

WELCOME & ANNOUNCEMENTS



Photo courtesy of Lisa Graumlich



Photo courtesy of Bill Karp

Lisa Graumlich

College of the Environment

BIO: Lisa J. Graumlich, Mary Laird Wood Professor, is the inaugural Dean of the College of the Environment at the University of Washington. As Dean, she leads a College with unparalleled depth and breadth in environmental systems: from the forests to the seas and from the depths of the earth to the edges of the solar system. As a scholar, Graumlich pioneered the use of tree-ring data to understand long-term trends in climate, focusing on the mountains of western North America. She is actively engaged with a broad range of stakeholders to understand the impacts of climate change on wilderness and natural areas.

Bill Karp

NOAA, Retired

BIO: Bill Karp is a graduate of Liverpool Polytechnic (1972) and UW (1975/1982). He retired after 30 years with NOAA in 2016, but remains professionally active as a SAFS affiliate faculty member and a NOAA Fisheries Scientist Emeritus. He is US Delegate and President Elect to the International Council for Exploration of the Sea. He led the Acoustic Assessment and the Observer Programs at the Alaska Fisheries Science Center and served as Deputy Center Director. Before retiring from NOAA, he directed the Northeast Fisheries Science Center for five years. Bill has worked closely with the fishing industry throughout his career.

WELCOME continued



Photo courtesy of André Punt

André Punt

SAFS

André E. Punt is a Professor and the current Director in SAFS. He received his PhD in Applied Mathematics at the University of Cape Town. The research undertaken by André and the MPAM (Marine Population and Management) group relates broadly to the development and application of fisheries stock assessment techniques, bioeconomic modelling, and the evaluation of the performance of stock assessment methods and harvest control rules using the Management Strategy Evaluation approach.



Photo credit: Bob Peterson

David Armstrong

SAFS, Retired

SAFS then and now: a century of growth, change, and success

ABSTRACT: In 2019, there are more than 100 academic fisheries programs in the United States that offer undergraduate and advanced graduate degrees. In 1913, there was none. The American Fisheries Society endorsed the need to establish advanced fishery education and training in the US, and six years later on April 2, 1919, the UW College of Fisheries opened its doors. Our early history is rooted in the legacy of strong-willed directors and deans who moved us forward in an expanding menu of academic themes and programs. From trawl nets to genomics, we have added expertise for research and passion for teaching in fields that define changes along the ten decades of our history...with more yet to come.

BIO: David Armstrong is Emeritus Professor in SAFS; he served on the faculty from 1978 to retirement in 2014, and was Director for 14 years, from 1998 to 2012. During his tenure as Director, David worked with faculty to affect major changes in direction, organization, and quality, which has resulted in world-class ranking of the School. His research was focused on crab and shrimp resources along the Pacific coast and in the eastern Bering Sea.



SESSION 1

Photo credit: Morgan Bond

Portraits from the waters: THE BIOLOGY AND ECOLOGY OF AQUATIC SPECIES

Chairs: David Armstrong and Bill Karp



Photo credit: Diane M. Rubiano

Ted Pietsch

SAFS, Retired

So many pickled fishes: how we came to have them and why we continue to collect

ABSTRACT: The Fish Collection started in the 1890s with the collecting efforts of the Young Naturalists' Society and progressed through a succession of collectors and curators hired as staff and faculty at SAFS, including Edwin C. Starks, Trevor Kincaid, Leonard P. Schultz, Arthur D. Welander, Allan C. DeLacy, John D. McPhail, and Bruce S. Miller, all of whom played vital roles to help make the collection what it is today. Our holdings now are vast—well over 11 million specimens—the largest fish collection in the world. I explain why we maintain the collection, why we continue to collect, and why SAFS, the Burke Museum, and outside stakeholders, including the National Science Foundation, continue to support it. The recent hiring of a new Curator of Fishes bodes well for the future of this essential resource.

BIO: Ted Pietsch, Professor Emeritus in SAFS, has spent most of his career mentoring graduate students and teaching ichthyology. Ted is interested primarily in marine ichthyology, focusing on the relationships, evolutionary history, functional morphology, and reproductive biology of bony fishes. As former Curator of Fishes, is also interested in natural history collection building and in biotic survey and inventory. Ted has also published extensively on the history of science, focusing primarily on 18th-century ichthyology.

