Wednesday, September 20, 2023

Presenter biographies

Julie Badger is studying the development of genetic biocontrol in the invasive common carp, C. carpio. Strategies include gene drives, sex ratio biasing methods, and engineered genetic incompatibility (EGI). Her goal is to use these technologies, which have been previously demonstrated in insects, and apply them to the common carp to control its population where it has been introduced, while also developing a framework for development of such technologies in complex, vertebrate, non-model organisms.

Alex Bajcz, PhD is a plant ecologist and environmental scientist by training; his past research has explored how and why plants reproduce as they do, how global change processes may disrupt that reproduction, and why invasives may experience enhanced reproductive success over their native peers. He strives to find actionable solutions to ecological problems like invasion and empower stakeholders to implement them. This goal led him to pursue computational and quantitative skills, which hold profound promise for guiding and shaping how these types of problems will be solved in the 21st Century and beyond. He is the Quantitative Ecologist for the Minnesota Aquatic Invasive Species Research Center.

Przemek Bajer, PhD is a Research Assistant Professor at the Minnesota Aquatic Invasive Species Research Center. His research focuses on various aspects of the ecology, life history, and behavior of the invasive common carp so that new management strategies for this species can be developed. Most recently, he has been working on exploiting carp's social behaviors to train these fish to aggregate around bait and remove them in large numbers. He is currently also working on using the Whooshh System to remove carp from streams during spawning migrations. In addition to leading several research projects, he is the founder and owner of a University of Minnesota startup company, Carp Solutions, where they develop, apply and perfect modern technologies for carp management that can

be used by managers, lake residents and private businesses. The overall goal is to make carp management effective, affordable and sustainable.

Matthew Barbour's research interests include dreissinid mussels and their impacts on the ecosystem. Currently, he researches dreissinid mussel control, primarily focused on understanding the relationship of physical parameters (e.g. temperature) and toxicity of different chemical compounds to zebra mussels.

Rebecca Bullers is currently working towards her M.S. in Conservation Science with a focus on Fisheries and Aquatic Biology. She received her B.S in Biological Sciences from University of Connecticut, where she is originally from. Her interest in AIS stemmed from her time working at Carp Solutions, LLC, where she assisted in common carp removal from lakes across the Midwest. Her current research focuses on acoustic conditioning and common carp behavior.

Selina Cai: Wenbo Cai, Ph.D. is an Associate Professor in the Department of Mechanical and Industrial Engineering at the New Jersey Institute of Technology (NJIT). She received a Ph.D. in Industrial Engineering and Operations Research at University of California, Berkeley. Dr. Cai's research interests focus on the integration of Operations Research and Economics methodologies, with the goal of developing innovative analytical frameworks. These frameworks aim to enhance operational efficiencies across various systems, such as energy, forestry, and digital services. Through her work, Dr. Cai uses game theory and optimization techniques to address real-world challenges, where creating incentives among key players can better align their interests and objectives. Her research areas include the management of invasive species, carbon capture and storage systems, energy supply chain, and digital services. Dr. Cai's research is mostly funded by NSF and the U.S. Forest Service.

Kiley Davan's research interests lie in the human dimensions of conservation and wildlife. For her current project, she is investigating people's attitudes and risk perceptions related to the use of genetic biocontrol methods to control invasive species, using the zebra mussel and common carp as case species. Kiley is a graduate fellow with MAISRC.

Mikael Elias received his B.S. and M.S. degrees from Université de Lorraine (France) and his Ph.D. degree from Université Aix-Marseille (France). He joined the Weizmann Institute of Science (Israel) as a Postdoctoral Fellow, where he worked as a Visiting Scientist and later as a Marie Curie Fellow. Since 2014, he has been an assistant professor at the University of

Minnesota. His research lies at the interface of biology and chemistry. He studies the structure, function and evolution of proteins and enzymes in particular. His scope of studies extends to microbiology with an emphasis on microbial chemical languages. With the Minnesota Aquatic Invasive Species Research Center, he is evaluating coatings to suppress zebra mussel populations.

John Fieberg specializes in quantitative ecology, and is interested in helping people make robust statistical inferences when confronted with a variety of messy data situations. Being a quantitative ecologist requires identifying and solving problems arising from the way data are collected in ecology and natural resource management fields. He recently completed a project with the Minnesota Aquatic Invasive Species Research Center focused on developing recommendations for underwater survey methods to estimate zebra mussel population abundance and distribution. He is leading a new project to develop a modeling framework for integrating professional and citizen-science data, leading to smarter surveillance and improved estimates of AIS distribution that account for imperfect detection and sampling biases.

