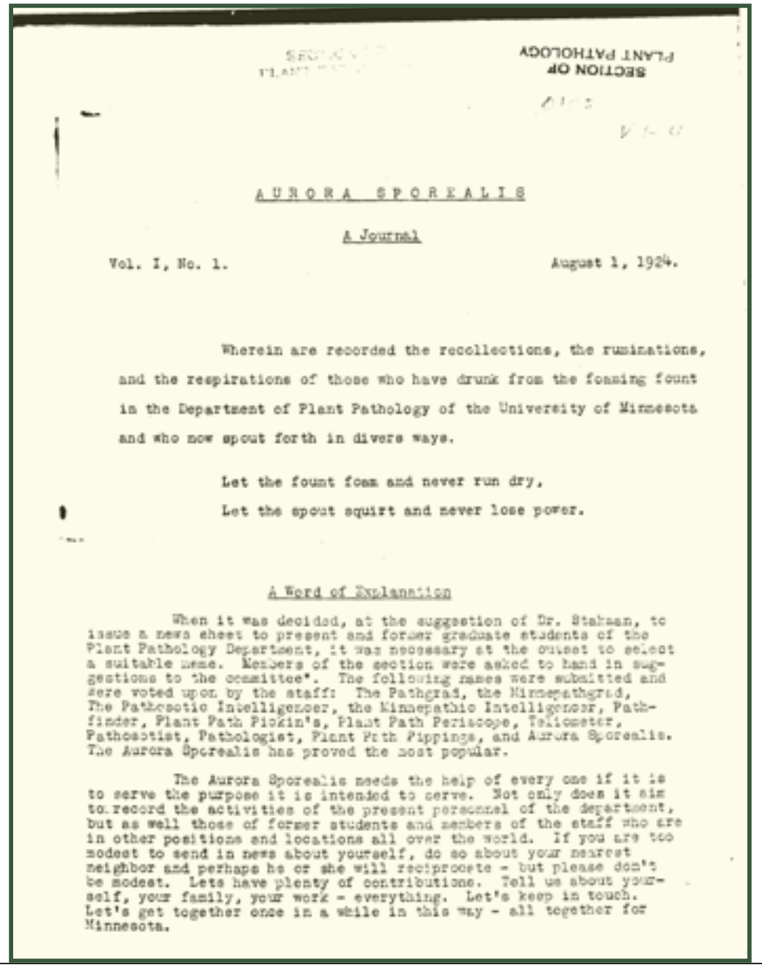
SPRING/SUMMER 2021

AURORA SPOREALIS

University of Minnesota | CFANS College of Food, Agricultural and Natural Resource Sciences | Plant Pathology



SECTION OF PLANT PATHOLOGY

AURORA SPOREALIS

A Journal

Vol. I, No. 1. August 1, 1924.

Wherein are recorded the recollections, the ruminations, and the respirations of those who have drunk from the foaming fount in the Department of Plant Pathology of the University of Minnesota and who now spout forth in divers ways.

Let the fount foam and never run dry,
Let the spout squirt and never lose power.

A Word of Explanation

When it was decided, at the suggestion of Dr. Stakman, to issue a news sheet to present and former graduate students of the Plant Pathology Department, it was necessary at the outset to select a suitable name. Members of the section were asked to hand in suggestions to the committee*. The following names were submitted and were voted upon by the staff: The Pathgrad, the Minnepathgrad, The Pathsotic Intelligencer, the Minnepathic Intelligencer, Pathfinder, Plant Path Piskin's, Plant Path Periscope, Telometer, Pathsotist, Pathologist, Plant Path Pippings, and Aurora Sporealis. The Aurora Sporealis has proved the most popular.

The Aurora Sporealis needs the help of every one if it is to serve the purpose it is intended to serve. Not only does it aim to record the activities of the present personnel of the department, but as well those of former students and members of the staff who are in other positions and locations all over the world. If you are too modest to send in news about yourself, do so about your nearest neighbor and perhaps he or she will reciprocate - but please don't be modest. Lets have plenty of contributions. Tell us about yourself, your family, your work - everything. Let's keep in touch. Let's get together once in a while in this way - all together for Minnesota.

WHO WE ARE

Since 1907 the Department of Plant Pathology at the University of Minnesota has had a strong impact on plant health, agricultural development, and ecosystem vitality on a local, national, and international scale.

