



# THE Open Reading Frame

Newsletter of the Genetics Section of the American Fisheries Society

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A diver follows Threespine Stickleback *Gasterosteus aculeatus*. Jason Ching, University of Washington.



## President’s Message

Welcome to the Winter 2024 edition of *The Open Reading Frame*, the AFS Genetics Section newsletter. I’m excited to have stepped into the role of Genetics Section president during the annual meeting in Honolulu. I’d like to extend gratitude to Marlis Douglas, who has just concluded six years of Genetics Section executive committee service, as well as the rest of the

executive committee for their service and leadership. Additional members of the current committee include Garrett McKinney as past-president, Shawn Narum as president-elect, and Mary Peacock as secretary-treasurer.

Over the past few months, the executive committee has been working to streamline section operations through development of a procedure manual and drafting updates to our bylaws that we will present to the membership in 2025 for comment. In addition to improving methods for documenting current section operations, we are also looking to better archive our section’s history. If you have pictures of past Genetics Section events, copies of newsletters from prior to 2006, or other items of historic relevance to the section, please consider [sending them to me](#) for archiving. It was great seeing many of you at the annual meeting in Honolulu in September. We followed up our virtual business meeting that was held a few weeks prior with an in-person social that provided an opportunity to catch up with colleagues, mentors, and past students as well as celebrate this year’s section award winners. The section also hosted a full day symposium that highlighted genetics research being led by graduate students and early career researchers that was followed by a social for the presenters. The full slate of presentations and a substantial audience for all talks has motivated the executive committee to plan on hosting the symposium annually, including at the 2025 meeting in San Antonio.

Finally, I’d also like to remind members that registration and abstract submissions for the [2025 Coastwide Salmonid Genetics Conference](#) in Anchorage, Alaska are currently open. A call for sessions is also currently open for the 2025 AFS Annual Meeting in San Antonio. If you are interested in hosting a genetics themed session, please consider reaching out to the section executive committee for assistance with coordination and promotion.

Wishing you a safe, restful, and enjoyable holiday season,

**Jared Homola**  
President, AFS Genetics Section



Dr. Jared Homola  
AFSGS President

# Sights from the 2024 Annual Meeting in Honolulu!



# Reflections on the AFS Genetics Section Symposium



The Genetics Section hosted the second annual symposium, "Highlighting the Cutting Edge: Graduate and Early Career Research in Genomics" at the Honolulu meeting. We designed this symposium to highlight the research led by the next generation of scientists. The focus on graduate and early career researchers provides a framework to evaluate the state of the art and discuss new ideas about where we need to go.

Jared Homola, our current Genetics Section president, gave the opening address. We had 20 presentations by Masters and PhD students as well as Postdoctoral Fellows, Research Scientists and Assistant Professors. These scientists came from across the country and topics ranged from the use of eDNA to detect imperiled fishes, population genomics studies using whole genome sequencing, long range haplotype structure and inversions to study population divergence, transcriptome studies to address heat stress and food deprivation, and the development of GT-seq panels.

We are excited to continue offering this symposium and look forward to 2025 in San Antonio.

**Dr. Mary Peacock**  
2024 AFSGS Symposium Organizer



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## 2024 Stevan Phelps Memorial Award

The Stevan Phelps Memorial Award was created in 2000 as a perpetual memorial to Steve who died prematurely from cancer in 1999. The award, honoring Steve's strong commitment to publication of applied genetic research in fisheries, is given annually for the best genetics paper published in an AFS journal the preceding year. This year's award was presented to a collaborative research team led by Dr. Jon Hess and including staff from Columbia River Inter-Tribal Fish Commission (CRITFC), all four member tribes—Nez Perce, Umatilla, Yakama, and Warm Springs—and supported by the U.S. Army Corps of Engineers, for their paper titled "The return of the adult Pacific Lamprey offspring from translocations to the Columbia River" (NAJFM 43: 1531–1552). Dr. Hess provided remarks below.



Holding tank at Bonneville Dam.  
Aaron Jackson.

