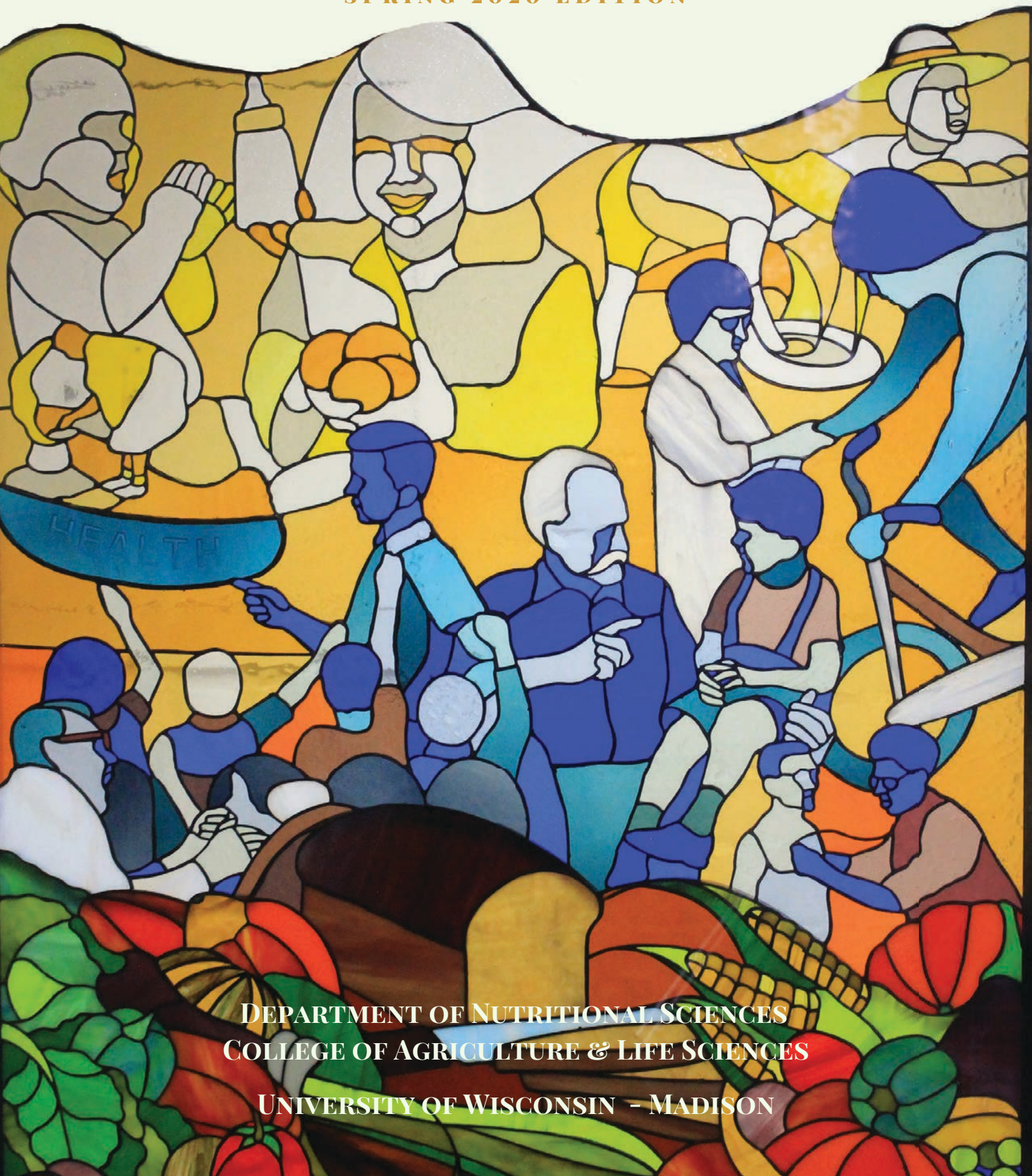


NUTRITIONAL SCIENCES DIGEST

SPRING 2020 EDITION



DEPARTMENT OF NUTRITIONAL SCIENCES
COLLEGE OF AGRICULTURE & LIFE SCIENCES

UNIVERSITY OF WISCONSIN - MADISON

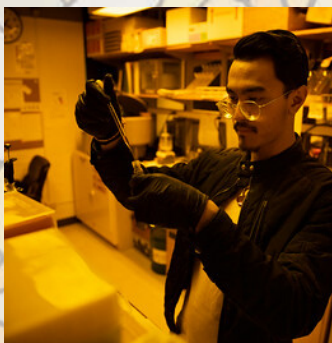
Note From the Chair: Dr. David Eide



Greetings from Nutritional Sciences. Exciting things are happening in our department. For my contribution to this edition of our newsletter, I'd like to spend a few lines bragging about the research activities of the tenure-track assistant professors in our department. These three individuals are providing the foundation for the continued long-term success of Nutritional Sciences. Assistant Professor Brian Parks, who joined the department in 2015, is using systems biology approaches to identify biological pathways and genes that affect the development of nutrition-related diseases. Using mice as a model, he has identified several genes whose differences in DNA sequence are linked to various metabolic effects of diet. As one specific example, his group identified the Sestrin-1 protein as an important and previously unknown regulator of cholesterol metabolism. Assistant Professor Jing Fan joined the department in 2017 when she was appointed as a Morgridge Investigator. The overarching

goal of Jing's research is to understand how metabolism in mammalian cells is reprogrammed in response to environmental conditions and cellular state. Her group uses mass spectrometry and state-of-the-art metabolomics approaches to dissect these processes. In one recent study, Jing and her collaborators discovered an exciting new mechanism for how macrophages, an important type of immune cell, reprogram a central pathway in metabolism in response to signals of infection. Assistant Professor Adam Kuchnia, who also joined the department in 2017, is addressing