CONNECT WITH US

Online: https://plpa.cfans.umn.edu

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SUPPORT US

We are global leaders in plant pathology and continue to adapt our research, teaching, and Extension efforts to respond to contemporary needs and opportunities. While institutional support and research grants from public and private entities are critical, contributions from donors play an increasingly important role in helping the Department remain an agile, adaptable, and highly effective world leader.
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PLANT DISEASE CLINIC

MAILING ADDRESS
495 Borlaug Hall | 1991 Upper Buford Circle | St. Paul, MN 55108

HAND DELIVERY ADDRESS
Room 105 Stakman Hall | 1519 Gortner Avenue | St. Paul, MN 55108

LAB HOURS
Tuesday - Friday | 8:30 a.m. - 4:30 p.m. | (612) 625-1275

Jim Bradeen
Professor and Department Head

Dear Friends:

As we close the books on what must be among the most challenging academic years in the history of our department, I am bolstered by the enthusiasm and resilience of our students, staff and faculty. I won't lie: it hasn't been easy. But we have gone above and beyond this year and I am truly proud of all we have accomplished together.

This edition of the Aurora Sporealis highlights just some of the commitment of my incredible department colleagues. You will read about the busy (and successful) season our Plant Disease Clinic had, effectively serving the people of Minnesota (and beyond) with accurate and timely diagnoses to plant health problems. You will hear from some of our graduate students on lessons learned after more than a year of online classes. You will see how funding from the Minnesota Terrestrial Plants & Pests Center has enabled several lines of research to combat invasive plant pathogens and pests. You will celebrate with us as we welcome a new faculty member and honor our many (many!) award winners. You will learn about how the department recognized the 50th anniversary of the awarding of Dr. Norman Borlaug's Nobel Peace Prize and how we are leveraging the moment to promote the critical research and Extension activities that are ongoing to this day. And we honor the lives of two of our alumni.

I hope you enjoy this edition. And from the bottom of my heart, "thank you" to each and everyone of you for all you do for this department and our mission.

Stay in good health and happy reading!

Jim

Departmental Scientists Fight Invasive Species

BY JENNIFER JUZWIK

Invasive species - insects, pathogens, and plants – are causing significant harm to Minnesota's agricultural resources, forests, prairies, and wetlands. Plant Pathology faculty have received funding in the past 5 years from the Minnesota Legislature through the Minnesota Invasive Terrestrial Plants and Pests Center (MITPPC) in CFANS to find practical solutions to invasive pathogens and plants. In a detection-focused project led by **Bob Blanchette**, team members used aerial imagery to survey pine plantations in Minnesota for the root disease pathogen *Heterobasidion irregulare* that results in "circles of death" where it has become established. Fortunately, the pathogen was not found in the surveyed lands, but a variety of fungi that could potentially act as natural biological control agents were obtained. Blanchette's team is now working on spore trapping techniques coupled with molecular identification

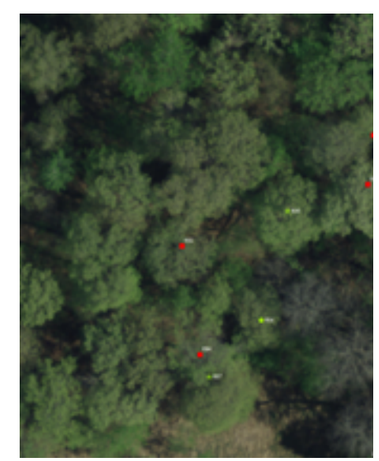
for the same and other tree pathogens to develop a biosurveillance program. Working with another MITTPC project led by **Jeannine Cavender-Bares**, Co-PI **Jenny Juzwik** has contributed to efforts that enable detection of oaks in early stages of the disease by identifying hyperspectral signatures based on step-wise use of oak phylogenetics, tree physiology and canopy spectral reflectance. Digital data captured by sensors on drones, fixed wing aircraft or satellites and processed through a developed "pipe-line" have potential for direct use by forest managers to accurately map the disease and initiate control actions.