Duane Stevenson

NOAA Alaska Fisheries Science Center

*The modern taxonomist:
using new tools to solve old problems*

ABSTRACT: The fundamental goal of the taxonomist is the same today as it has ever been: to produce a taxonomic framework that accurately represents the biodiversity on the planet, which will serve as a foundation for all studies of organismal biology. Our taxonomic systems integrate our knowledge about the natural world and reflect our ideas about the evolution of life on Earth. Modern genetic tools have revolutionized the field of taxonomy by providing insight into fine-scale evolutionary processes previously undetectable using morphological analysis. The modern taxonomist uses these genetic tools along with traditional morphological analysis to produce robust taxonomic and phylogenetic hypotheses.

BIO: Duane Stevenson finished his PhD at SAFS in 2002, and immediately accepted a position as a Research Fisheries Biologist at the NMFS Alaska Fisheries Science Center (AFSC). He works with both the Groundfish Assessment Program and the North Pacific Observer Program at AFSC, and is active in resource assessment surveys throughout Alaska's waters, as well as fisheries observer training and data analysis. His research interests include the taxonomy and systematics of various groups of North Pacific fishes, as well as biogeography and faunal distribution dynamics in North Pacific marine systems.

Photo courtesy of Duane Stevenson





Photo credit: UW College of the Environment

Steven Roberts

SAFS

Considering epigenetics in aquatic species culture and conservation

ABSTRACT: Epigenetics has attracted considerable attention with respect to its potential value in many areas of aquatic species conservation and aquaculture. Epigenetics refers to processes that result in heritable alterations in gene activity without manipulating the underlying DNA sequence, and includes processes such as DNA methylation and histone modification. From an aquaculture perspective, one could leverage epigenetics using environmental manipulation, where the intention is to induce generations to produce a desired phenotype. Epigenetic selection, alone or combined with genetic selection, may increase the reliability of producing animals with desired phenotypes. With regard to conservation, we can now better understand acclimatization and adaptation and begin to use epigenetics in defining relatedness and make predictions on species distribution.

BIO: Steven Roberts is the Kenneth K. Chew Endowed Associate Professor in SAFS. He received his PhD in Biology at the University of Notre Dame in 2002. Steven's main research interest is the physiological response of aquatic species to environmental change with a particular focus on environmental epigenetics, reproductive biology, and aquaculture.

Luke Tornabene

SAFS

Reef fish biodiversity in the 21st century: revealing the hidden half

ABSTRACT: Coral reefs occupy less than 1% of the ocean floor, yet they support more than 25% of marine fishes. Most of our knowledge of reefs are based on the upper 50 m, yet tropical deep reefs extend to 300 m in some locations and are far less-studied. Our understanding of reef ecosystem dynamics is also limited by a bias towards studying large, conspicuous fishes, yet nearly half of fish diversity is composed of "cryptobenthic reef fishes"—bottom-dwelling, cryptic, and poorly studied species less than ~50 mm in length. Here, I examine taxonomic trends since 1758, and demonstrate that the future of biodiversity studies on reef fishes in the 21st century will focus on this "hidden half"—cryptobenthic fishes and fishes from deep reefs.

BIO: Luke Tornabene is an ichthyologist studying the evolutionary relationships and biodiversity of fishes. His research focuses on identifying the factors that drive phenotypic, ecological, and taxonomic diversification in fishes. Many of his current research projects involve the "Twilight Zone"—a diverse yet poorly studied region of the ocean that lies below the depths reachable by SCUBA. Luke currently curates the UW Fish Collection, one of the largest collections of its kind in the world.

Photo credit: Carol Beckerman



PANEL DISCUSSION

Moderator
Tim Essington



Photo credit: UW College of the Environment

Tim Essington

SAFS

BIO: Tim Essington is a Professor at SAFS, where he teaches quantitative ecology and fisheries conservation. Tim first became acquainted with SAFS when he visited for a quarter during graduate school. Seven years later, he was hired as an Assistant Professor and he has no plans to ever leave.



