

NUTRITIONAL SCIENCES DIGEST

FALL 2019 EDITION



DEPARTMENT OF NUTRITIONAL SCIENCES
COLLEGE OF AGRICULTURE & LIFE SCIENCES

UNIVERSITY OF WISCONSIN - MADISON

Note From the Chair: Dr. David Eide



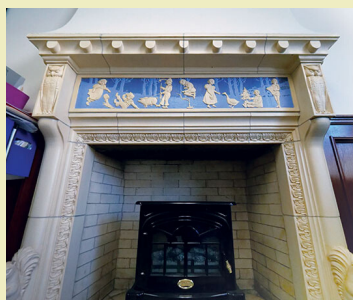
Greetings from the Department of Nutritional Sciences and welcome to the latest edition of our newsletter. In these pages, we are excited to share our many recent accomplishments and highlight a few new things in our department. We are offering a new course, Nutritional Sciences 377: Cultural Aspects of Food and Nutrition. This class will teach students to explore a new worldview, attitudes toward cultural differences, and much more. We are also excited to highlight new awards and acknowledgements for many staff and students throughout the department in the past months. The past few months have also had us thinking a lot about the future direction of the field of nutritional sciences as part of our annual strategic planning process. Our field has made great strides over the past few decades in understanding the functions of nutrients, the regulation of their homeostasis, and the metabolic processes involved in utilizing diet components. Those discoveries have had huge benefits to human health and the Department of Nutritional Sciences at UW-Madison has been in the vanguard of that success. Our field now faces new challenges in how nutrition-related metabolism can vary so widely between individuals. As one striking example of this phenomenon, a 2015

paper by Zeevi et al. (Cell 163: 1079-94) showed us that while one person's blood glucose spiked after eating a cookie but not a banana, another person showed the exact opposite response, i.e. no change from the cookie but a dramatic increase with the banana! Such "metabolic heterogeneity" can be tremendous and is likely responsible for the often limited value and conflicting outcomes of dietary recommendations that are currently based on population-level approaches. The ability to provide useful nutritional recommendations on an individual level, i.e. "personalized nutrition", is an important goal to us all and is greatly hindered by our lack of understanding of the sources and impact of that individual variation. Nutrients and food-based bioactive molecules pass through complex metabolic pathways that differ between people because of variations in our genetics, epigenetics, gut microbiota composition, lifestyle differences, and environmental conditions and exposures. The question of how these factors singly and in combination with each other influence nutrition is at the cutting edge of nutritional sciences. As we look to our future, the Department of Nutritional Sciences will be focusing its research efforts on these key questions to tackle the problems of nutrition in the 21st century.

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Undergrad Highlight: Raven Hall

To call Raven Hall an involved student would be an understatement. Raven is currently a third-year student in the process of earning a B.S. in Nutritional Sciences and certificates in both Global Health and Food Systems.

While she was in high school, Raven started interning at the Medical College of Wisconsin, hoping to gain experience and get to know many facets of the medical world — that she did.

"It's like a second home to me," she said. "I have a number of mentors and I can apply my STEM coursework to real-life situations. These experiences reaffirmed my passion for medicine."

While many students would slow down after acquiring a great internship, Raven kept on going. She's interned with REAP Food Group in a Farm to Business Internship where she learned extensively about food supply chains, the importance of local food systems and the current dairy crisis. She's also done an F.H. King Students for Sustainable Agriculture Internship in an effort to learn about food and nutrition from every possible angle.

She's not exclusively interested in nutrition, though.

"I feel like every person has at least one course that they take that completely inspires them or changes their way of thinking. Geographical Regions in a Global Context and some cultural anthropology courses were mine," Raven explained. "These courses taught me that nutrition is at the core of our lives as humans. It also brought me to my niche within the medical field — food and medical anthropology. Health is affected by more than just science because where we live, how much money we have, and who our ancestors were all play a role in how our bodies are able to process certain nutrients."



But for Raven, her most life-changing experience did not occur in the classroom. She spent time with the Global Gateway India Program, working in India and applying her anthropological course-work to a real life issue. Her personal research project focused on the factors surrounding the banning of cow slaughter in India.

"My findings were fascinating because they highlighted the intersections of politics, religion, and nutrition," Raven said. "I 100% plan on going back soon to continue working on this increasingly popular topic."

Back home, Raven works all over campus, frequently at one place very familiar to students — the Campus Food Shed. She currently runs this organization, providing food and produce to students that otherwise would have gone to waste. The food shed is located in the Student Activities Center (SAC) and is stocked almost every day. The organization has many community partners that donate, including Fresh Madison Market, Madison Sourdough Company and the Community Action Coalition.

As for future plans, Raven's not entirely sure where her interests will take her. In the near future she is going to Uganda to study how food and disease relate to one another, but in the more distant future she would like to go to medical school.

"I'm currently deciding if I want to earn my MD and PhD or MD and Masters of Health — or all of the above," Raven said. "My ultimate goal is to make a contribution to the community through studying and understanding the ways in which food and people's access to it in different parts of the world affects health outcomes."





