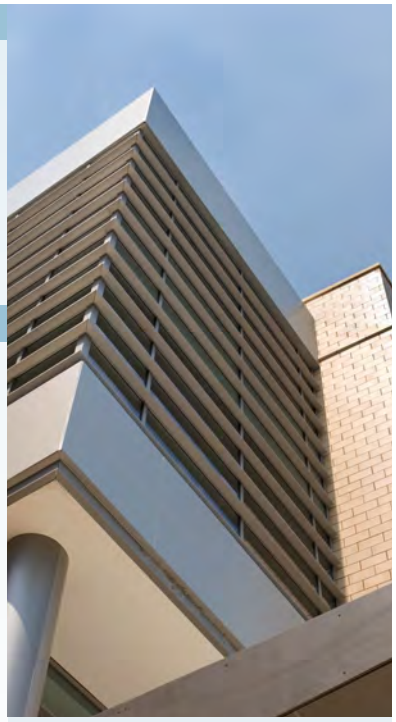
PennState

May 2022

Food Science News

Department of Food Science



Department Head Update

Dear Friends of Food Science,

I hope that everyone is doing well and enjoying spring. The warming weather, the greening foliage and the longer days are always rejuvenating. Today, Friday May 6th is the last day of final exams for spring semester 2022. Students have completed their exams, faculty are busy evaluating final assignments and entering course grades, and we are preparing for the first College of Agricultural Sciences spring commencement ceremony since 2019 on Sunday, May 8th. This event, which be held in the Pegula Ice Arena, is a significant milestone on our return to "normal."

This spring we continued in-person instruction and finally unmasked in March. I joked with the students in our Careers in Food Science class during our first unmasked session that "it was nice to really see people for the first time in two years!" They agreed! Also in March, Dr. Helene Hopfer and Dr. Ryan Elias took a group of students to Bavaria over spring break to study brewing. This was our first study abroad trip in two years. Both unmasking and international travel are yet more milestones on our return to "normal."

As is our custom, this issue of Food Science News contains information about awards and recognitions earned by students, faculty and alumni. I would like to call special attention to Dr. Gregory Ziegler's recognition as a Distinguished Professor of Food Science in the College of Agricultural Sciences. Greg holds the distinction of being the first Food Science faculty member to ever be named Distinguished Professor. Please join me in congratulating him on this well-deserved recognition based on a career of sustained excellence.

The Food Science Club, the Food Industry Group and the Department are planning on resuming the Food Science Tailgate this fall. The date for the event is October 1, 2022, when Penn State will take on Northwestern. We look forward to seeing you this fall!

Just today it was announced that Dr. Helene Hopfer and Dr. Robert Chiles were granted tenure and promoted to the rank of Associate Professor and Dr. Kathleen Keller was promoted to the rank of Professor. Congratulations!

Finally, please join me in congratulating all the students who will graduate this weekend. They have successfully completed a rigorous course of study during difficult times. Their fortitude and resilience has been inspiring, and we wish them the best as they move on to the next phase of their lives and careers.

As always, *Stay Calm, Stay Safe and Stay Healthy*.

Robert F. Roberts

Bob Roberts, Professor and Head

Inside this issue

Special Points of Interest

- Food Science Tailgate 2022
- Upcoming Events
- Update your Alumni Information

Antibiotic-Resistant Salmonella Strains not seen in Migrating Wild Birds

GettyImages KenCanning

Although many wild birds carry Salmonella, the strains of the bacteria they convey usually do not harbor antimicrobial-resistance genes, according to Penn State researchers, who led a team conducting a new, nationwide study.

That's good news, according to team leader Ed Dudley, professor of food science, Penn State.

"While we've known for a while that wild birds can carry Salmonella, the strains they carry appear to be of lesser concern to human health," he said. "The assumption was that these Salmonella — like the bacteria we can isolate from domesticated farm animals — would carry large numbers of antimicrobial-resistance genes. We found the opposite to be true."

Wild birds are known to be common reservoirs of Salmonella enterica, a pathogen that sickens millions of people every year, Dudley explained, and scientists have worried that wild birds carrying antimicrobial-resistant Salmonella enterica pose a risk to public health because they can spread the resistant bacteria across large areas in a short time. This research indicates that wild birds do not serve as important reservoirs of resistant Salmonella enterica strains.