MITPPC researchers led by **Pablo Olivera Firpo** are determining the distribution and host range of a novel rust pathogen of two invasive plants in the state: glossy buckthorn and reed canary grass. In addition, the team will determine whether the rust can provide effective biocontrol of both species. Olivera Firpo also will lead a

"Plant Pathology faculty have received funding in the past 5 years from the Minnesota Legislature through the Minnesota Invasive Terrestrial Plants and Pests Center (MITPPC) in CFANS to find practical solutions to invasive pathogens and plants."

new 2021 funded project to develop cost-effective molecular diagnostic tools to identify barberry hybrids (*Berberis x ottawensis*) across Minnesota. **Dean Malvick** has led a center-funded project focused on distribution, detection, and biology of *Fusarium virguliforme*, the cause of sudden death syndrome of soybean. With 2021 awarded funds, Malvick also will document distribution of corn tar spot over time and clarify the host range and methods for detection of the causal fungus. Findings from Malvick's studies will add to the knowledge base needed to develop long-term management strategies to these new threats to corn and soybean production in the state.

Ben Held and **Ryan Murphy** have led a MITPPC project studying surviving elm trees in the region to better understand their natural resistance to Dutch elm disease (DED). They are identifying survivor elms in the Minnesota landscape, clonally propagating them, and conducting inoculation trials to determine their resistance to DED. Their aim is to add diversity to DED resistant American elm available for use in urban settings and to return elm species back to the Minnesota landscape.
Ash is another hardwood in the state threatened by an invasive species, the emerald ash borer (EAB). Co-PIs **Bob Blanchette** and **Kathryn Bushley** seek to understand the interactions between this pest and the fungi associated with them in their MITPPC funded project. Their work also will identify diseases linked with EAB infestation and identify biocontrol fungi for potential use in pest management.



STRESSFUL. RIGOROUS. EXHAUSTING. DISORIENTING. DIFFICULT. BY: SAVANA LIPPS

When graduate students in the department were asked to describe their experience taking classes remotely and/or socially distanced during the times of COVID-19, these were some of their responses.

The pandemic has challenged our community in many ways. For students in the department, the university-wide stay-at-home mandate back in March during the Spring 2020 semester resulted in an abrupt shift in the method of course delivery at the university level. Students quickly transitioned from attending their classes in person, to attending remotely either through Canvas sites or our newly beloved Zoom platform. Though many were hoping to return to "normal" in-person classes by the Fall 2020 semester, the reality was that the majority of courses were still offered as completely remote or socially distanced. Taking classes as a graduate student has always been challenging, but with the new normal of remote/socially distanced course delivery, it has been tougher than ever. Graduate students **Dong-gyu Kim**, **Nick Greatens**, and **Sofia Simeto** shared their challenges taking classes during a pandemic.

Dong-gyu: As everybody who took courses during the Spring 2020 semester will remember, there was a great struggle to adapt to an entirely online platform of learning. Instructors certainly had the most harrowing task of having to alter their teaching material to fit an online format, and at the same time be memorable and instructive. As a student (and later instructor myself during the Fall 2020 semester), my one constant struggle throughout both semesters was exploring the technical capabilities and limits of an online platform, as I had never taken an online course before

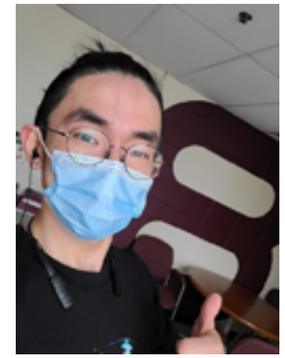
Nick: I find a lot of distractions at home and online. I find it generally more difficult to pay attention over Zoom, and when I am working or taking classes at home, it is easy to become distracted by housework or other things. But I can find distractions in a classroom too.

Sofia: Distance learning demands more effort on focusing and keeping up to date with assignments. You still have the routine of having the lectures or lab sessions but somehow it does not feel the same. For me probably the biggest drawback of distance learning was not having in-person laboratory sessions which I find key for fixing information learned during lectures. That being said, I appreciate the effort of the instructors to replace those activities with other, still interactive (e.g. by using apps), or to produce visual material of lab experiments, etc. While rising to the challenge students also learned more about themselves including their learning-style preferences, how to make online learning work for them, and ways to be resilient in difficult situations.

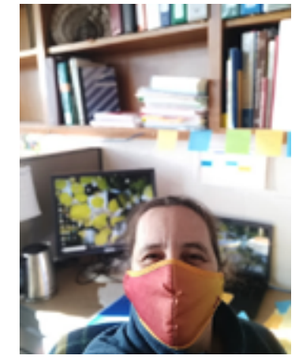
Dong-gyu: Much more important than learning the technicalities of online platforms was remembering the importance of maintaining a life outside of academia. I think the added stressors of life in lockdown made me truly appreciate the value of personal and social connections as balancing forces of my professional life.