Thomas Quinn

SAFS

Salmon, trout, and the UW fisheries program

ABSTRACT: Pacific salmon are extraordinarily important fishes from ecological, economic, and sociological standpoints. Accordingly, they have played a dominant role in fisheries science in general, and especially so at the University of Washington. I will first review some seminal discoveries and themes in salmon research over the past decades, many of which included contributions from UW scientists. I will then highlight two important, divergent UW programs—the Fisheries Research Institute’s long-term sockeye salmon ecology and population dynamics work in Alaska, and the aquaculture and hatchery program on campus involving salmon and trout. Finally, I will share some thoughts on the challenges of such long-term “legacy” programs in a university setting.

BIO: Thomas Quinn grew up in New York City, received a BA with Distinction in Biology from Swarthmore College in 1976, and then did his graduate work in the then College of Fisheries, receiving a PhD in 1981. After four years working for the Canadian Department of Fisheries and Oceans in Nanaimo, BC, he rejoined the then School of Fisheries as a faculty member in 1986, and has since taught and done research at UW.

Photo courtesy of Tom Quinn



Photo courtesy of Andrew Berdahl

Andrew Berdahl

SAFS

Collective decision making in animal migrations

ABSTRACT: Migration is a common strategy for increasing fitness in dynamic environments. For migratory animals, a formidable challenge is to find their way over long distances and through complex environments. Across a wide variety of taxa, many migratory animals travel together in groups, such as schools, flocks, or herds. By traveling together, these animals may benefit from collective decision making when choosing both when and where to go. I will present some potential mechanisms providing this boost in accuracy and explore instances and implications of collective decision making during migration, with a focus on Pacific salmon.

BIO: Andrew Berdahl recently joined the SAFS faculty as an Assistant Professor. Prior to this, he was an Omidyar Fellow at the Santa Fe Institute for complex systems in New Mexico. He received his PhD from Princeton University in the Department of Ecology & Evolutionary Biology and his BSc and MSc in Physics from the Universities of Waterloo and Calgary, respectively. Andrew combines field work, experiments, simulations, and theory to explore collective behaviors in mobile animal groups. He was born and raised in Canada’s Yukon Territory and now lives in northeast Seattle with his wife and their five-year-old twin boys and baby daughter.

Jacqueline Padilla-Gamiño

SAFS

Ecophysiology and reproductive biology in a changing environment

ABSTRACT: Global change is a multi-dimensional problem that can affect organisms at many levels of biological organization and at multiple life history stages. I will present work on the ecophysiology and biological consequences of ocean acidification of key marine species off the Pacific West Coast—specifically, how larvae of marine invertebrates and algal spores respond to ocean acidification. This research will help us to understand the physiological flexibility and potential for local adaptation of marine organisms in ecologically and economically important ecosystems already affected by global change.

BIO: Jacqueline (Jackie) Padilla-Gamiño is an Assistant Professor in SAFS. She studies the ecophysiology and reproductive biology of algae and marine invertebrates in a changing environment. By combining field and laboratory techniques, she examines the importance of transgenerational effects in acclimatization and local adaptation and investigates the synergistic effects of multiple stressors on coastal ecosystems. Jackie graduated from Universidad Autónoma de Baja California and completed a PhD in Oceanography at the University of Hawaii. She is interested in science communication and community engagement and is the author of the bilingual children's book, *Kupe and the Corals*, which has been translated into five languages.

Photo courtesy of Jackie Padilla-Gamiño



Photo courtesy of Sean McDonald

Sean McDonald

SAFS

Dungeness crab: complex life history and a Puget Sound mystery

ABSTRACT: Life history complexity and habitat shifts linked to ontogeny are central to many fishery species. For Dungeness crab, the target of valuable commercial, recreational, and subsistence fisheries, these characteristics have important implications for management. In this talk, I highlight what is known about Dungeness crab life history and habitat use (largely from SAFS research) and describe ongoing concerns about the state of crab populations in Puget Sound. I also discuss efforts by the Pacific Northwest Crab Research Group to unravel the mystery of declining crab populations in some parts of Puget Sound.

BIO: Sean McDonald is a Research Scientist in SAFS and a Lecturer in the Program on the Environment. He has served on the governing board for the Pacific Coast Section of the National Shellfisheries Association for more than a decade. Sean's research interests center on marine ecology and natural resource issues, in which he focuses on applying ecological principles to problems involving exploitation, cultivation, and conservation of aquatic species in a changing global landscape. He is interested in responses to major agents of ecosystem change, such as climate change and invasive species, in human and natural systems.