protein metabolism and how it relates to the preservation of muscle mass and muscle quality in patients undergoing treatment for diseases such as cancer. A key problem for this type of work is the ability to assess muscle quality in patients with serious medical conditions. Adam is devising new methodologies to meet these challenges. He and his collaborators have shown the power of combining the noninvasive techniques of bioimpedance spectroscopy (BIS) with dual-energy X-ray absorptiometry (DXA) to detect muscle loss. These three young faculty members have been in the department for only a short time but they are already having big impacts on their respective fields of study. The department is truly fortunate to have them among our faculty!

In This Edition...



Vitamin A Assessment



New Diversity and
Inclusion Coordinator



Our Incoming Class!



Vitamin A Assessment

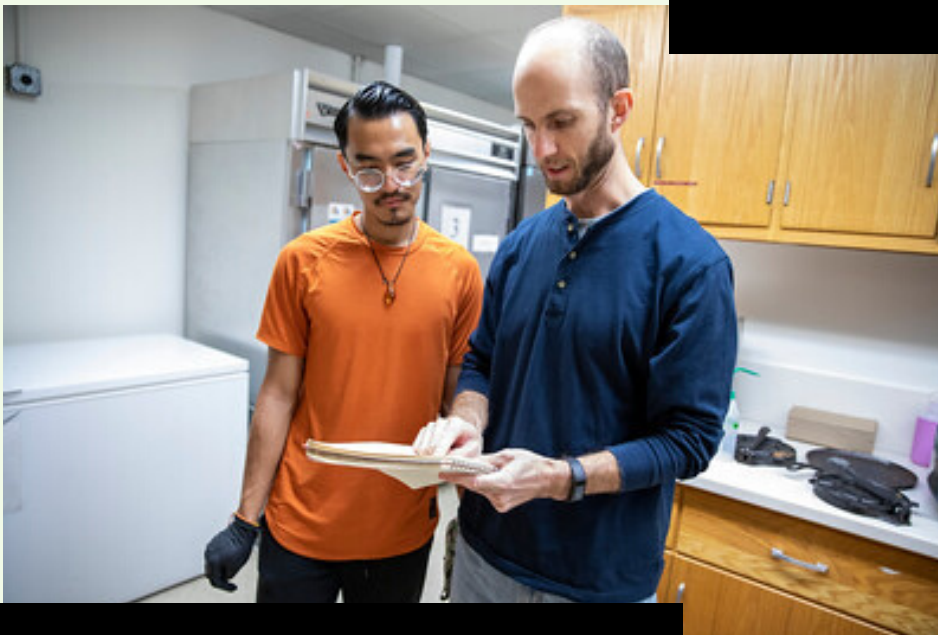
The World Health Organization estimates that approximately 190 million pre-school aged children and 19.1 million pregnant women suffer from vitamin A deficiency worldwide. Vitamin A deficiency can lead to increased risk of morbidity and mortality. The Vitamin A Assessment Laboratory is a progressive research and outreach team in the Department of Nutritional Sciences, directed by Dr. Sherry Tanumihardjo. The Tanumihardjo lab focuses on two primary research objectives. The first is working on methodology for assessing vitamin A status in humans, because direct measurements of liver are not currently feasible. The second is evaluating the efficacy of potential interventions for alleviating vitamin A deficiency in at risk populations, primarily through dietary sources rich in provitamin A carotenoids, which are less likely to cause toxicity and are more likely to have other essential micronutrients.