Nick: During long lectures and zoom meetings, I have learned to keep my hands away from my computer. Otherwise, I'm inevitably browsing Wikipedia or Twitter even as it looks like I'm paying attention.

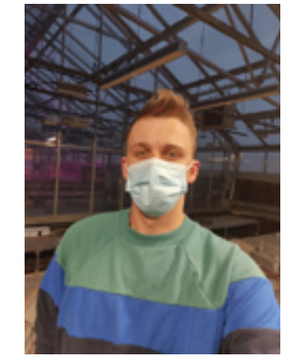
Dong-gyu Kim



Sofia Simeto



Nick Greatens



Sofia: I think that it is important to stay as involved with the class as possible. Although I'm not fond of being on camera I tried to always leave it on to keep a sense of being in a classroom. I also tried to keep interacting with the class as if I were in person (asking questions and actively participating in discussion breakup rooms, etc).

While it is unclear exactly when students will be able to take classes "normally" again, it is clear that students who experienced taking classes during a pandemic exemplify resilience. The graduate students advised on taking courses during a pandemic to future students.

Dong-gyu: I would suggest that students remain positive about their academic prospects, and not forget that their well-being should take priority. Also, take a walk around the neighborhood whenever they get the chance.

Nick: Make sure to interact with the professor and other students. It's even easier now to go through class unnoticed and receive a good grade, but you should try to form relationships with your professors and classmates. Attend virtual office hours. Meet with other students on zoom for projects or for studying.

Sofia: Try keeping focus and minimize distractions during class, ask your instructor whenever you don't understand something, and try to participate actively. Try setting routines of work but also of other activities not related to studies or work at all, just to have a well-deserved fun time. Reach out if you need support and be proud of your accomplishments!

Finally, students shared the critical role that the department played in supporting them during these tough times.

Dong-gyu: The members of our Department were vigilant in maintaining our community. I would also especially like to shout out to members of staff for so frequently checking in on me (as I'm sure they did for others as well), making sure that nonsensical policy changes did not affect me, and assuring me that my work is valuable. The past several months were much less stressful thanks to them.

Nick: Faculty have been understanding and supportive. I've noticed that instructors are much more likely now to request feedback from students about what is working well and what isn't. Previously, many instructors only did this at the end of class after it was too late to change.

Sofia: I have felt most supported by our department during these times, especially when preparing for the prelims, and I am very grateful for that. Although it might seem like a small detail, every mail asking how we are doing or receiving a greeting card or even some treats helped in feeling supported.

With the uncertainty and challenges associated with taking courses during the past year, 2020 will surely go down as an unforgettable and unusual year to be a student.

How Did We Do It?

Contactless Delivery in the PDC

BY JENNIFER FLYNN AND GRACE ANDERSON

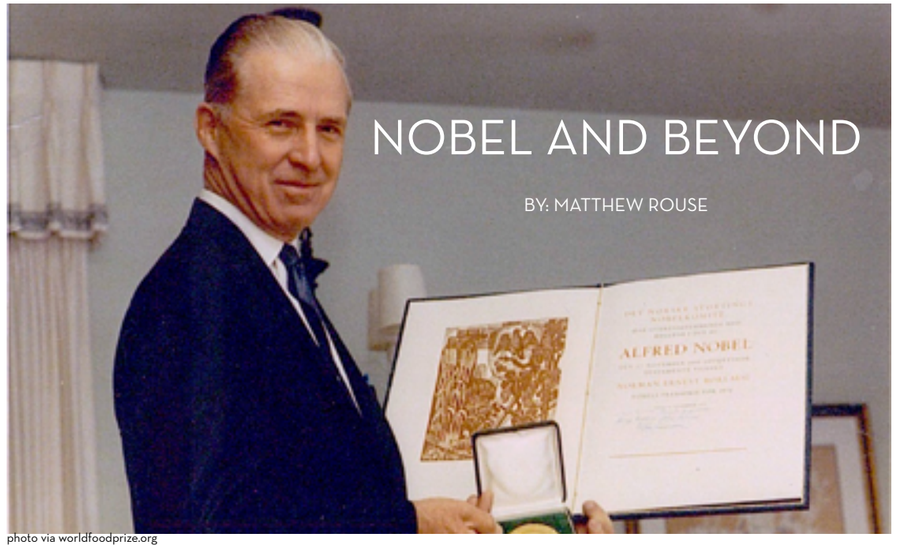
Plant Disease Clinic clients usually have perishable samples that are often large and/or difficult to mail. With about half the state's population living or working within an hour's drive of the lab, hand delivery of samples has always been a popular option. Then there was COVID-19. For those of us working in person, March 17, 2020, greeted us with locked doors.