Chelsea Wood

SAFS

Lessons from “lesser” taxa

ABSTRACT: From its birth, the School of Aquatic and Fishery Sciences has been dedicated to doing science that benefits society. In recent years, population and community ecology research at SAFS has expanded to encompass diverse study systems—including “lesser” invertebrate, protozoal, and bacterial taxa—while maintaining its traditional emphasis on pressing global issues. I’ll highlight some of the lessons we’ve learned from these “lesser” taxa by discussing my work on schistosomiasis in West Africa. This human disease is caused by flatworm parasites produced by freshwater snail intermediate hosts and is transmitted through skin contact with infested ponds, lakes, and rivers. Our work demonstrates that cutting-edge, quantitative population and community ecology tools may be key to reducing the burden of this disease, which affects over 200 million people globally.

BIO: Chelsea Wood is a community ecologist interested in how environmental change shapes parasite assemblages. She received her PhD in 2013 from Stanford University, where she was a student of marine ecologist and conservation biologist Fiorenza Micheli. Before coming to SAFS, Chelsea completed post-docs at the University of Colorado and the University of Michigan.

Photo credit: UW College of the Environment



Photo credit: Matthew Bowman

Sarah Converse

Washington Cooperative Fish and Wildlife Research Unit and SAFS

In search of the polar bear: building better methods for monitoring a threatened carnivore

ABSTRACT: Polar bears—sea ice-obligate predators—are expected to decline in a warming Arctic. Studies of polar bear populations over the coming decades have the potential to lend insights into ecological mechanisms and to inform management to slow declines. But the complex life history, long-distance movements, and remote habitats of polar bears make them exceedingly difficult to study. We are developing new statistical modeling approaches to improve the study of polar bear populations. By exploiting a variety of data sources, we will be able to develop a more detailed understanding of how polar bears move, exploit habitat, reproduce, and survive.

BIO: Sarah Converse is the Unit Leader of the Washington Cooperative Fish and Wildlife Research Unit, and Associate Professor in the School of Environmental and Forest Sciences and SAFS. Her research focuses on the development and application of methods to understand the functioning of populations, especially small and declining populations, and to improve their management. She works across a broad variety of taxa (terrestrial birds, seabirds, marine mammals, amphibians, and others).



Photo courtesy of Julian Olden

Julian Olden

SAFS

Aquatic aliens among us

ABSTRACT: There is a long history of species invasions in fresh waters, and the magnitude and rate of introductions has accelerated greatly over time. Although not all introduced species have appreciable effects on their new ecosystems, many exert significant ecological, evolutionary, and economic impacts. For scientists, managers, and policy makers interested in conserving freshwater diversity, understanding and minimizing the magnitude and array of potential impacts of invasive species is of utmost importance. I will discuss the many persistent and emerging challenges associated with aquatic invasive species, providing illustrative examples from our research in the Pacific Northwest.

BIO: Julian Olden is a Professor in SAFS. Broadly motivated by a future where people recognize and respect the diverse values provided by functioning freshwater ecosystems, Julian seeks to integrate science-based approaches with on-the-ground management and conservation decisions. His research focuses on the challenges associated with water resource management, dams, invasive species, and climate change.

Lauren Rogers

NOAA Alaska Fisheries Science Center

Portfolio effects in Bristol Bay sockeye salmon

ABSTRACT: The earliest surveys of sockeye salmon in Alaska recognized that the spawning migrations to rivers were actually stock complexes composed of many individual populations that assorted to individual habitats throughout watersheds. These populations share some environmental conditions but have unique exposure to others, which produces substantial diversity in their dynamics. This diversity of population dynamics reduces the variability expressed at the aggregate river and regional scales, thereby stabilizing fisheries much like investment diversity reduces risk in financial portfolios.

BIO: Lauren Rogers is a Research Fish Biologist at NOAA's Alaska Fisheries Science Center, where she leads research on early life stages of fishes in support of Ecosystem-Based Fisheries Management in Alaska. Her research focuses on understanding how fish and their ecosystems are affected by changes in climate, and in determining which features of populations, communities, and ecosystems make them resilient to increasing human pressures. Lauren was previously a fisheries ecologist at the Natural Capital Project and a post-doctoral researcher at the University of Oslo. Lauren's dissertation (PhD SAFS, 2010) focused on the dynamics of Bristol Bay sockeye salmon on annual to centennial time-scales.

Photo credit: Jan Ohlberger

