifetime Leadership Award from the National Association of Landscape Professionals (NALP). We are proud to add our award to his list of accomplishments. To learn more about Professor Allen’s work and help to congratulate him on his achievements, join us on April 10, 2019.

Keep an eye on your email in early spring for a formal invitation and more detailed event schedule!
CALL FOR TOURS!
Horticulture Club is interested in visiting your horticulturally-related workplace (i.e. greenhouse, farm, studio, etc) to learn about careers in horticulture. If you are interested in hosting a tour of your facility, please reach out to hortclub@umn.edu.