Notable Alumni: Utchima Sriprachya

Why did you choose to study nutrition?

It might sound funny, but I chose to study nutrition because of a Korean series that I saw when I was in high school called *Dae Jung Geum*. It was a story about this lady working as a novice chef in the kitchen of the Royal Palace and later became a royal doctor. She used whole foods as a medicine to heal and cure whatever medical conditions the royal family had. She designed the menu that she cooked for the royal guests based on not just taste, but also the ability of that food to improve the health of the guests. I was so impressed by the power of food on health and the being of people, and that's the inspiration behind choosing to study nutrition.

What made you switch from studying nutrition to studying cooking and ultimately opening your own restaurant?

Cooking has been my passion since I was young. I always imagined being a chef and owning a small restaurant. That brought about my interest in nutrition and dietetics: to learn how to eat well and to help others eat well through cooking. So, after my graduate degree with an internship from Tufts university, I wasn't hesitant to continue my passion of cooking at the Natural Gourmet Institute. I was in a Chef's training program and working at the restaurants in New York for 1 year before heading back to Thailand. I was waiting for the right location and the right time to open my own restaurant. Luckily, I found the location of my dream and opened Little Sunshine Cafe in Bangkok.

What's your inspiration for the menu at Little Sunshine Cafe?

I am always inspired by local and seasonal eating, therefore, homemade comfort food with a local and healthy twist is the concept behind menu design here at Little Sunshine Cafe. I'm trying to emphasize using local, seasonal, and organic ingredients. Each dish is made fresh dish by dish, just like what your mom would make for you at home.

What do you like to do for fun outside of work?

It might sound boring, but I spend most of my time reading cookbooks, cooking new recipes, reading blogs, and dining out to keep up with my inspiration and self-improvement.

Do you have any favorite memories from your time at UW-Madison? Any professors, classes or moments that stick out to you?

I think all my memories from UW-Madison are quite precious and I'm still longing for that time now. My favorite moment is probably volunteering at the Dane County Farmer's Market through the Nutrition and Dietetics Club throughout my four years of undergraduate. There, I learned a whole lot about this great connection of everyone in the production of good food: growers (farmers), producers (chefs), consumers, and dietitians. I was introduced to the concept of sustainable and local eating. Again, I experienced this context of the connection in the world of food in Rural Sociology 222 with Jack Kloppenburg, which I think was probably my favorite class. We studied food, sustainability, and culture. We held potlucks in class and at Jack's house — so much fun! Working at the farmer's market and being in Jack's class sparked my interest in cooking for health, for the food community, and for the sustainability of the food system. All these lessons and experiences still carry with me to this day, even in my work in the restaurant.

What advice do you have for students currently pursuing a career in nutrition?

Cooking is a very important skill for everyone studying in this field. For me, it is a very powerful tool to communicate with patients or with other people in general. So, learn to cook well and never stop learning! Nutrition is a growing field everywhere in the world these days, so you're all on the right track!

Exerpt from:

Wisconsin Alumni Association: "Office Space"

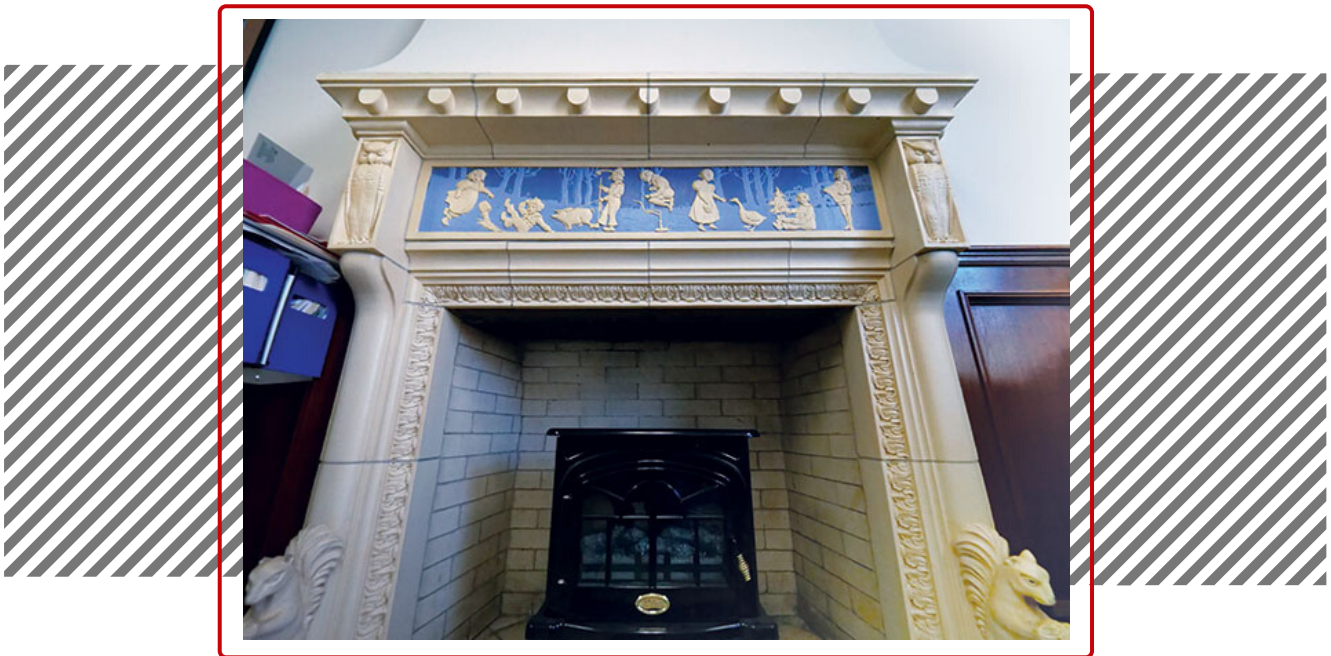
Over the past summer, the Wisconsin Alumni Association news wrote a story on notable office spaces across the University of Wisconsin-Madison. The following story was featured in the piece, detailing the office belonging to Dr. Sherry Tanumihardjo in the Department of Nutritional Sciences.

