

# **Food Science Graduate Seminar Series Fall 2022**

Tuesdays from 3:45– 4:35 PM  
*7-week course, session 1*  
Stocking Hall  
Cornell University

Seminar Chair: Dr. Sam Nugen

### Respect Statement

Diversity in the field of food science – in race, gender, sex, religion, language, ability, veteran status, place of origin, academic specialization, etc. – is an asset to our learning experience. As a result, we hope to provide an inclusive and welcoming space for our speakers to share their expertise. We want to reaffirm our commitment to speaking respectfully and mindfully to members of our Cornell community as well as our guests and note that individuals identifying with historically minoritized groups should not be expected to describe or provide perspective on these groups unless they themselves volunteer to relate their experiences. We value the scholarship of each of our speakers, and we invite our speakers in order to hear their unique contributions to the field.

Date	Speaker	Seminar Title
Aug 23	<b>Rajni Aneja</b> , MBA Managing Director, Cornell Institute for Food Systems Industry Partnership Program Cornell University	“Approaches to University Technology Transfer in the US”
Aug 30	<b>Bauman Lecture</b> <b>Harris Lewin</b> , PhD Visiting Professor, Rockefeller University Distinguished Professor of Evolution and Ecology, Emeritus, University of California, Davis Professor Emeritus of Animal Sciences, University of Illinois at Urbana-Champaign	“The Earth BioGenome Project: Progress on Biology’s Moonshot”
Sept 6	<b>Elad Tako</b> , PhD Associate Professor Cornell University	“From Cell to Organism: The Link Between Micronutrient Dietary Deficiencies and Physiological Status, Intestinal Functionality and Microbiome”
Sept 13	<b>Lawrence Goodridge</b> , PhD Leung Family Professor of Food Safety, Ontario Agricultural College Director, Canadian Research Institute for Food Science	“The curious case of <i>Salmonella</i> ”
Sept 20	<b>Lindsay Springer</b> , PhD Head of Plants and Nutrition Gardyn Inc.	“A Fresh Perspective on Fresh Produce: Embracing Hyperlocal Food Production and Artificial Intelligence for Climate Smart Agriculture and Unlocking Plant-based Nutrition”
Sept 27	<b>Miguel Gomez</b> , PhD Robert G. Tobin Professor of Food Marketing Cornell University	“Consumer Preferences for Fresh Produce Attributes in Kenya: A Choice Experiment Approach”
Oct 4	<b>Tim Lott</b> PhD Candidate Wiedmann Lab  <b>Jonathan Sogin</b> PhD Candidate Worobo Lab	“To Better Milk Quality and Beyond!”  “A Look Under the Digital Microscope: Using Amplicon Metagenomics to Better Understand Food Fermentations”



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For questions contact: Erin Atkins | [ea56@cornell.edu](mailto:ea56@cornell.edu) | 607-255-2539 (office)

## Rajni Aneja



Rajni Aneja is Managing Director, Cornell Institute for Food Systems-Industry Partnership Program (CIFS-IPP) at Cornell University where she is responsible for developing and implementing impactful university-industry relationships between the Institute's Faculty Fellows and their corporate counterparts. In this role, she also serves as a member of the Steering Committee for the Business of Food Initiative at Cornell's SC Johnson College of Business.

Ms. Aneja has more than thirty years of experience in the commercialization of early-stage life sciences technologies and products through to exit. Previously Ms. Aneja was Vice President, Corporate Development and a cofounder of zuChem, Inc., an industrial biotechnology company commercializing novel "green" manufacturing technologies to produce small molecule carbohydrates for the food ingredients, fine chemicals, and pharmaceuticals industries. She has held senior corporate development and research management positions with MediChem Life Sciences, ThermoGen, Onyx Pharmaceuticals, and ARCH Development Corporation, the technology transfer and venture affiliate of The University of Chicago, where she was responsible for the protection, marketing, and licensing of the University's entire life sciences intellectual property portfolio. She is currently a Member of the Editorial Board of *Industrial Biotechnology*, the leading peer-reviewed journal on science, business, and policy developments of the emerging global bioeconomy.