The researchers reported in Environmental Microbiology that they found Typhimurium was the dominant Salmonella enterica strain, accounting for 68% of the bird isolates. However, less than 2% of those isolates were identified as multi-antimicrobial resistant or resistant to heavy metals. Interestingly, all the multi-resistant Salmonella enterica were isolated from water birds or raptors; none of them was isolated from songbirds.

The isolates tested in the study came from the National Wildlife Health Center, which is part of a U.S. Geological Survey lab. The federal connection resulted from Dudley's research group being part of the U.S. Food and Drug Administration's Genome Tracker program since 2016. That initiative's overarching goal, he noted, is to learn how to use the increasingly powerful ability to sequence bacterial genomes to learn more about food borne pathogens such as Salmonella.(Read more... Penn State News)

Children Eat what they like, but Food Intake Driven more by what they Dislike

Children participated in two identical laboratory sessions in the study conducted in the Children's Eating Behavior Laboratory where seven foods were included on a tray. Also included were two beverages, fruit punch and milk. Credit: ***Penn State. Creative Commons***

It is often said that "children eat what they like," but the results of a new study by Penn State nutritionists and sensory scientists suggests that when it comes to meals, it is more accurate and more relevant to say, "children do not eat what they dislike."

There is an important difference, according to lead researcher Kathleen Keller, associate professor in the departments of Nutritional Sciences and Food Science, who conducted an experiment involving 61 children ages 4-6 years to assess the relationship between their liking of foods in a meal and subsequent intake. The research revealed that when presented with a meal, disliking is a stronger predictor of what youngsters eat than liking.

"In other words, rather than high-liking driving greater intake, our study data indicate that lower-liking led children to avoid some foods and leave them on the plate," she said. "Kids have a limited amount of room in their bellies, so when they are handed a tray, they gravitate toward their favorite thing and typically eat that first, and then make choices about whether to eat other foods."

Study co-author John Hayes, professor of food science and director of the Sensory Evaluation Center in the College of Agricultural Sciences, puts it another way.

"For 50 plus years, we've known liking and intake are positively correlated, but this often leads to the mistaken assumption that if it tastes better, you will eat more," he said. "Reality is a bit more nuanced. In adults, we know that if you really like a food, you may or may not eat it. But if you don't like it, you'll rarely or never eat it. These new data show the same pattern is true in young kids." (Read More...Penn State News)

More Intense Roasting of Cocoa Beans Lessens Bitterness, Boosts Chocolate Liking

Confection makers who want to develop products containing 100% chocolate and no sugar for health-conscious consumers can reduce bitterness and optimize flavor acceptance by roasting cocoa beans longer and at higher temperatures.

That's the conclusion of a team of researchers who conducted a new study in Penn State's Sensory Evaluation Center in the Department of Food Science. The study involved 27 100%-chocolate preparations made from cocoa beans roasted at various intensities and 145 people who came to the center on five consecutive days, evaluating five different samples each day.

The research confirmed that bitterness and astringency are negatively correlated to consumer liking, and demonstrated that those qualities in chocolate can be reduced through optimizing roasting, according to research team member Helene Hopfer, Rasmussen Career Development Professor in Food Science in the College of Agricultural Sciences.

The researchers chose cocoa beans from three origins — Madagascar, Ghana and Peru, harvested in 2018 and 2019 — and roasted and ground all samples into cocoa liquor, from which the 100% chocolate was formed into small discs for sensory evaluation. ***Credit: Montes, Unsplash.***

"More and more people these days are eating darker chocolates with less sugar and more cacao because they are trying to cut down on sugar intake or they want to take advantage of perceived health benefits," she said. "Dark chocolate is particularly high in flavonoids, particularly a subtype called flavan-3-ols and their oligomers, which are all considered functional ingredients due to their associated health effects."

However, unsweetened chocolate is too bitter for most people to enjoy, so researchers experimented with roasting treatments to modify the flavor — investigating more than basic tastes such as sour and bitter — making it more acceptable for consumers, Hopfer explained.