Sherry Tanumihardjo

*Director of Undergraduate Certificate in Global Health, Department of Nutritional Sciences, College of Agricultural & Life Sciences Office Space: 273 Nutritional Sciences Building, 1415 Linden Drive
Joined UW faculty in 1999; in current office since 2011.*

The most notable feature of Sherry Tanumihardjo's office is a fireplace with bas-relief depictions on the mantel of Mother Goose and nursery rhymes such as "Jack and Jill," and "Jack Be Nimble," as well as Tiny Tim from A Christmas Carol. Located in what was formerly the Mary Cornelia Bradley Hospital for the Study of Children's Diseases, the room "was set up as a way for parents to say goodbye to their dead child," she says.

The office also has an inset in the wall the size of a small casket where the children's bodies were placed. The room sat empty for many years until Tanumihardjo became the director of the Certificate in Global Health program. She then requested the office because of its medical history.



"Suddenly, it meant more to me," she says. "I like it and students like it," she adds. "I renovated it a little bit. I have it set up kind of like a living room, so when students come in, they can sit on the comfy couch." A buffet table that Tanumihardjo brought from home now graces the casket area.

When visitors see the office, Tanumihardjo says, "They're kind of like, 'Wow.' And there are stories of ghosts, but not in this room." An emeritus professor informed her that the alleged ghosts were actually on the fourth floor.

"I personally have never seen a ghost in this building," she says.

Five things everyone should know about . . .

A2 Milk

By Don Otter and Shelby Anderson

- 1 A2 milk comes from cows with a natural genetic variation that gives their milk a slightly different protein ratio than conventional milk.** All milk contains proteins, including whey and casein, and about 80% of the proteins in cow's milk are caseins. There are four types of caseins (α s1, α s2, β , and κ), and each type has different genetic versions. The β -casein protein has two principal genetic variations — A1 β -casein and A2 β -casein — which differ in their structures by a single amino acid. Conventional milk contains a mixture of both genetic variants, while A2 milk comes from cows genetically selected to produce only A2 β -casein.
- 2 All cows produce at least some A2 β -casein, but certain breeds have predominantly A2 in their milk.** This includes the Guernsey, Jersey, Charolais, and Limousin breeds. Other animals, such as sheep, goats, buffalo, camels, donkeys, and yaks, also produce milk that mostly contains A2 β -casein. Holstein, Friesian, Ayrshire, and British Shorthorn cows produce milk with roughly equal amounts of A1 and A2 β -casein.
- 3 All milk contains an amino acid sequence known as β -casomorphin-7 (BCM-7), which has been implicated in a number of negative health outcomes.** However, digestive enzymes in the small intestine find it harder to derive BCM-7 from the A2 β -casein protein. In other words, drinkers of conventional cow's milk will be exposed to more BCM-7 than drinkers of A2 milk. To suggest that their product is a healthier choice, some A2 milk companies claim that BCM-7 can worsen gastrointestinal motility, absorption, secretion, and immune function in humans.
- 4 There is a general lack of definitive human trials that support the various health claims made for A2 milk.** Suppliers of A2 milk products mention that people who experience discomfort when drinking conventional cow's milk may be able to drink A2 milk "without the downsides." However, the existing scientific evidence is inconclusive. Meanwhile, researchers continue to investigate the effects of A2 milk.
- 5 "Designer milks" like A2 milk could be the beginning of something big for the dairy industry.** Health debate aside, these new products could be a source of renewed growth and differentiation. Through advanced breeding techniques and other new technologies, farmers could produce milks with express characteristics, such as fewer allergens and specific nutrient profiles. We are already seeing this trend with the rise of milk from grass-fed cows.