Ms. Aneja holds an M.B.A. in Business Economics and Finance from The University of Chicago Booth School of Business, an M.S. in Biochemistry from Cornell University, and a B.Sc. (Hons.) in Biochemistry from University College London.

### Approaches to University Technology Transfer in the US

Landmark legislation in the 1980s not only gave US universities the right to retain title to patents from inventions arising from federally funded research, but it also provided a critical impetus for US universities to diligently commercialize these inventions in partnership with the private sector. Unsurprisingly, a variety of technology transfer models have evolved that universities employ to bring their groundbreaking science to commercial application in the public good, models that reflect varying academic cultures, university rewards systems, and the availability of resources to support entrepreneurship. This seminar will examine the federal legislative framework that gave birth to modern-day university-based technology transfer in the U.S., the potential impact of the recently passed CHIPS and Science Act of 2022, and different universities' approaches to technology transfer with particular reference to the ongoing development of the food systems innovation ecosystem at Cornell University.

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## Harris Lewin



Harris A. Lewin is Distinguished Professor Emeritus of Evolution and Ecology at the University of California, Davis. Until July 2022, he held the Robert and Rosabel Osborne Endowed Chair and Distinguished Professor of Evolution and Ecology and at the University of California, Davis, with joint appointments in the Department of Reproduction and Population Health, School of Veterinary Medicine, and the John Muir Institute for the Environment. From 2011–2016, he served as the UC Davis Vice Chancellor for Research. Prior to joining the faculty and administration at UC Davis, Lewin spent 27 years at the University of Illinois at Urbana-Champaign, where he held the E.W. and J.M. Gutsell Endowed Professorship in Immunogenetics, with a primary appointment in the Department of Animal Sciences. Lewin served as Director of the University of Illinois Biotechnology Center, Founding Director of the W.M. Keck Center for Comparative and Functional Genomics, Founding Director of the world-renowned Institute for Genomic Biology, and was member of the Center for Advanced Study. After many years working on the genetics and genomics of domesticated cattle, Lewin shifted his research interests to mammalian genome evolution as it relates to adaptation, speciation, and the origins of cancer. In 2017, Lewin co-founded the Earth BioGenome Project (EBP), which aims to sequence all described eukaryotic life, and currently serves as the Chair of the EBP Working Group. He is the founding co-Editor of *Annual Reviews in Animal BioSciences*, which is now the world's leading journal in zoology, animal and dairy sciences, and veterinary science, as measured by *Journal Citation Reports*. In 2008, Lewin was elected as a Foreign Member of the Royal Swedish Academy of Agriculture and Forestry. In 2011, Lewin was awarded the Wolf Prize in Agriculture, and in 2013 he was elected to the U.S. National Academy of Sciences.

### **The Earth BioGenome Project: Progress on Biology's Moonshot**

Earth is in the midst of global biodiversity crisis, with species loss 100–1,000-fold above the background extinction rate. Loss of biodiversity threatens vital ecosystems on which humans depend, and until now, extinction is irreversible, eradicating genomic diversity that has taken many millions of years to evolve. It may not be possible to slow or halt biodiversity loss without a deeper understanding of the origins, evolution, adaptability, and ecological functions of diverse species, and the ecosystems in which they evolve. Furthermore, the rapidly growing worldwide bioeconomy and emerging needs in pandemic responsiveness and biodefense require broadening our understanding

of biodiversity. The [Earth BioGenome Project \(EBP\)](#) aims to sequence, catalog, and characterize the genomes of all of Earth's known plant, animal, and microbial eukaryotic biodiversity; ~1.8 million species. The ultimate aim of the EBP is to use these genomes as a foundation for revealing the "rules of life," i.e., how biological complexity arose, the relationship between genotype and phenotype, and how biological systems evolve under changing environmental conditions. Accomplishing these goals requires multidimensional coordination at a global scale. I will review progress made by EBP-affiliated projects, with a focus on producing and analyzing reference-quality genomes at scale, across the eukaryotic tree of life and at ecosystem scale. Examples of important findings made with reference-quality genomes will be presented, and the challenges faced in achieving the goals of the EBP will be discussed.