For the study, research team member Alan McClure, founder of craft chocolate company Patric Chocolate and related consultancy Patric Food & Beverage Development, partnered with Hopfer and Penn State to characterize the flavor and acceptability of the chocolates.

Part of his doctoral degree dissertation research, McClure chose cocoa beans from three origins — Madagascar, Ghana and Peru, harvested in 2018 and 2019. He roasted and ground all samples into cocoa liquor at his factory in Columbia, Missouri, and then shipped the solidified 100% chocolate to Penn State, where he and Hopfer remelted and portioned out the chocolates into small discs for sensory evaluation.

McClure found the reaction of study participants to his 27 100% chocolate preparations especially interesting, and he suggested that what he learned from this research will guide him, and roasting staff at other chocolate manufacturing companies, in creating future products through an increased scientific understanding of the complex changes resulting from cocoa roasting.

In findings published in Current Research in Food Science, the researchers reported that more intense roasting conditions — such as 20 minutes at 340 degrees Fahrenheit, 80 min at 275 F, and 54 min at 304 F — all led to chocolate consumers finding unsweetened chocolate the most acceptable. Conversely, research participants did not find 100% chocolate acceptable when made from raw or lightly roasted cacao, such as beans roasted 11 minutes at 221 F, or 55 minutes at 147 F.

Hopfer noted that scientists' understanding of the variation of cacao-related bitterness has historically come from instrumental investigation of the bitter compounds found in cocoa beans, but the Penn State research is novel because of its use of human sensory evaluation to quantify such variation.

"Our research was intended to learn about bitterness perception and the liking of chocolate made from cacao roasted with a variety of roasting profiles to see if wide consumer acceptability of 100% chocolate is possible," she said. "A chocolate maker doesn't have many other options to influence the flavor quality of 100% chocolate except to vary how he or she roasts the beans, and our results show optimal roasting can adequately reduce bitterness."

Ingolf Gruen, associate professor in the Department of Food Science, University of Missouri, contributed to the research.
A grant from the Professional Manufacturing Confectioners Association and the U.S. Department of Agriculture's National Institute of Food and Agriculture supported this work.

The Department of Food Science will offer an innovative bean-to-bar short course for both craft and industrial chocolate manufacturers June 20-23. Attendees will engage both their minds and hands to gain detailed knowledge of chocolate processing. McClure will be one of the instructors present at the short course. For more information or to register, visit the website or call 877-778-2937. (Penn State News)

Alumni News

Dudeks Expand Support to Ag Sciences, Earth and Mineral Sciences

Erickson Food Science Building

Frank and Janet Glasgow Dudek, longtime supporters of Penn State's Colleges of Agricultural Sciences and Earth and Mineral Sciences, have expanded their prior support for graduate and undergraduate students. The couple has updated their estate plan, pledging an additional $2.3 million for a total of $4.8 million, and will give $125,000 over five years for the early activation of two awards included in their future commitment.

The Frank and Janet Dudek Graduate Endowment in Food Science will provide financial assistance for graduate students studying food science in the College of Agricultural Sciences to attend conferences to network and share their research findings. The Frank and Janet Dudek Energy Business and Finance Scholarship will benefit full-time undergraduate students planning to major in energy business and finance in the College of Earth and Mineral Sciences (EMS) who have demonstrated financial need.

This gift marks the couple's third pledge to early activate areas of their 2011 estate commitment, and the Dudeks are excited to see their philanthropic plans come to life.
"We've met a number of the students who have benefited from our giving through the years," said Janet. "The letters we receive are quite nice, and we greatly appreciate it. Since our previous early activation commitment has been completed, it makes sense to early activate additional programs, an option that benefits the colleges and their students."

Janet, who holds a bachelor's degree in zoology from what is now the Eberly College of Science and a master's degree in animal nutrition from the College of Agricultural Sciences, is a pharmaceutical consultant and understands some of the challenges graduate students face when pursuing their degrees, which inspired her desire to create the graduate award in food science.

"It's important for graduate students to present their research and network with other scientists," said Janet. "This endowment will make money available to help graduate students attend conferences and present their papers or posters. In addition, there is always new technology coming along, and it can be very expensive to keep up. They need to be able to utilize the latest equipment and know the latest techniques when it comes time to get a job. Those are the two things I wanted to focus on with this endowment."