David Fulton's research program focuses on understanding and improving human decision processes in the conservation and management of fish and wildlife. He is particularly interested in understanding the social, political, and cultural factors related to improving decision processes and the role that human values and attitudes play in decision-making. He emphasizes the use of theories and methods from sociology and psychology but encourages students to take an interdisciplinary research approach. David believes that both qualitative and quantitative social research methods are essential for understanding the human dimensions of wildlife conservation and management.

Daryl Gohl's work focuses on developing new techniques for genomics-based measurements and genetic manipulation of complex biological systems. He has applied such methods to diverse problems, from accurately measuring microbial communities (microbiomes), to studying the nervous system, to infectious diseases such as HIV, tuberculosis, and to the recent coronavirus pandemic. Dr. Gohl was part of the team that sequenced the zebra mussel genome, and is now working (together with Dr. Michael McCartney and Dr. Scott Ballantyne) to use this genomic information to develop methods to genetically manipulate zebra mussels and to identify a genetic achilles heel that could aid biocontrol efforts. In addition to his academic work, Dr. Gohl is a Co-Founder and

Senior Scientific Advisor of CoreBiome, Inc. (now Diversigen, Inc.) a microbiome analysis company based in New Brighton, MN.

Gretchen Hansen is an assistant professor in the Fisheries, Wildlife, and Conservation Biology Department at the University of Minnesota. Her research focuses on large scale drivers of change in freshwater ecosystems, including climate, land use, and invasive species. She is especially interested in how local management and lake characteristics influence the resilience of fish populations and communities to regional and global change. Gretchen previously worked as a research scientist for state fisheries management agencies, and is committing to conducting actionable science via collaboration with stakeholders and managers. To answer complex questions she employs multiple approaches including statistical analyses of historical data, observational field studies, simulation modeling, and large-scale experimentation.

Amy Kinsley is an Assistant Professor in the Department of Veterinary Population Medicine. Her research focuses on using advanced epidemiological modeling techniques to develop tools that support decision making surrounding the management of invasive species, infectious diseases, and aquatic pollutants. She has a B.S. in Civil Engineering from the University of Florida and a DVM and PhD from the University of Minnesota.

Jessica Kozarek is a Research Associate at St. Anthony Falls Laboratory. Her research focuses on ecohydraulics (or the interactions between flow, sediment, and aquatic biota), and stream and river restoration and management. At MAISRC, she is testing the feasibility of multi-beam sonar methods to detect zebra mussel beds.

Allen Mensinger, PhD is a Professor in the Swenson College of Science and Engineering at University of Minnesota Duluth. His research is focused on neural mechanisms of behavior. Specifically, how fish detect, integrate, and respond to external cues in the environment. He and his team have developed an implantable electrode and telemetry system to record physiological signals from free swimming fish. He also has been investigating the potential of acoustic deterrents to be used against invasive bigheaded carp. Dr. Allen Mensinger and his lab are interested in how fish detect, integrate and respond to external cues. Their goal is to understand and exploit fish sensory systems to develop environmentally friendly and cost effective deterrents to invasive fishes.

Chris Merkes has always been fascinated with DNA. His primary interests are in how DNA sequences can control development or cause disease. He also uses forensic DNA analysis

to learn more about the natural environment. Resource managers can then use that information to implement efficient and effective management practices to keep our natural resources healthy. Chris is a geneticist with the United States Geological Survey.

Ben Minerich, MSc, Native Mussel Conservation Specialist, has worked at the Minnesota Zoo for nearly a decade in a variety of roles. His experience started in the Aquariums department, helping to lead the care of the coral, jellyfish, and Minnesota fish tanks. Ben is researching zebra mussel breeding in the MAISRC containment lab.

Ray Newman, PhD is a Distinguished Teaching Professor in the Department of Fisheries, Wildlife and Conservation Biology at the University of Minnesota specializing in aquatic invasive plants. He is passionate about aquatic ecology and understanding the interaction between plants, invertebrates, and fish. His work with the Minnesota Aquatic Invasive Species Research Center includes restoring native plant communities after invasive plants – such as Eurasian watermilfoil and Curly-leaf pondweed – have been introduced and assessing the distribution of hybrid watermilfoil and management implications of different genotypes. He was previously researching sustainable methods of biocontrol involving weevils and integrated approaches to milfoil management.