As of 2019, Dr. Tanumihardjo ranked in the top 0.0078% of vitamin A researchers in the world by expertscape.com. Many members of the lab are also ranked high on this list, including Chris Davis and Mike Grahn who are researchers in the Tanumihardjo Lab, as well as many current and previous students of Dr. Tanumihardjo. “The rankings are determined based on number of publications from 2009-2019, showing that the lab has remained highly productive in a very competitive research environment. It also speaks to the collaborations that have been established with other research groups around the world,” Chris Davis, Senior Research Specialist in the Tanumihardjo lab.

In continuing the labs celebrated legacy of vitamin A research, there are many students engaged in unique research projects, one particular standout being Wai “Chris” Bwar. Chris, a recipient of the Department of Nutritional Sciences Cargill/Benevenga Undergraduate Research Stipend, is a dietetics undergraduate student and is also pursuing a Certificate in Global Health.

project is very important for a multitude of reasons, including looking at nixtamalization, a process for the preparation of maize (corn). Nixtamalization is used commonly in Mexico and other Latin American countries. In Zambia, this process often over refines maize affecting its nutrition content.

countries is the process of treating maize with lime (nixtamalization) before preparing it into various foods. In order to test how these processing methods impact the potential vitamin A provided from the maize we will apply various traditional processing techniques to two varieties of biofortified maize, and then feed



Currently, Chris is working on biofortified maize from the International Maize and Wheat Improvement Center (CIMMYT). Maize is a staple crop in numerous Central American and African countries, some of which are thought to have at-risk populations for vitamin A deficiency. Efforts to increase the carotenoid content of maize through natural breeding methods have led to varieties with much greater concentrations of the carotenoids β -cryptoxanthin and β -carotene, which can be converted to vitamin A. Chris’

In addition to looking into nixtamalization, Chris and the lab will be testing a dietary supplement at the same time.

The processing of maize post-harvest can result in the degradation or loss of carotenoids, therefore reducing how much vitamin A can be provided. The major difference between maize processing in Mexico and many African

the maize to Mongolian gerbils to determine differences in total vitamin A acquired from the diet.

Furthering his interest in nutritional sciences, in 2018, Chris went to Texcoco, Mexico with the Linking Agriculture to Nutrition course. “I experienced first-hand how an organization operates down to individual scale through fieldwork experience. Whether it is talking to farmers, visiting different farms, going to see how tortillas are made,

playing soccer with kids, or visiting the Teotihuacan pyramids, it is really engaging.”

Linking Agriculture to Nutrition is a week of lectures and discussions at the CIMMYT taught by Dr. Tanumihardjo. Complemented by site visits to farms in the surrounding area, students in the class learn from research experts on the topics of food security, agronomy, sustainable agriculture, nutrition, climate change, and the environment.