Alumni and Friends Giving

The Nutritional Sciences Department appreciates any and all funding it receives. If you are interested in helping the department and would like to donate to a particular cause the following are a few specific funds we have decided to highlight:

Meryl Pickering Stone Memorial - Fund 32040764

Established in December of 1991 by Frank Stone, The Meryl Pickering Stone Memorial fund is designated to support programs in Nutritional Sciences at the University of Wisconsin-Madison with preference given to the dietitians program. This fund is currently used to help support the dietetics undergraduate major, and Dr. Amber Haroldson who teaches NS 431- Nutrition in the Lifespan and NS 631- Clinical Nutrition in addition to advising undergraduate dietetics majors and serving on the Dietetics Program Committee. Dr. Haroldson is also the faculty advisor for the Dietetics and Nutrition Club (DNC).



Nutritional Sciences Department Fund- Fund 32040034

The department fund is the most used fund by far, supporting seminar and speaking engagements, faculty searches, and travel needs to various scientific conferences around the globe. This fund is essential to the operation of the department and aids in keeping the Department of Nutritional Sciences amongst the elite nutrition departments in the country. Established in 1985 with gifts from the estates of Dorothy L. Miller and Irene DeNoyer, the Nutritional Sciences Department Funds seeks to support the greatest needs of the Department of Nutritional Sciences.



For more information and to make a donation, visit the University of Wisconsin Foundation Website at <https://secure.supportuw.org/give/>



A. E. Harper Graduate Program Fund/Nutritional Sciences- Fund 32041328

Established to support the Interdepartmental Graduate Program in Nutritional Sciences. Alfred E. Harper led the founding of the Department of Nutritional Sciences and served as its first Chair from 1968-1982. A native of Lethbridge, Alberta, Harper arrived on campus in 1949. He began research on amino acids, the building blocks of proteins, in the lab of biochemist Conrad Elvehjem. Harper served as a member of the National Academy of Sciences Food and Nutrition Board, the 1969 White House Conference on Nutrition, the United Nations Food and Agriculture Organization/World Health Organization Expert Committee on Protein and Energy, the U.S. Department of Agriculture/National Institutes of Health Committee on Dietary Allowances, and the USDA Human Nutrition Board of Scientific Counselors. During his career, Harper guided 30 students to master's degrees and another 44 to doctorates in biochemistry or nutrition.



Hellen M. Linkswiler Graduate Student Award Fund- Fund 3204282

The friends and colleagues of the late Dr. Hellen M. Linkswiler and the Department of Nutritional Sciences, College of Agricultural and Life Sciences set up this fund. Dr. Linkswiler received her MS in Foods and Nutrition and her Ph.D. in Nutrition and Physiology from Madison, and was a Professor of Nutritional Sciences at UW-Madison from 1960 until her retirement in 1981. This fund supports an annual scholarship to a student enrolled in the Master of Science in Clinical Nutrition.

Didactic Program in Dietetics Reaccredited through 2026



Every seven years, the Department of Nutritional Sciences must complete the exhaustive accreditation process through the Accreditation Council for Education in Nutrition and Dietetics (ACEND). This accreditation is essential for the department to maintain its promise to students to prepare graduates to become entry-level Registered Dietitian Nutritionists (RDNs) with a high quality, research-based education, and to prepare graduates to pursue their career goals. The Department of Nutritional Science's Didactic Program in Dietetics (DPD) repeatedly outperforms the industry dietetic internship placement standard of 50%. In 2017, the program even boasted a 100% placement rate of qualified students to DPD internships.

To achieve our core mission, the Department of Nutritional Sciences completed the time intensive ACEND process of the Academy of Nutrition and Dietetics this year. Led by Denise Ney, PhD, RDN, Director of the Didactic Program in Dietetics, and Tara LaRowe, PhD, RDN, Coordinator of the Didactic Program in Dietetics, the program received accreditation for the next 7 years, ending in 2026. According to the ACEND website, (www.eatrightpro.org) "Accreditation recognizes the quality of an institution or program and assists in its improvement.

As such, accreditation:

- Provides value to educational institutions and programs while protecting students and the public interest
- Complements institutional accreditation by giving reasonable assurance of the quality and content of the education necessary for a particular profession or field.
- Brings together practitioners, regulators, educators and students to improve professional preparation and practice, ultimately benefiting the profession and the public that it serves."

"The site visit for reaccreditation of the Didactic Program in Dietetics was a positive experience. It allowed us to better understand the need for specific coursework and assignments to provide for student learning outcomes to support the education of future Registered Dietitian Nutritionists (RDNs). This has resulted in positive changes to the program including: renaming the degree from BS Dietetics to BS Nutrition and Dietetics, eliminating unnecessary coursework, and developing new elective courses to expand teaching in the area of community nutrition." – Denise Ney, PhD, RDN, Director, Didactic Program in Dietetics.