The Dudeks have been strong supporters of the Department of Food Science for many years, noted Bob Roberts, professor and head of food science. "Their support has rewarded excellence in graduate students, allowed the department to keep equipment in the teaching laboratories up to date and provided flexible funding to support new initiatives," he said. "We greatly appreciate their ongoing generosity." (Read More….Penn State News)

Faculty News

Greg Ziegler Named Distinguished Professor

Dr. Gregory Ziegler

Penn State's Office of the Vice Provost for Faculty Affairs has named Greg Ziegler, professor of food science in the College of Agricultural Sciences, as a distinguished professor.

The title of distinguished professor at Penn State recognizes the academic contributions of current, full-time faculty members who hold the rank of professor. Distinguished professors are acknowledged leaders in their fields of research or creative activity; demonstrate significant leadership in raising the university's standards in teaching, research or creative activity, and service; and exhibit excellent teaching skills.

Ziegler is a world-renowned expert in the science and engineering of chocolate manufacturing, according to Robert Roberts, professor and head of the Department of Food Science, who nominated him for the honor.

"The major focus of Ziegler's work has been to understand the physical and sensory properties of confectionery products, an area where he has made significant contributions," he said. "Greg's research to reveal the physical and structural transformations occurring in chocolate during 'conching' helped transform the process from an 'art' to a science."

Ziegler also elucidated the relationship between the structure of spray-dried milk particles and the energy required to refine them during chocolate making, Roberts added. "His work on the relationship between the particle size distribution in chocolate and its physical and sensory properties continues to be built upon and used by chocolate manufacturers." (Read More...Penn State News)

Staff Profiles

Tanedjeu Kemgang joins Department as Pilot Plant Specialist

Dr. Tanedjeu Kemgang

Dr. Tanedjeu Kemgang joined the Department of Food Science as the Pilot Plant Specialist on January 31st, 2022. Originally from Cameroon in Central Africa, Tanedjeu received his Master in Biochemistry from the University of Yaoundé 1 - Cameroon. His desire to study probiotics led him to another Master's with thesis in Animal Biology and Physiology from the University of Ngaoundéré - Cameroon, where he further obtained his M.Phil. in Food Science and Nutrition. He was then granted a merit scholarship by the African Union to continue his probiotic work in India, at the National Dairy Research Institute where he elucidated the mechanism of action of various immuno-boosting probiotic cultures during his Ph.D. study. Dr Kemgang spent four years at Persea Naturals LLC, as Scientist and Project Director, leading successfully a USDA funded project on the development and commercialization of natural food colorant from avocado seed.

Combining his academic and industrial professional experiences, Dr. Kemgang is now responsible for operating and maintaining the food manufacturing pilot plant facilities which are used for teaching, research, and outreach activities. Tanedjeu coordinates and supports various short courses offered by the Department of Food Science, including the long-standing Ice Cream Short Course, Ice Cream 101, and the Cultured Dairy Product Short Course, among others. He also helps manage and conduct pilot plant trials that support companies evaluating new ingredients, formulations, and processes. His research interests are probiotics, microbiology, gut immunology, biostatistics, food processing and new product development, among others.

Outside of his academic work, Tanedjeu likes playing volleyball, soccer, and road trips.

Dilhani Jayawardhana joins Kwasniewski and Wee Laboratories as Research Technologist I

Dilhani Jayawardhana

Dilhani Jayawardhana joined Dr. Misha Kwasniewski's Lab and Dr. Josephine Wee's Lab in the Department of Food Science as a Research Technologist I on March 16, 2022. Her responsibilities include undertaking routine metabolite extractions and purification for analysis by GC-MS and LC-MS; overseeing microbiology and molecular biology works; working on projects related to wine, beer, and other fermented products as well as plant extractions from grape, hemp, and hops; and delivering training to incoming laboratory members.

Dilhani is from Sri Lanka, one of the most beautiful islands in South Asia. Dilhani received her bachelor's degree in Agricultural Technology and Management (major in Food Science and Technology) from the University of Peradeniya, Sri Lanka. She did her master's degree in Food, Nutrition, and Culinary Sciences from Clemson University in the United States, and her research focused on finding methods to reduce foodborne illnesses, including the implementation of risk management practices in small-scale strawberry farms.