In the future, Chris plans on working in field of public health particularly for NGOs and in research before going to graduate school for masters in public health. Because of his interests in nutrition and public health, he plans on learning more about healthcare policies in developing countries.

Moving forward, the Tanumihardjo lab will likely continue to evaluate public health policies for addressing vitamin A deficiencies and look more closely at nutrient-to-nutrient interactions between vitamin A and other key micronutrients in the human diet. You can learn more about Sherry’s research by visiting our website at <https://nutrisci.wisc.edu/sherry-a-tanumihardjo/>.





Colin Steck

Undergraduate Highlight

Undergrad student Colin Steck is currently a Junior majoring in Nutritional Sciences with a certificate in Global Health here at the University of Wisconsin-Madison, planning to graduate in the Spring of 2021. Colin has always had an interest in nutrition. His interest in food, the human body, and medical fields have led him to the educational path he's on now and the ambitious career goals he has set for the future.

"No matter what you do, food and nutrition is always around, and that makes it a very tangible topic that I can easily relate to. I really like understanding how the body works, along with human metabolism of different micronutrients and their corresponding pathways. It seems like with this major you take so many things that you have learned in the required classes and then apply them to your life. The body is such a fascinating creation that I seek to understand, and nutritional science allows me to do that," said Colin.

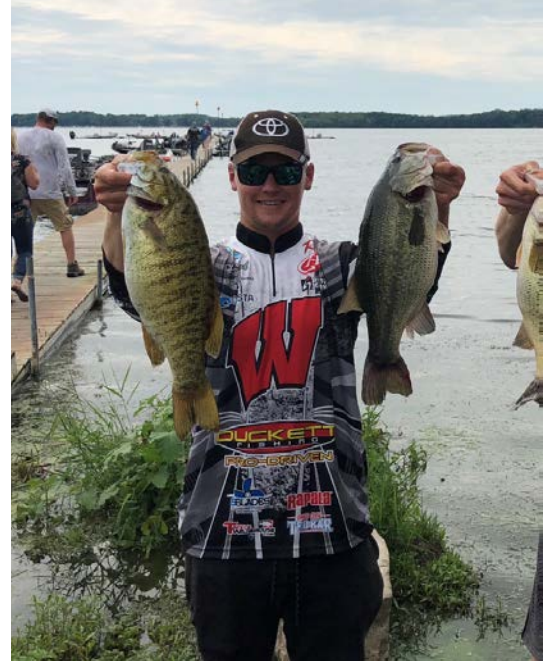
In addition to working in the lab, Colin also works as an EMT for Ryan Brothers Ambulance. At work he monitors patients that are being transported from hospital to hospital and responds to 911 calls at

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certain stations. He makes critical treatment decisions on scene and in route to the hospital, providing lifesaving interventions if necessary. He also strives to make patients comfortable during the transport by practicing good patient care.

When he's not busy studying or saving lives, Colin likes to unwind by fishing. He is the President of the Wisconsin Fishing Team where he runs and hosts different meetings, plans future events, coordinates different volunteering opportunities, and plans future fishing tournaments. As a team they also host many fundraisers, travel across the country for many bass fishing tournaments, and represent UW-Madison at the national level for college bass fishing.

As for future plans, Colin intends on going to medical school after his undergrad degree. Ideally, he would like to become either a surgeon or a family physician.





Working from Home

COVID-19

With the closure of campus during the Spring 2020 semester, home became the new workplace.



Incoming IGPNS Students



Lauren Clark

Lauren is anticipated to complete her degree in Biochemistry from College of Saint Benedict in May 2020. During her time at St. Benedict, Lauren worked for IMPACT (Innovative Minds Partnering to Advance Curative Therapies) in partnership with Mayo Clinic. During IMPACT, she assisted graduate students in projects regarding hypoplastic left heart syndrome. Lauren continued to work with Mayo in Summer 2019 to work on TaqMan Gene Expression, and impacts of gene deletion on risk of developing gliomas by molecular subtype. Additionally, Lauren worked Dr. Kumi Nagamoto-Combs in the Pathology Department at the University of North Dakota. Lauren studied the composition of cells in the brain and compared the quantity and morphology of CD4+ T-lymphocytes, astrocytes, and microglia between sham and sensitized mice.