**Elad Tako**

Elad Tako holds degrees in animal science (B.S.), endocrinology (M.S.), and physiology/nutrigenomics (Ph.D.), with previous appointments at the Hebrew University of Jerusalem, North Carolina State University, Cornell University, and USDA-ARS. As an Associate Professor with the Department of Food Science at Cornell University, Dr. Tako's research focuses on various aspects of trace mineral deficiencies, emphasizing molecular, physiological, and nutritional factors and practices that influence the intestinal micronutrient absorption. With over 150 peer-reviewed

publications and presentations, he leads a research team focused on understanding the interactions between dietary factors, physiological and molecular biomarkers, the microbiome, and intestinal functionality. His research accomplishments include the development of the *Gallus gallus* intra-amniotic administration procedure and establishing recognized approaches for using animal models within mineral bioavailability and intestinal absorption screening processes. He has also developed a zinc status physiological blood biomarker (red blood cell Linoleic Acid: Dihomo-Linolenic Acid Ratio), and molecular tissue biomarkers to assess the effect of dietary mineral deficiencies on intestinal functionality, and how micronutrients dietary deficiencies alter gut microbiota composition and function.

**From Cell to Organism: The Link Between Micronutrient Dietary Deficiencies and Physiological Status, Intestinal Functionality and Microbiome**

Dr. Elad Tako and his research team conduct multidisciplinary research that links between the research fields of Food Science and Nutrition. The research is focused on various aspects of (a) dietary trace mineral deficiencies, cause and effects, with emphases on the physiological and nutritional factors and practices that influence the intestinal absorption of micronutrients, specifically iron (Fe) and zinc (Zn); and, (b) the characterization of the individual and interactive effects of dietary minerals (Fe/Zn), phytochemicals and prebiotics common to staple foods on the intestinal microbiome composition and function, and the duodenal brush border membrane (BBM) functionality and morphology. In this context, the team is using various and unique approaches that utilize both cellular and animal (*Gallus gallus*, both adult and embryonic) models to assess mineral bioavailability of staple food crops, and plant origin bioactive compounds. In his seminar, Dr. Tako will present and provide an overview of his team's research activities with emphasis on addressing Fe



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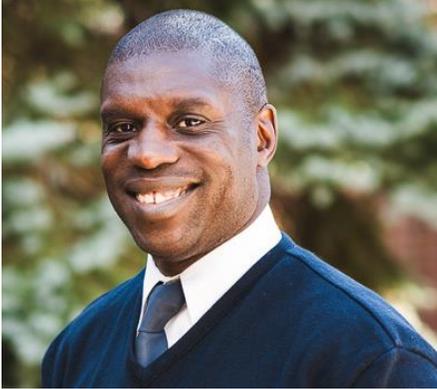
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and Zn deficiencies across the globe, dietary challenges, strategies, and the development of a unique research approach (*in vivo*).

## Lawrence Goodridge



After completing a B.Sc. Honours degree in Microbiology at the University of Guelph, Lawrence completed both his M.Sc. and Ph.D. degrees in Food Science with an emphasis on microbial detection of foodborne pathogens, also at Guelph, before leaving for a Postdoctoral Fellowship to continue his training in microbial food safety in the laboratory of Dr. Michael Doyle in the Center for Food Safety at the University of Georgia.

Prior to returning to Guelph, Lawrence has held faculty positions at the University of Wyoming and Colorado State University. More recently, he was the Ian and Jayne Munro Chair in Food Safety in the Food Science Department at McGill University. In January, 2019, Lawrence joined the Department of Food Science as Director of the Canadian Research Institute for Food Safety, where he holds the Leung Family Professorship in Food Safety.

Dr. Goodridge conducts research related to control and detection of pathogenic microorganisms including bacteria, viruses and parasites. Dr. Goodridge has published more than 100 peer reviewed journal articles and book chapters, and has been awarded more than \$50 million in research funding from US, Canadian and international funding sources.