Outside of work, Dilhani enjoys hiking, traveling, and dancing. Also, she likes trying new cooking recipes and spending time with her family.

Save the Date : Oct 1, 2022
PSU vs Northwestern

Student News

Students Experience International Culture over Spring Break

FDSC460 group picture at the Old Town Hall in Munich's Marienplatz.

A group of undergraduate and graduate students from Food Science and Agricultural & Biological Sciences visited Bavaria, Germany over Spring Break, March 5-13, 2022, to experience the international culture, flavors and food production methods as part of FDSC/INTAG 460—International Food Production. Students participated in behind-the-scenes tours, demonstrations, and hands-on activities in the German federal state of Bavaria. A major theme of this trip was beer production.

@FDSC460 Sauerkraut is a common topping on weißwurst and side dish to the famous Nürnburg sausages. Raw shredded cabbage is fermented by LAB or lactic acid bacteria, such as species of Lactobacillus and Pediococcus. Bacteria produce lactic acid aiding to the characteristic flavor.

@FDSC460 One of the very first pieces of food regulation was the Reinheitsgebot, first enacted in Munich in 1487 and more famously in all of Bavaria in 1516! This "purity law" dictated that beer was only to include barley, hops, and water (notably not yeast!)

Fall Class of 2021

Matthias Bersdorf
Matthew Heisley
Samuel Karwic
Jacob Masser
Kyle Moore

Spring Class of 2022

Madalyn Arthur
Lila Bechtel
Ryan Bullotta
Tyler Chandross-Cohen
Rebecca Cimino
Natalie Constantakis
Alexandra DeRose
Kevin Diaz
Kayla Finkelstein**
Ian Finn
Caitlyn Harms
Jaclyn Hess
Yu Hsi Hou
Claire Hummel
Pornpat Jantip
Erin LeMay
Tuowei Li
Samantha Liddy
Yvonne Longenecker
Allison Maloney
Cora Marchand
Nancy Montanez
Sarah Olson
Christopher Pedone
Kelsey Schlegel
Christopher Talarico
Haley Velemirovich
Leah Ward
Aaron Wiedemer
Cameron Wilkin
Conner Wilson
Emmaline Yang
Abigail Zimomra

**Student Marshal

MS and PhD Graduates, Fall 2021

Liz Astorga, MS

Thesis title: *Effect of High-Pressure Jet Processing on the Structure and Physicochemical Properties of Plant Protein Isolates in Aqueous Dispersions*
(Advisor – Federico Harte)

Allison Brown, PhD

Thesis title: *Understanding Flavor in Fine or Flavor Theobroma Cacao: A Multidisciplinary Human Subjects Research Approach.*
(Advisor – Helene Hopfer)

Terianne Hamada, PhD

Thesis title: *Effects of alkalization on the chemistry of cocoa.*
(Advisor – Gregory Ziegler)

Stiphany Tieu, MS

Thesis title: *Effect of mild thermal and pH changes on the sol-gel transition in skim milk.*
(Advisor – Federico Harte)

MS Graduates, Spring 2022

Kiana Coleman, MS

Thesis title: *Anti-inflammatory Effects of Cocoa Supplementation in a Mice Model of Inflammatory Bowel Disease.*
(Advisor – Joshua Lambert)

Elisabeth Weir, MS

Thesis title: *Measuring Olfactory and Chemosensory Function in Healthy Controls and Covid-19 Positive Individuals.*
(Advisor – John Hayes)

Awards and Honors

Distinguished Professor of Food Science

Dr. Gregory Ziegler

Summer Undergraduate Research Awards in Food Science

Rachael Godshall
Jess Kaothaisong
Anna Ngyen
Ashley Ohstrom

Summer College of Ag Undergraduate Research Awards

Zoe Goldblum
Kellien Peritz
Hunter Porcana
Betty Raup

Gamma Sigma Delta Poster Awards

Aaron Wiedemer – 3rd place, Undergraduate Division, Micro-Food Systems Category, Title: *Boy, that doesn't stink! The Effect of Roasting and Cacao Origin on Important Sulfur Compounds in Chocolate.* (faculty advisor, Helene Hopfer)