The University of MN was "closed". What to do? What were the other service labs doing? Adapting. Veterinary Medical Center - OPEN. Soil Testing Lab - OPEN. Plant Disease Clinic - OPEN. The era of no-contact drop-off began. Add to that: face masks, social distancing, sanitizing high-touch items, and limits on how many of us could be in the clinic at the same time.

It was a very busy year for this bin placed at the front door of Stakman Hall. The 2020 season saw as many or more submissions than previous years despite the pandemic. We served almost 700 customers with more than 2100 samples processed. We utilized our diagnostic skills in communicating over the phone vs. in person. Due to closures and limitations of clinics in other states, we saw an increase in the number of out-of-state submissions.

The increase in the number of packages delivered was managed efficiently with the help of Plant Pathology Administration and UMarket staff.

We are proud that we managed to continue to provide essential plant diagnostics to local, state, and US customers last season and look forward to a time when contactless delivery is no longer necessary.



NOBEL AND BEYOND

BY: MATTHEW ROUSE

photo via worldfoodprize.org

On December 10, 2020, the Department of Plant Pathology teamed up with CFANS to host the online conference "Nobel and Beyond: Building on the Legacy of a Hunger Fighter". The event was planned to coincide with the bestowal of the 2020 Nobel Peace Prize, 50 years after Department alumnus, Norman Borlaug, received the prize in 1970.

As this event approached, the Norwegian Nobel Committee announced that the 2020 Nobel Peace Prize would be awarded to the United Nations World Food Programme "for its efforts to combat hunger, for its contribution to bettering conditions for peace in conflict-affected areas and for acting as a driving force in efforts to prevent the use of hunger as a weapon of war and conflict." This coincidence was especially significant for two reasons. First, the recognition of an organization combating hunger fits with the legacy of Dr. Borlaug. Second, Dr. Arif Husain, U of M alumnus in Applied Economics, currently serves as the Chief Economist of the World Food Programme.

Jim Bradeen the event moderator, and Brian Steffenson the event co-chair invited Arif Husain to speak as part of the star-studded zoom conference including Dr. Borlaug's daughter Jeanie Borlaug Laube, Ronnie Coffman of Cornell University, and the President of the World Food Prize, Barbara Stinson. U of M President Joan Gabel provided a pre-recorded message for the conference and CFANS Dean Brian Buhr spoke. The event also featured other speakers including several CFANS students.

After receiving the Nobel Peace Prize earlier that day, Arif Husain gave a very motivating message including three points of advice to students and researchers: 1. Get your problem right – what problem are you trying to solve? 2. You cannot dismiss things as someone else's problem. 3. In your research, don't just leave it at analyses – let decision-makers know why it matters.

Shortly after this conference, Jim Bradeen wrote an article that was published in the Twin Cities Pioneer Press, "Building on Borlaug to feed the future". Bradeen summarized the significance of the World Food Programme receiving the Nobel Peace Prize on the same day that the Department commemorated the 50th anniversary of Borlaug receiving the prize. Bradeen also explained how researchers at the Department and the U of M are continuing the legacy of Borlaug by relentlessly "applying science and policy to alleviate hunger, provide good nutrition, and protect the environment." Bradeen referenced current research such as studying how the microbiome of native prairies can be applied to modern agriculture to protect plants from disease.

December 2020 was a memorable month for the Department as we not only reflected on the legacy of Dr. Borlaug but also looked to the future. Our department has a rich history of impacting the world, and together we will continue this legacy with our cutting-edge research to "alleviate hunger, provide good nutrition, and protect the environment."