### **The curious case of *Salmonella***

## **Lindsay Springer**

Lindsay Springer, Head of Plants and Nutrition at Gardyn, is a plant-based food scientist and food futurist who drives systematic food and technology innovations to maximize human and planet health. Synthesizing her knowledge of plant chemistry and food science, she is driven to see new technologies invoke food system changes from concept to commercialization. Lindsay holds a B.S. in Biomedical Sciences and M.S. degrees in Pharmaceutical and Biomaterials Sciences from the University at Buffalo. She earned her Ph.D. in Food Science and Technology, focusing on food chemistry, plant breeding, and biophysics, from Cornell University. She subsequently pursued Food Safety Modernization Act (FSMA) Produce Safety training and research as an Extension Specialist at the Institute for Food Safety at Cornell, and postdoctoral fruit chemistry research in the School of Integrative Plant Sciences. Seeking to make a food system impact, Lindsay joined the Good Food Institute in 2019 as a Senior Scientist where she focused on enhancing the evolution and acceleration of plant-based meat, eggs, and dairy. Before joining Gardyn, Lindsay served as the Vice President of New Product Innovation at Steuben Foods, Inc., where she worked cross functionally to drive plant-based food innovation through ideation, technical landscape assessment, and accelerating the adoption of novel plant-based food ingredients.

### **A Fresh Perspective on Fresh Produce: Embracing Hyperlocal Food Production and Artificial Intelligence for Climate Smart Agriculture and Unlocking Plant-based Nutrition**

Recent findings presented by the United Nations agricultural agency at the COP26 Climate Conference in Glasgow indicate that 31% of human-caused greenhouse gas emissions originate from the world's agri-food sector. In order to achieve carbon neutrality by 2050, a significant redirection to climate smart agriculture, as exemplified by Gardyn, is urgently needed. With soilless growing, using 95% less water, no single use plastics, and no pesticides, Gardyn improves the sustainability of fresh produce growing while simultaneously enhancing our collective adaptation and resilience to climate change. Using household environments and infrastructure vs. de novo hydroponic business structures, the economic model of hyperlocal food production can finally achieve significant cost and climate impact gains over the current agricultural production models for fresh produce. The incorporation of Gardyn's artificial intelligence system to chaperone the growing process lowers technical barriers to entry, ensures growing success, and empowers consumers through lifestyle enhancement. Additionally, by eliminating lengthy fresh produce supply chains, hyperlocal fresh produce production unlocks the potential for a wealth of plant biodiversity to enrich human nutrition on both a population and personalized level.



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**Miguel Gomez**

Miguel is the Robert G. Tobin Associate Professor in the Dyson School of Applied Economics and Management, Cornell University. He is director of the Food Industry Management Program, which is globally recognized as the premier food industry education, research, and outreach program. His research concentrates broadly on the study of food marketing and distribution issues with emphasis on fresh produce. Specifically, his research focuses on how to improve the economic and sustainability performance of food value chains; and on the economics of food markets to enhance benefits for value chains participants including growers, packers/shippers, manufacturers, retailers, and consumers.

**Consumer Preferences for Fresh Produce Attributes in Kenya: A Choice Experiment Approach**

**Tim Lott**



**To Better Milk Quality and Beyond!**

**Jonathan Sogin**

Jonathan is a 5<sup>th</sup> year PhD candidate studying food microbiology in Dr. Randy Worobo's lab. He completed his Bachelor's degree in Food Science at the University of Wisconsin – Madison prior to his studies at Cornell. His interests stem from several food service jobs and a complete unawareness as a kid of how common grocery store foods like yogurt and cream cheese were made.

**A Look Under the Digital Microscope: Using Amplicon Metagenomics to Better Understand Food Fermentations**

Jonathan studies food microbiology from safety and quality perspectives using classical and next generation detection methods. In this seminar, he will introduce attendees to Amplicon Metagenomic Sequencing and contextualize how it can answer various questions within the framework of Next Generation Sequencing to address research queries in the field of Food Science. Jonathan will present his research on Kombucha and Tempeh fermentations as example studies in which Amplicon Metagenomic Sequencing was used to better understand underlying microbial dynamics.