Anjali Sapre – 2nd Place, Undergraduate Division, Micro-Food Systems Category, Title: *A Preliminary Evaluation of the Performance of RNase H2-dependent PCR (rhAmpSeq) for Resistome Characterization in a Complex Sample.* (faculty advisor, Jasna Kovac)

Tyler Chandross-Cohen – 1st Place, Undergraduate Division, Micro-Food Systems Category, Title: *Isolation, Characterization, and Application of Anti-listerial Isolates in a Raw Milk Cheese Model to Inhibit Listeria monocytogenes.* (faculty Advisor, Jasna Kovac)

Christopher Pedone – 1st Place, Undergraduate Division, Plant-Related Category, Title: *Reduction of Salmonella on Rainbow Chard Seeds Due to Planar Atmospheric-Pressure Dielectric-Barrier-Discharge Treatment.* (faculty advisor, Jasna Kovac)

Laura Rolon – 1st Place, Graduate Division, Micro-Food Systems Category, Title: *Two-Year Monitoring of Environmental Microbial Communities in Three Apple Packing Facilities and their Association with the Presence of Listeria monocytogenes.* (faculty advisors, Robert Roberts and Jasna Kovac)

USDA National Institute of Food Agriculture (NIFA) Predoctoral Fellowship

Daphne Weikart, Ph.D. student in Food Science, recently received a USDA National Institute of Food Agriculture (NIFA) predoctoral fellowship for her research on *Anti-inflammatory Effects of Cocoa Polyphenols in Obesity Models*. (faculty advisor, Josh Lambert)

USDA Food Safety and Inspection Service (FSIS) Fellow

Sharon Nieves-Miranda, Ph.D. student, was selected as one of six USDA Food Safety and Inspection Service (FSIS) fellows for the 2022 year. Sharon's research may lead to improved detection methods for pathogenic E. coli and facilitate epidemiological studies and out break investigations. Sharon is advised by Dr. Edward Dudley.

2022 AG Springboard Competition

Hannah Carney, **Peter Demartino**, **Andrew Paff**, and **Tara Pickens** won 1st place, $7500. Unbaked Flour Co. (startup)

2022 Keystone IFT Scholarships

Leah Bodinger
Madalyn Arthur

2022 PMCA Student Outreach Program

Kayla Finkelstein
Nixon Meneses-Marentes
Elisabeth Weir
Tyler Yany

Dennis L. Zak, Ph.D., Memorial Education Award (presented at PMCA)

Elisabeth Weir

Contact Information

Department of Food Science
202 Rodney A. Erickson Food Science Building
University Park, PA 16802
Phone: (814) 865-5444
FAX: (814) 863-6132
Email: foodsci@psu.edu

foodscience.psu.edu

Giving to the Food Science Department go to: GiveTo.psu.edu/FoodScience

Upcoming Events

May	17-19	Preventive Controls for Human Foods, Pittsburgh, PA
	24-26	Food Microbiology Short Course, University Park, PA
June/July	20-23	Penn State Chocolate Short Course, University Park, PA
	27-1	Fundamentals of Food Science Short Course, University Park, PA
Aug.	16-18	HACCP programs for Meat and Poultry Processors, University Park, PA
Sept.	20-29	Cultured Dairy Product Short Course, University Park, PA
	27-29	Pasteurizer Operators Workshop, University Park, PA
Oct.	11-13	Food Safety and Sanitation for Food Manufacturers Short Course, University Park, PA
Nov.	7-10	The Science and Art of Cheese Making Short Course, University Park, PA

Update Your Alumni Information

Updating your information with the Alumni Association is now easier than ever. You can change your home address, work address, e-mail address, and other information online by completing the secure record update form on the Penn State Alumni website. Or you may also contact the Alumni Records staff directly.

Web: Record Update Form
Phone: 800-548-LION (5466), option 2
Mail: Penn State Alumni Association
Alumni Data Access & Services
Department B
Hintz Family Alumni Center
University Park, PA 16802

PennState Alumni Association