Our DPD alumni reach all over the world and are working in many areas including; industry, clinical settings, underrepresented communities, and higher education, amongst many other areas of need. Please visit our website to learn more about our mission, goals, objectives, and program outcomes at <https://nutrisci.wisc.edu/didactic-program-in-dietetics-dpd-b-s-dietetics>

Cultural Aspects of Food and Nutrition

In 2012, five Results and Recommendations articles were published in the Journal of the Academy of Nutrition and Dietetics related to a Dietetics Workforce Demand Study. All five articles noted the shift in the racial and ethnic background of the United States population towards a more diverse and pluralistic society, indicating Registered Dietitian Nutritionists (RDNs) must adapt existing programs and services to remain competitive and relevant in the workforce. Not limited to the RDN, developing practical skills and foundational knowledge for respectfully, sensitively and effectively working with individuals in the context of food and nutrition will span an interdisciplinary health care team to promote improved health outcomes. Without foundational knowledge of food-related customs, health behaviors and beliefs, traditional health practices, and histories of individuals from a variety of backgrounds and identities, health care providers and community partners enter professional practice underprepared to meet the needs of a diverse society.

To address the need for culturally relevant food and nutrition programming, the Department of Nutritional Sciences has developed and piloted a 3-credit fully online undergraduate course, NUTR SCI 377: Cultural Aspects of Food and Nutrition. NUTR SCI 377 challenges undergraduate students to explore their own worldview, attitude towards cultural differences, as well as personal stereotypes and biases as a barrier to delivering effective food and nutrition care. Students will examine and discuss historical and continued trauma influencing health outcomes for future generations, along with the framework for providing trauma-informed care. Funded through an Education Innovation grant awarded by the UW-Madison Division of Continuing Studies. The department partnered with academic and community collaborators to ensure the course content is relevant and sensitive. Coursework includes readings, podcasts, case study assignments involving real patient encounters within healthcare, and collaborator-created content. NUTR SCI 377 is currently in University governance to become a permanent course offering.

Learning outcomes include:

1. Describe the concept and significance of cultural competency and humility in the context of food, health and well-being.
2. Apply sustainability principles and/or frameworks to addressing the challenge of food insecurity by utilizing resources and community-driven programs and initiatives.
3. Use sustainability principles for developing personal goals and professional values.
4. Identify worldview, traditional and contemporary foodways common across ethnic communities disproportionately burdened by nutrition-related chronic disease.
5. Interpret dietary laws and customs in the context of health care delivery systems.
6. Critically examine how U.S. food policies can influence dietary choices at multiple levels, and how those dietary choices may influence the culture around food.

NUTR SCI 377 largely focuses on the shift toward cultural humility and building cross-cultural skills on the part of the food and nutrition professional as the foundation for respectful and effective patient/client encounters. Self-awareness and appreciation toward various cultural worldviews is an early and important part of cultivating humility, accomplished through peer-to-peer discussion of worldview, personal biases and stereotypes. Reflecting on their own perceptions of health and health care, students independently explore their values, beliefs and health care practices, recognizing that culture determines how people define health, recognize illness and consider medical treatment. Comparing contemporary and traditional food habits along with dietary laws and cultural practices, students understand the impact of colonization and acculturation, recognizing that ignoring or violating cultural beliefs, practices, or customs could lead to rejection of essential health care information and damage their patient's trust.

Awards & Acknowledgements



Nutritional Science's Dr. Tara LaRowe has become only the 12th Board Certified Specialist in Sports Dietetics in the state of Wisconsin, earning the CSSD credential. Dr. LaRowe is a Nutritional Sciences Faculty Associate, and the Coordinator of the Didactic Program in Dietetics.



IGPNS student Victoria Flores was recognized and awarded at the American Aging Association Conference over the summer. She received the Walter R. Nicolai award for meritorious research by a pre-doctoral student in the area of biomedical gerontology.



This year's recipients of the Cargill Benevenga Research Stipend were Wai Hlaing (Chris) Bwar, Brandi Kreger, Lauren Tancer and Jordan Smith. Any undergraduate in a Nutritional Sciences major, or any undergraduate student working on a research project with a faculty member in the Department of Nutritional Sciences, may be considered for the stipend-based research award. This award and stipend is used to support both the student and the lab that the student works in. Four credits of research, a written final report and an oral report are all expected as well.



Studying, tutoring, volunteering, and research are a regular part of Nutritional Sciences student Kevin Crosby's daily life. Over the course of his undergraduate career, Mr. Crosby has shown his drive for greatness through his academics, his extracurricular activities, and his devotion to integrating environmental science and medicine. Mr. Crosby's hard work made him a competitive candidate for many research opportunities off- and on-campus. He has interned three summers at the National Institute of Allergy and Infectious Disease, where he conducted biomedical research for over eight weeks each summer. Mr. Crosby also engaged in research on the UW-Campus including receiving a competitive National Science Foundation scholarship through Nelson's Institute Community Environmental Scholars Program (CESP).