Mark Heggen

Mark has worked in the McNeil lab group and the W M Keck Metabolomic lab at Iowa State University since 2017. In the Keck lab, Mark managed the capsaicin levels of peppers and compared metabolite detection on GC-MS, GC-MSMS, and HNMR machines. In the McNeil research group, Mark works with *Drosophila* populations to analyze high fat diet effects on the heart. Mark's experience in the lab has given him several opportunities including a leadership position in the Keck lab and the selecting of Mark's abstract for an oral presentation at the American Society of Plant Biology Midwest meeting.

His research experience also expanded outside of Iowa State. Mark started with the USDA, where he assessed the influence of infection with *Mycobacterium avium* subsp. *paratuberculosis* infection in cattle on milk production and calcium pump function in the mammary gland. He is anticipated to graduate with a BS in Agricultural Biochemistry in Spring 2020.



Jake Hermanson

Jake is a familiar face at UW-Madison. He completed his degree in Biochemistry in Fall 2019. During his time as an undergraduate, Jake joined the Hornberger lab in Fall 2017. His work focused on connecting cellular signaling events with hypertrophy in myofibers. The Hornberg lab, in collaboration with others, identified a phosphorylation event that occurs in response to resistance exercise in mouse myofibers. Jake has since taken responsibility of analyzing post-exercise muscle characteristics in the absence of this event. Jake has coauthored 5 abstracts including one that is being submitted to Cell Metabolism.

Eric McGregor

At Charleton College, Eric worked in many different research capacities. In the Calderone lab, a mechanistic biochemistry lab, Eric worked on a project focused on determining the amino acid residues responsible for catalysis in the active sites of two succinyltransferase enzymes (TabB and DapD). Eric early experience in the Caldron lab sparked his interest in translational research and a position in the Kohan lab. He followed the Kohan lab to the University of Pittsburg, where his project is to determine how circulating lipoproteins deliver triglyceride to regulatory CD4+Foxp3+T cells (Tregs) from the gut, and whether inhibition of this metabolic pathway changes Treg activity in cardiovascular disease. He graduated from Charleton College with a BS in Biochemistry in June 2019.



(continued on next page)

SIERRA STREBE



Sierra graduated December 2018 from New Mexico State University with a degree in Genetics and Biotechnology and a minor in Biochemistry. For the last two years Sierra has been a Maximizing Access to Research Careers (MARC) research scholar, which has allowed her to be a part of a research team. Her and her team did a project Characterizing Two Highly Expressed Genes in *Caulobacter crescentus* that had been identified yet the function was unknown. She used a variety of methods to uncover phenotypes associated with these genes. Sierra also co-authored a publication, The B12 Receptor BtuB Alters the Membrane Integrity of *Caulobacter crescentus* which was recently accepted to the journal of Microbiology. Sierra deferred her acceptance from Fall 2019 to Fall 2020 to pursue a Fulbright research scholarship in Germany.



AWARDS AND ACKNOWLEDGMENTS

JESSE SHEFTTEL



Congratulations to Jesse Sheftel!
Jesse is the 2020 recipient of the Wisconsin Distinguished Graduate Fellowship Award. Administered by the College of Agricultural and Life Sciences, the award was established through the estate of Elsa Thomsen. Jesse was awarded the Fellowship due to his "excellent academic performance and research productivity during your Ph.D. career at the University of Wisconsin-Madison."

2020

JULIE THURLOW



The department wishes Professor Julie Thurlow a very happy retirement! Julie attended UW-Madison for undergrad, receiving a degree in Dietetics. She received her R.D., M.S., and PhD before returning to UW-Madison in 1986 to teach NS 631: Clinical Nutrition. She was involved in 10 different classes in the department, whether that be by teaching, developing or launching them. Along with her teaching responsibilities, Julie has had hundreds of advisees she's worked with and guided. The department will miss you greatly!