Nick Phelps is the Director of MAISRC and an Associate Professor in the Department of Fisheries, Wildlife and Conservation Biology at the University of Minnesota. He studies emerging threats to aquatic systems at both the macro and microbial scales in the fields of fish health and aquatic invasive species, which lie at the intersection of animals, humans and the environment. His goal is to identify threats, understand risks, and ultimately develop long-term evidence-based management solutions to balance the needs of all relevant stakeholders.

Abha Panda is a graduate student in Dr. Dan Larkin's lab working towards a Ph.D. in Conservation Science. She received her B.S. in Environmental Studies from the University of Michigan and has previously held research and communications roles related to water resources and environmental justice. Abha's current research focuses on actively restoring native plant communities following invasive plant management in lakes as a means to build more invader-resistant plant communities.

Amit Pradhananga is a researcher and affiliate faculty at the Department of Forest Resources, Center for Changing Landscapes. His research centers on investigating linkages between natural environments and human systems. He has applied qualitative and

quantitative social science research methodologies to examine the human, social, and policy dimensions of natural resources in the context of water resource, forest, invasive species, and recreation resource management, as well as climate change adaptation. His research areas include: 1) social and psychological drivers of conservation behavior, and 2) diversity and inclusion in environmental planning and management. In the area of AIS management, he is interested in understanding public perceptions and values related to AIS and AIS management.

Christopher Rounds' research is focused on optimizing eDNA sampling for multiple AIS. The research seeks to optimize the detection of invasive species using environmental DNA and understand how detection rates of invasive species change seasonally, spatially, and during different life history periods. With this project, Chris would love to help agencies develop best practices for using eDNA to detect and sample invasive species. Currently, Chris is working towards his Ph.D. at the University of Minnesota.

Amy Schrank, PhD, MS is a fish ecologist studying how hybrid cattail affects fish communities in lake ecosystems. Her research also focuses on how human effects such as dams and increased water temperature affect movement patterns of stream fishes. In addition to research, she also collaborates with fisheries and aquaculture researchers and stakeholders around Minnesota to provide research support and a bridge to communicate technical information to stakeholders, managers, and the public.

Ingrid Schneider, PhD is a Professor in the Department of Forest Resources at the University of Minnesota. Her research focuses on the behavior and management of visitors to protected areas like parks, forests and water bodies. In the last decade, she has turned her attention to invasive species and visitor responses to them. Her project with MAISRC continues her work focused on influencing visitor behaviors with engaging information.

Ryan Thum, PhD:
Dr. Ryan Thum's research is rooted in conceptual evolutionary ecology, but aims to contribute conceptual knowledge and understanding to guide practical decision making and solutions regarding invasive species – one of the world's most pressing environmental problems. Most of Ryan's research is organized around the simple idea of how genetic variation influences invasive plant management outcomes.

Isaiah Tolo is an advanced doctoral student in conservation sciences with a background in microbiology. He is broadly interested in pathogens and how they impact natural resources

and wildlife. As a career biologist with extensive experience in field and laboratory research, his hope is to use his experience in stakeholder engagement to translate research for the public good.

Anna Totsch is using molecular biology in order to solve environmental problems. She specializes in molecular biology but is also interested in learning geographic information systems. Her research focus is on optimizing field and lab methods for maximizing detection probability for multiple AIS (aquatic invasive species) using eDNA.

Diane Waller, PhD:
Dr. Diane Waller's research focuses on development and evaluation of selective management strategies for aquatic invasive species, particularly zebra and quagga mussels. She is especially interested in developing control tools and application methods that minimize impacts to nontarget species. The goal of her research is to provide sound management strategies and tools to resource managers to minimize the impact of invasive species. She also conducts research on native freshwater mussels to improve conservation efforts for this imperiled fauna, including life history studies, propagation methods, and health assessment studies.

James Wamboldt is a fish biologist at the Upper Midwest Environmental Sciences Center with the U.S. Geological Survey.

Amanda Weberg is the AIS Program Supervisor for Cook County SWCD in Grand Marais, MN.

Ashley Wolfe is a master's student at Montana State University, working within the Department of Plant Sciences and Plant Pathology. Her main research project involves creating an interactive website that serves as a comprehensive database for identified strains of Eurasian and hybrid watermilfoil. In partnership with lake managers, stakeholders and state agencies, she coordinates sample collection and genetic processing, contributing to the strain data. Additionally, Ashley is involved in characterizing herbicide responses of watermilfoil strains, a key component in improving management strategies for both Eurasian and hybrid watermilfoil.