Aside from his work as a dedicated scientist, Mr. Crosby worked as a peer mentor for the Physics Learning Center, the Department of Biochemistry, and serves as an undergraduate Teaching Assistant for Nutritional Sciences 132, a course that serves over five hundred students per semester. In Fall 2019, Mr. Crosby was a finalist for both the Rhodes Scholar Award and the Marshall Scholarship award, both which accept less than 50 students internationally. Although he did not receive the scholarships, the nomination for not one, but two of these prestigious awards speaks to Mr. Crosby's drive in academics and healthcare.

Mr. Crosby's professional goal is to attend an MD or an MD/PHD program. He is well versed in the expectations of healthcare from his numerous hours shadowing doctors and physicians at Meriter Hospital and through UW-Madison's Center for Pre Health Advising's Health Professions Shadowing Program. He will graduate in Spring 2020 and will apply to medical schools in Summer 2020.



Remembering Dr. William Hoekstra

University of Wisconsin–Madison Professor Emeritus of Biochemistry and Nutritional Sciences and Ph.D. alumnus William G. “Bill” Hoekstra died on Monday, Nov. 4, 2019 at 91. For nearly four decades, he was a faculty member with expertise in the role of trace minerals in human and animal nutrition. He made seminal contributions to both departments and helped found the Department of Nutritional Sciences during his time in the UW–Madison College of Agricultural and Life Sciences.

Hoekstra was born in Colorado and obtained a bachelor’s degree at Colorado State University. He then headed to graduate school at UW–Madison and obtained a master’s degree in biochemistry and animal science in 1952 and his Ph.D. in biochemistry under Paul H. Phillips in 1954.

He then joined the faculty after his Ph.D. and retired in 1990. He had appointments and students from both Biochemistry and Nutritional Sciences throughout his career. He also had students from the Department of Animal Sciences. Among other significant contributions, his lab was the first to discover the role of selenium, a trace element, in human and animal nutrition.

“Bill Hoekstra was a strong and influential mentor to his graduate students, and he will be missed,” says UW–Madison Nutritional Sciences Professor Roger Sunde, who was a student of Hoekstra’s. “He showed his scientific intuition by supporting and encouraging his students to think widely and to continue to explore good research questions, like ‘Why is selenium essential?’ even though experts said there was not sufficient selenium to be an enzymatic cofactor.”

He adds that this support led to the discovery of a biochemical role for the essential trace element selenium, allowing federal approval of selenium supplementation of animal diets and fathering the field of selenoprotein biochemistry and metabolism.

Hoekstra’s career was filled with awards and service to the fields of nutrition and biochemistry. He held both national and international positions, published many research articles, and received numerous awards of distinction. He was president of the American Institute of Nutrition, now the American Society of Nutrition, and founded the Trace Elements in Man and Animals, an international symposium that is still yearly. He received the Borden Award in Nutrition in 1975 and the Gustav Bohstedt Award for Research in Minerals and Trace Elements from the American Society of Animal Science in 1967. In 1992 he received the Klaus Schwarz Medal.

Hoekstra was known as foremost a teacher and mentor to his students. His colleagues say he brought biochemical depth to the existing faculty with his vast experience.