DR. ASHISH RANJAN JOINS THE DEPARTMENT

BY: MATTHEW ROUSE

Growing up in Northeast India, Dr. Ashish Ranjan has been familiar with the importance of agriculture since his childhood visits to his grandfather's farm. Years later, during Ashish's Master's degree program in Biochemistry, discussions with his advisor led him to see the opportunity to apply biochemistry and molecular biology towards improving the plants that are a part of our everyday lives. This led Ashish to pursue a Ph.D. in Plant Microbe Interactions at the Centre for Cellular and Molecular Biology in Hyderabad. Through his Ph.D. studies, Ashish discovered that treating rice with cell wall degrading enzymes could upregulate rice (*Oryza sativa*) receptor-like kinase, WALL-ASSOCIATED KINASE-LIKE21, and the jasmonic acid defense pathway leading to enhanced innate immunity to *Xanthomonas oryzae* pv *oryzae*. Dr. Ranjan then joined the University of Wisconsin as a postdoctoral researcher studying disease resistance mechanism and pathogenicity factors involved in the soybean and *Sclerotinia sclerotiorum* pathosystem. This work resulted in the identification of tolerant soybean lines, understanding the molecular mechanisms of resistance, and utilizing siRNA and gene-editing to downregulate soybean genes that result in enhanced resistance (this work was patented).

After a brief return to India as an Assistant Professor at the University of Hyderabad, Dr. Ashish Ranjan joined the University of Minnesota Department of Plant Pathology as a Research Assistant Professor in November 2020. Ashish plans to continue researching plant-microbe interactions that can be leveraged to improve agriculture in Minnesota and around the world. Building on his expertise in soybean and *S. sclerotiorum*, Ashish plans to address Sclerotinia stem rot in soybean, canola, and sunflower through examining host diversity in resistance, the role of the microbiome in *S. sclerotiorum* infection, and population genomics of the pathogen to identify virulence factors and biological controls. Also, Ashish will be involved in teaching the plant-microbe interactions course in the Department. Ashish's goal in his research is ultimately to help farmers and growers to find solutions to pathogens of economically important crops.

Ashish has already settled into living in Minnesota and is very glad to be reunited with his family. When asked about any advice that he would give to students who are working and studying during the pandemic, Ashish said to "have hope" and that the "key is discipline and keeping yourself motivated". On the positive side, Ashish has appreciated the flexibility in teaching and learning that has changed during the pandemic. Dr. Ashish Ranjan adds valuable expertise in plant-microbe interactions and practical knowledge in soil-borne diseases that complements our Department well.

Remembering Dr. Larry James Littlefield and Dr. Gacheri (Jane) Kimathi Muriuki

BY DEBRA BADEN DRANGE, JUDY COX AND RICHARD ZEYEN

Larry James Littlefield was born in Fort Smith, Arkansas on February 7, 1938. He died on July 11, 2020 in Farmington, New Mexico.

Larry was raised in eastern Oklahoma and after high school started college at Oklahoma A&M, now Oklahoma State University. Later he attended Cornell University, in New York, where he received a B.S. degree in 1960. He then enrolled in Plant Pathology at Minnesota where he received an MS (1962) and PhD (1964) under the guidance of professor Roy Wilcoxson. In 1965, after a year's NSF postdoctoral at Sweden's Uppsala University, he was hired as an assistant professor of Plant Pathology at North Dakota State University (NDSU).

Larry had a lifelong thirst for learning. While on the faculty at NDSU he expanded his knowledge and skills through sabbaticals at Purdue University and Oxford University. In 1979 he teamed up with Dr. Michele Heath from the University of Toronto to publish another book, Ultrastructure of Rust Fungi, which was reprinted in 2012. Then, in 1981 he published his second book, Biology of the Plant Rusts. In 1985 he was appointed Professor and Head of the Department of Plant Pathology at Oklahoma State University. He remained so, until 1996 when that department was merged with Entomology. He remained a professor in the newly merged Department of Entomology and Plant Pathology until his retirement in 2004.

After retirement Larry and his wife, Julianne, moved to Albuquerque, New Mexico. While retired he joined with Dr. Michele Heath from the University of Toronto to publish another book, *Ultrastructure of Rust Fungi*. He also began working with naturalist Pearl M. Burns, and in 2015 they published *Wildflowers of the Northern and Central Mountains of New Mexico: Sangre de Cristo, Jemez, Sandia, and Manzano*.

His friends and colleagues will remember Larry as a scientists' scientist, and a man who loved interacting with students and the public.

Dr. Gacheri (Jane) Kimathi Muriuki (Ph.D., 2001) passed away on March 30, 2021 in London, Ontario, Canada.

She was born on June 23,1963 in Kiraa, South Imenti-Meru County, Kenya, Africa. She attended the University of Nairobi, Kenya and received her B.Sc. in Biochemistry and Botany (with Honors in 1989), and a M.Sc. in Mycology in 1992.