100% PLACEMENT

The Department of Nutritional Sciences is overjoyed to share the Spring 2020 class of dietetic graduates has achieved a 100% dietetic internship placement level. This is far above the national average of 60%. Way to go, Badgers!

2020



HANNAH NEUENSCHWANDER

Congratulations to one of this year's Cargill-Benevenga Research Stipend recipients, Hannah Neuenschwander. This stipend is an award to support both Hannah and her mentors' laboratories. Hannah will be mentored by Dr. David Eide, and Dr. Colin MacDiarmid. A total of four credits of research is expected along with a written final report and oral presentation. Good luck with your research, Hannah!

AWARDS AND ACKNOWLEDGEMENTS

New Departmental Diversity and Inclusion Coordinator

By Erika Anna, MS, RDN

February 2020, the Department of Nutritional Sciences welcomed a new Academic Staff position, which included intentional space within the role for a Departmental Diversity and Inclusion Coordinator. One of the visions for this role is to enhance departmental communications among faculty, staff, and students; as well as, increase training and awareness. I look forward to the opportunity to actively foster and promote values of diversity, equity, and inclusivity within the Department of Nutritional Sciences, the Campus community, and beyond.

Our Shared Future Heritage Marker

In a joint submission for the WI Experience and Our Shared Future Heritage Marker Grant, CALS hosted the “Our Shared Future” marker in the lobby of Agricultural Hall March 13 through April 7, 2020. Collaborating units included CALS, Life Science and Communications, Earth Partnership, Department of Nutritional Sciences, and Agricultural and Applied Economics. The “Our Shared Future” marker was designed in collaboration with Ho-Chunk Nation leaders and dedicated in June of 2019. It recognizes UW–Madison land as the ancestral home of the Ho-Chunk, acknowledges the circumstances that led to the tribe’s forced removal, and honors the Ho-Chunk Nation’s history of resistance and resilience. The marker is seen as an important step for campus in furthering a respectful, collaborative relationship with the Ho-Chunk Nation. The Summer and Fall 2020 offering of NUTR SCI 377: Cultural Aspects of Food and Nutrition includes one of the structured learning experiences specified within the grant, and takes a look at Ho-Chunk history, food, nutrition, and culture. The “Our Shared Future” marker is touring public locations around campus to help increase awareness and will return to its permanent home on Bascom Hill in 2021.

Notable spring 2020 graduates from UW–Madison CALS

On May 9, a new group of University of Wisconsin–Madison students will officially graduate and join the Badger alumni community. Following the state’s Safer At Home guidelines, UW–Madison will recognize this group—including graduates of the College of Agricultural and Life Sciences—during a commencement ceremony video that will be posted online that day at noon. Some university departments are also coordinating their own virtual celebrations and recognitions. As is the case with so many other aspects of our lives these days, pomp and circumstance is being redefined this spring.

“Despite the unfamiliar situation we all find ourselves in these days, I cannot imagine a better time to be an agricultural or life scientist,” says CALS Dean Kate VandenBosch. “Today’s pandemic illustrates the tremendous value of the skills our graduates have learned to secure our food system, improve public health, discover biological mechanisms and to forward public policy and public service that benefit our communities.”

While the celebration of student accomplishment may look and feel different this semester, their achievements are undiminished. Below are brief snapshots of a few of our CALS students who will be graduating this spring.



Allison Breunig explains the composition of cow feed to Wisconsin Idea Seminar tour group members during the group’s visit to Mystic Valley Dairy in May 2018. Photo by Catherine Reiland/UW–Madison.

Allison Breunig

Life Sciences Communication major, with Entrepreneurship certificate

During college, Breunig was actively involved with the Badger Dairy Club; Association of Women in Agriculture; National Agri-Marketing Association; Collegiate Farm Bureau; and the Intercollegiate Dairy Judging Team. She was also selected to be a Renk Agribusiness Institute Scholar. She helped host UW–Madison’s 2018 Wisconsin Idea Seminar tour group at Mystic Valley Dairy, her family’s farm. Breunig plans to work in agriculture communications in some way. “I’m really interested in food marketing and how farmers can have a more personal relationship with consumers to create a platform for telling their story,” she says.