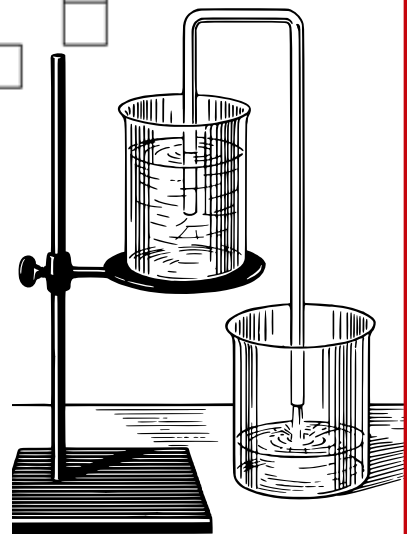
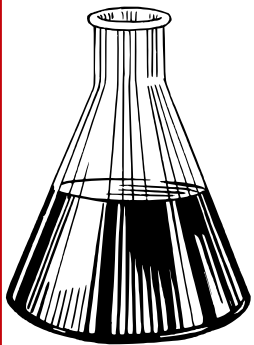
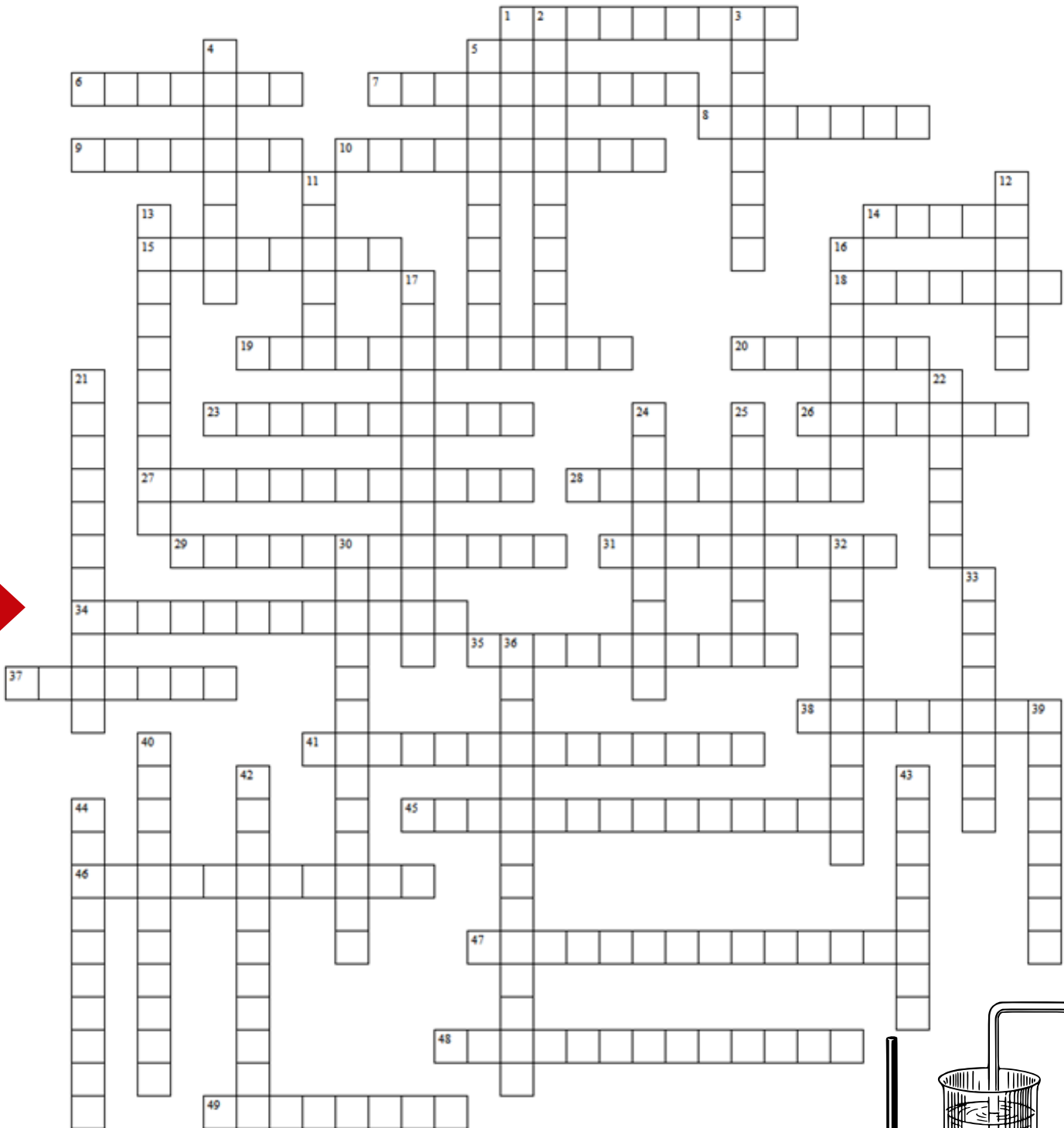


“We were graduate students at the same time, in labs right across the hall, so we got to become great friends and also started as assistant professors together,” says Hector DeLuca, a Biochemistry Professor Emeritus. “He was a wonderful friend, colleague, and collaborator who helped shape CALS into what it is today.”

Learn more about Dr. Hoekstra's life by visiting:

<http://www.gundersonfh.com/obituaries/Dr-William-G-Bill-Hoekstra?obId=8711375#/obituaryInfo>.

Test Your Knowledge of Nutritional Sciences!



Clues

ACROSS

1. A calcium-binding transport protein
6. A condition in infants and children that results from vitamin D deficiency
7. The only food most babies need for about the first six months
8. A hormone secreted by the stomach and duodenum that signals hunger
9. An amino acid metabolite essential for the growth and health of kittens
10. A method which uses soundwaves to assess muscle quantity and potentially muscle quality.
14. Partially digested food
15. The progressive loss of muscle mass and function with age
18. Vitamin A
19. A method for estimating body composition from measurement of total body density
20. A hormone produced by adipose cells that signals the amount of body fat content and influences food intake
23. A cell of the liver
26. The point of exhaustion that makes an endurance athlete unable to go any further as a result of depleted muscle and liver glycogen.
27. A bone disease characterized by a decrease in bone mineral density and the appearance of small holes in bones due to loss of minerals
28. A fat cell
29. A method to assess body composition using painless, electrical currents sent through the body.
31. The breakdown or digestion of the body's proteins, such as those found in the blood or within cells
34. High concentrations of potassium in the blood
35. A substance with both water-soluble and fat-soluble portions that promotes the mixing of oils and fats in a watery solution
37. The hormone of late pregnancy
38. The eating habits and culinary practices of a people, region, or historical period
41. Heat processing of food that inactivates some, but not all, microorganisms in the food
45. The transfer of an amino group from an amino acid to a carbon skeleton to form a different amino acid