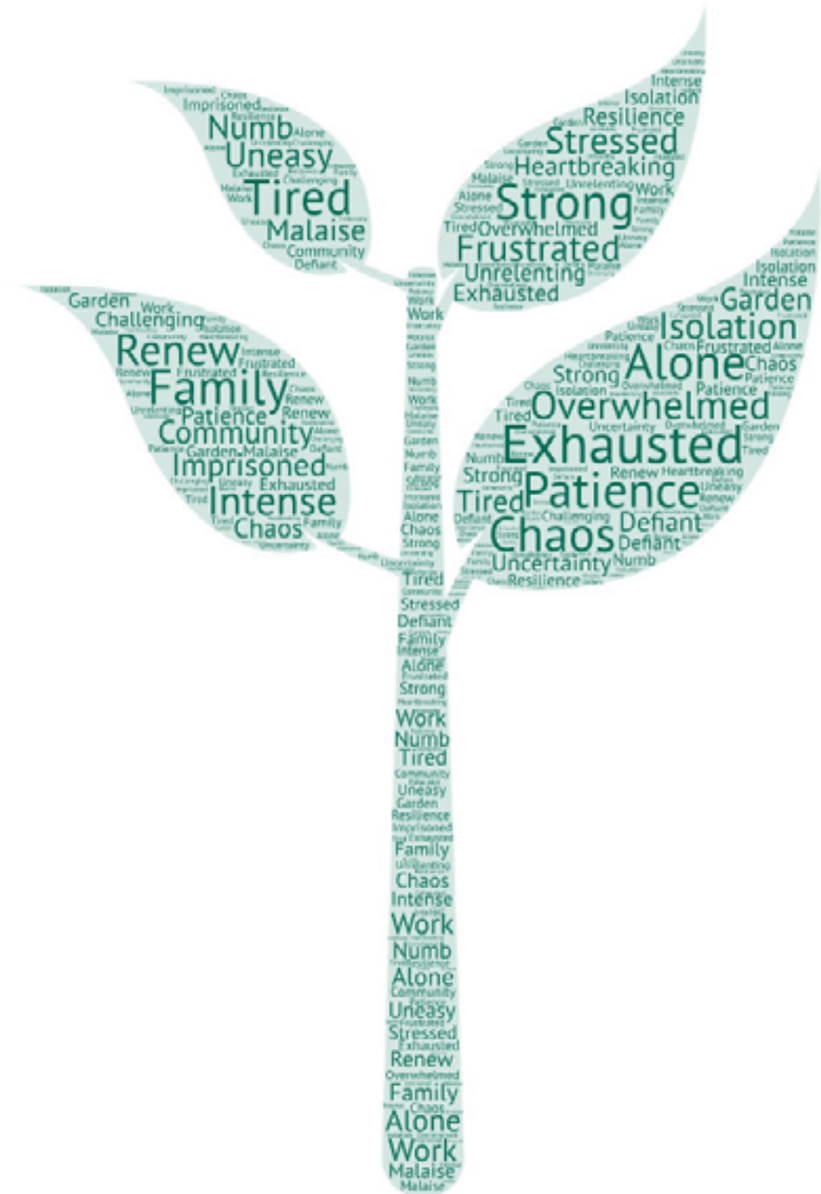
Her M.Sc. thesis was entitled Mycoflora of stored maize and maize products; their enumeration and significance. From 1992 to 1996 she was a lecturer at Jomo Kenyatta University of Agriculture and Technology located in Nairobi, Kenya.

In 1996 she came to the University of Minnesota's Plant Pathology Department as a Ph.D. student to study with Professor Richard Meronuck and in conjunction with Professor Chester Mirocha. At Minnesota she worked with mycotoxins important in the Fusarium Head Blight Disease of wheat. Gacheri was noted for her joyful personality and religious faith.

During her studies Professor Meronuck unexpectedly passed away and Professor Mirocha retired; however, Professor Mirocha continued on to serve as her advisor. In 2001 Gacheri completed her thesis – Deoxynivalenol and nivalenol in pathogenesis of Fusarium head blight in wheat. Following her Ph.D. she did a post-doctoral year in the Department with Professor Brian Steffenson.

Gacheri moved to Canada and worked as a Clinical Research Associate (toxicology) at KGK Synergiz Inc. and with various non-profit charitable organizations. At the time of her passing she was Director of 'Ignite Your Destiny International', a non-profit charity that she founded in 2015 in London, Ontario, Canada. Its mission was directed at her beloved Kenya, and was to: 'Train, equip and empower youth and communities through vocational education'.