Kevin Crosby

Nutritional Sciences major, Environmental Studies certificate

While a UW–Madison student, Crosby interned three summers at the National Institute of Allergy and Infectious Diseases (part of the National Institutes of Health) and two years at the William S. Middleton Memorial Veterans Hospital in Madison. Crosby served as a peer mentor for campus’ Physics Learning Center and the Department of Biochemistry, and as an undergraduate teaching assistant in the Department of Nutritional Sciences. Outside the classroom, Crosby volunteered as a cultural coalition chair for a consortium of three residence halls, working with a team to create a

more culturally inclusive campus. Through the Badger Volunteers Program, he has assisted with the operation of The River food pantry in Madison and an afterschool program at a local elementary school. Crosby attended UW–Madison on a full-tuition scholarship through the Posse Foundation, which identifies students with extraordinary leadership potential and partners with top universities to diversify their applicant pools. He was a Rhodes Scholarship finalist.



Kevin Crosby addresses the crowd as the student spotlight speaker at the UW Board of Regents meeting in February 2020. Photo by Bryce Richter /UW–Madison.



Hannah Fenelon holds a disc of resin containing ticks at various life stages in campus’ Russell Laboratories building in December 2019. Photo by Michael P. King/UW–Madison CALS.

Hannah Fenelon

Entomology and Spanish double major, with Global Health certificate

Fenelon pursued undergraduate research, taking a position in the lab of Susan Paskewitz in the Department of Entomology. To help address the public’s general lack of knowledge about ticks and how to identify them, Fenelon worked on perfecting a method for suspending ticks in hard resin blocks that could serve as teaching aids and allow the public to “safely hold ticks in the palms of their hands and get a better idea of what they look like.” The big-picture goal is to help reduce the spread of Lyme disease. To that end, Fenelon shared her resin blocks with kids at a summer camp. She says the entire process has helped her develop skills for working with the public, which will prove indispensable as she pursues a career in global public health and medical entomology.

Grace Padgett

Biology major, with Global Health certificate

During her sophomore year, Padgett joined the lab of James Ntambi in the Department of Biochemistry, diving into a project to explore the cellular and molecular mechanisms behind obesity. Over the course of three years, she gained invaluable research experience that will help her as she moves on to a career in medicine and public health. “Doing this kind of independent research really helped me apply what I was learning in my classes,” says Padgett. “It’s helped me learn about the many approaches to an issue, be that clinical, through a global or public health perspective, or in laboratory research.”



Grace Padgett prepares samples for an experiment in the Ntambi Lab at UW–Madison in November 2019.

Photo by Michael P. King/UW–Madison CALS.



Monica Starck at her home in spring 2020. Photo courtesy of Starck.

Monica Starck

Nutritional Sciences and Life Sciences

Communication double major

Starck served as co-leader of the UW–Madison’s Food Recovery and Pre-package Program, a campus “gleaning” effort that launched this past year that was designed to reduce both food waste and food insecurity. The operation involves gathering food that was cooked, but not served, at campus dining halls and markets and then dividing the food up into healthy, frozen, microwaveable meals. The meals are made available to food insecure students. When it was up and

running, the program delivered an average of 250 meals a week. After graduation, Starck will be heading to a dietetics internship at Illinois State University, one of the 18 students that helped the Department of Nutritional Sciences achieve a 100% dietetics internship placement rate this year. Starck will be graduating alongside Brianna DeNamur (Nutritional Sciences major, with Global Health certificate), her fellow co-leader of the Food Recovery and Pre-package Program.

Help celebrate the class of 2020 by posting messages of congratulations on social media using #uwgradcals.

Read this story online at <https://news.cals.wisc.edu/2020/04/28/notable-spring-2020-cals-graduates/>

Coloring Page - Recognize our cover? This edition's cover features the stained glass pieces in the front lobby of the Nutritional Sciences building!





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