46. A class of mainly yellow, orange, and red pigments, some of which can be converted to vitamin A
47. Nutrients, such as vitamins and minerals, that are needed in relatively small amounts in the diet
48. The use of genomics to investigate diet and gene interactions involved in health or disease
49. The targeted inactivation of a gene typically in a cell culture, plant or experimental animal

DOWN

2. Chemical that inhibits oxidation and reacts with free radicals to form a harmless product
3. Deficiency of blood in a tissue
4. The thiamin-deficiency disease
5. The process by which organic molecules are broken down to produce energy
11. A protein-digesting enzyme produced by the stomach
12. The sum of all the chromosomal genes of a cell
13. Complication associated with tube feeding
16. The total collection of proteins in a cell or cellular substructure
17. The sites of aerobic production of ATP, where most of the energy from carbohydrate, protein, and fat is captured
21. The green pigment of plants, which absorbs light and transfers the energy to other molecules
22. A group of fat-soluble compounds that includes triglycerides, sterols, and phospholipids
24. A protein that attached to other proteins within cells or tissues to promote the degradation of the protein
25. A pigment responsible for the red color of tomatoes and other red-hued vegetables
30. Amino acid restricted in PKU
32. Compounds that can induce goiter
33. The niacin-deficiency disease.
36. Nutrients, such as carbohydrate, fat, or protein, that are needed in relatively large amounts in the diet
39. Moon mineral
40. Excessive cell proliferation
42. The resupply of an organ or tissue with oxygen, nutrients or both
43. Above normal acidity in the blood and body fluids
44. Bacteria adapted to living in a specific environment such as the intestines

(ANSWER KEY ON BACK)

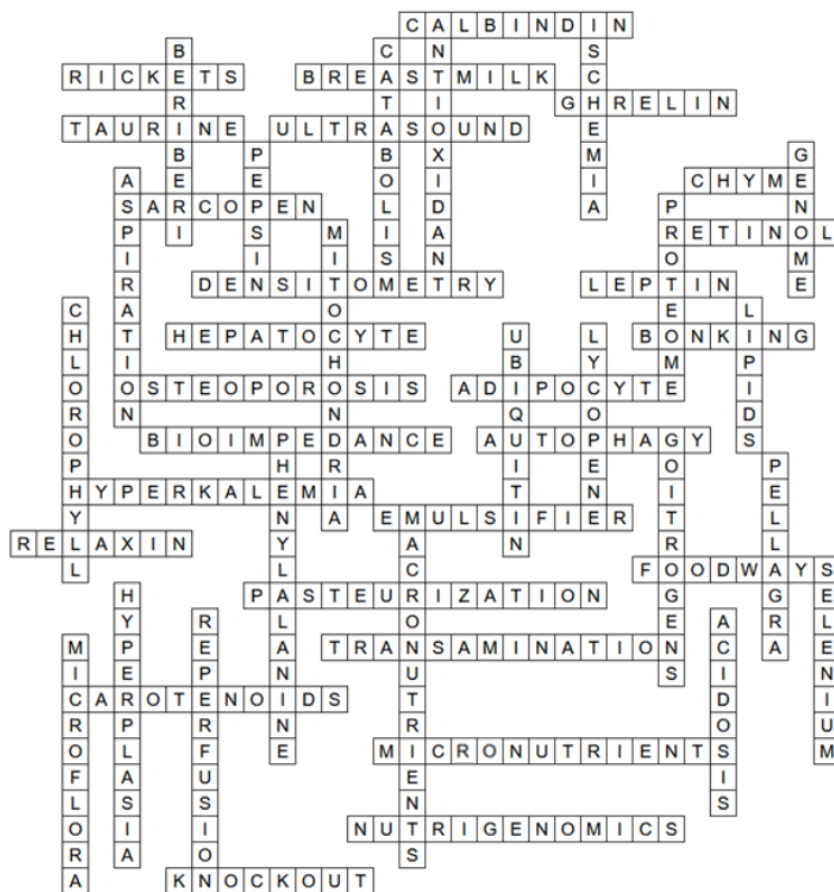


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comments. Please direct them to:
Maya Muschitz, Editor
student-staff@nutrisci.wisc.edu



Answer Key

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☐ Printed form enclosed ☐ I will initiate this match on my company's website

Company's name _____

I/we wish to designate my/our gift to: The Department of Nutritional Sciences

Name _____

Address _____

City _____ State _____ Zip _____

Phone: ☐ Home (Landline) ☐ Work ☐ Cell _____

E-mail _____

Job Title _____

Company Name _____

Company Address _____

City _____ State _____ Zip _____

☐ Check here if this is a new address

Credit Card Information

Please charge \$ _____ to my credit card.

☐ MasterCard ☐ Visa ☐ American Express ☐ Discover

Card Number _____ Expiration Date _____

Cardholder name (please print) _____

Cardholder signature _____



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