Gacheri is survived by her children Kingsley Mutuma Kimathi and Ivy Brenda Nkatha Kimathi; and, by grandson Grayson Mutuma, and her sisters and brothers bth in Canada and Kenya. Gacheri made many friends and will be greatly missed.



COVID IN ONE WORD FROM PLPA

2021 Awards Plant Palthology Day

By SAVANA LIPPS

Despite the pandemic, multiple faculty, students, and staff received departmental and external awards in 2021

Graduate students **Sofia Simeto Ferrari, Austin Lien, Sam Rude,** and **Jacob Botkin** received Graduate Student Travel Awards established by former Plant Pathology faculty, Dr. Ward C. Stienstra and Dr. Elwin Stewart and Dr. Richard A. Meronuck to recognize outstanding graduate student research and to support student participation in professional scientific meetings.

Yeidymar Sierra-Moya received the M.F. Kernkamp Fellowship, which was established in honor of former Professor and Head M.F. Kernkamp to recognize outstanding students of the Department of Plant Pathology at Minnesota.

Robert Alvarez Quinto received the Fred I. Frosheiser Scholarship, established in honor of former Professor F.I. Frosheiser to recognize outstanding students in the Department of Plant Pathology at Minnesota.

Savana Lipps received the Dr. John Dueck Memorial Scholarship, which was established in honor of former alumnus Dr. John Dueck to support outstanding students in the Department of Plant Pathology at Minnesota.

Sofia Simeto Ferrari received the Dr. Carl and Johanna Eide Scholarship, established in honor of Dr. Carl and Johanna Eide to support outstanding students in the Department of Plant Pathology at Minnesota.

Nick Greatens received the Vaala-Henry Endowment in support of the Norman E. Borlaug Fellowship for International Agriculture. This is awarded to students conducting research on a cereal crop who have demonstrated outstanding academic promise and achievements.

Grace Andersen received the Civil Service Award of Excellence, which recognizes excellence in job performance among civil service personnel within the department.

Grant Czadzeck received the Professional and Academic Award of Excellence in the Professional category, which recognizes excellence in job performance among professional and academic personnel in the Department of Plant Pathology.

Ben Held received the Professional and Academic Award of Excellence in the Scientific category, which recognizes excellence in job performance among professional and academic personnel in the Department of Plant Pathology.

Susan Kingsbury received the graduate mentor award, which recognizes excellence in mentoring of graduate students in the department.

Sofia Simeto Ferrari received the Minnesota Mycological Society Graduate Student Scholarship to support her research in the field of mycology.

Jennifer Juzwik was awarded as a Fellow of the American Phytopathological Society in recognition of distinguished contributions to plant pathology or to The American Phytopathological Society.

Yeidymar Sierra Moya was awarded the CFANS Diversity Scholars Graduate Fellowship to support success in academics and professional development.

Kristen Opitz received the CFANS Professional and Academic Award in the Professional category that recognizes members of the P&A staff who continue the mission and goals of their unit(s) and the college.

Jim Bradeen received the CFANS Little Red Oil Can Award that recognizes faculty who made an outstanding contribution to the enhancement of St. Paul Campus Life.

Ruth Dill-Macky received the CFANS Distinguished Teaching Award for Tenured Undergraduate Faculty that recognizes those members of the faculty who have made significant contributions to teaching.

Ben Held received the CFANS Professional and Academic Award in the Professional category that recognizes members of the P&A staff who continue the mission and goals of their unit(s) and the college.

Devanshi Khokhani received the CFANS Bridge & Development Award that supports CFANS faculty in developing and sustaining projects related to agriculture research, education, extension, and technology transfer principles while they work to secure longer-term external grant support. She also received the ASPB 2021 Women's Young Investigator Travel Award (WYITA) to attend the Plant Biology conference in 2021.

Several members and former members of the department were named as one of "50 CFANS Hunger Fighters" by the UMN College of Food, Agricultural and Natural Resource Sciences. These individuals are **Mo Yakub, Pablo Olivera, Matt Rouse, the Lieberman and Okinow families, Silvia Pereyra, Yue Jin, Jeanie Borlaug, and Margaret Krause**.

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We are global leaders in plant pathology and continue to adapt our research, teaching, and Extension efforts to respond to contemporary needs and opportunities. While institutional support and research grants from public and private entities are critical, contributions from donors play an increasingly important role in helping the Department remain an agile, adaptable, and highly effective world leader.

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