This study exemplifies the application of advanced genetic monitoring to fisheries management, shedding light on the effectiveness of translocation programs and the biological mysteries of Pacific Lamprey (*Entosphenus tridentatus*). This ancient, eel-like fish species holds profound cultural importance for the Columbia River Treaty Tribes and serves a vital role in the river's ecosystem. Despite this, their numbers in the interior Columbia River have declined significantly due to dam passage, habitat loss, and other human-induced changes. Recognizing the need for action, the tribes initiated translocation programs to boost lamprey abundance by manually transporting adults to areas within their historical range. These programs, spanning the Snake, Umatilla, and Yakima river basins, aim to restore Pacific Lamprey to historical abundance and ensure their availability for tribal harvest—a tradition deeply tied to tribal identity and sustenance.

The awarded study provides compelling evidence of the success of these efforts. Genetic analyses confirmed that translocated lamprey offspring are returning as adults to Bonneville Dam in numbers that exceed projections. Notably, over 1,000 adult lamprey from the three tribal programs were detected in 2021 alone. The research also demonstrated that Pacific Lamprey, despite their lack of precise natal homing, display a preference for returning to their regions of origin, translating to direct

ecological and cultural benefits of restoration actions for the species. This perhaps may be the most significant finding of the study, because it had been unknown whether tribal restoration projects that enhanced larval and juvenile abundances in the interior Columbia River basin would translate to direct increases of adults for the same region (i.e., the same larvae returning as future adult spawners). This study showed that not only Pacific Lamprey return but they can return in efficient numbers.

The study also emphasizes the unique life cycle of Pacific Lamprey, which spans over a decade. These fish begin as filter-feeding larvae in freshwater before migrating to the ocean, where they live as parasitic feeders for up to five years. The genetic monitoring approach employed in this study was instrumental in tracing the life cycle of translocated fish, marking the first time adult lamprey have been tracked from spawning to their eventual return as adults.

This research underscores the critical role of translocations in restoring Pacific Lamprey abundance and their availability for tribal harvest in culturally significant areas, such as Sherars Falls on the Deschutes River. By prioritizing Pacific Lamprey restoration, the CRITFC member tribes not only address a pressing conservation challenge but also reaffirm their enduring connection to this remarkable species.



Kanim Moses Conner releases adults into the Wenaha River.  
Aaron Jackson.

## James E. Wright Award Winners

*The James E. Wright Graduate Award is given in the memory of Jim Wright, one of the founders of fish genetics research and education in North America. This award is presented annually to recognize excellence in graduate-level work in fisheries genetics, as well as assist graduate students with travel to the national meeting. For 2024, our student winners were Sydney Almgren, Jonathan Masingale, and Rebecca Smith. Sydney and Rebecca introduce themselves and their research below.*

### Sydney Almgren, University of Alaska Fairbanks

I am a third year MS Fisheries student co-advised by Dr. Jessica Glass and Dr. Andrés López. My research focuses on genetic topics of Pacific herring in Alaska. For my thesis, I am using low coverage whole genome sequencing to describe the population structure of Pacific herring spawning aggregations in the eastern Bering Sea, which will be the first genomic baseline for this species in Alaska. I will also identify genomic regions related to sex determination in Pacific herring. Additionally, I am working with our larger research team to locate the biogeographic break between herring populations in the Bering Sea and Gulf of Alaska. Pacific herring holds ecological, economic, and cultural importance in Alaska, and I hope my research will be a useful tool for fisheries managers and for keeping Alaskan herring populations robust.

I am very grateful to have received the James E. Wright Award and for the support of the AFS Genetics Section. This award allowed me to attend the annual AFS meeting in Honolulu, which was my first time attending a conference out of state. I was able to present my research and meet new fisheries professionals, as well as connect with other students and develop new ideas for my research. It was motivating to be able to learn about the breadth of fisheries research being conducted and integrated across the country, both within genetics and other fields.



Sydney Almgren

### Rebecca Smith, University of Tennessee



Rebecca Smith

I am a fifth-year PhD candidate in the Ecology and Evolutionary Biology program at the University of Tennessee, studying population genetics under the guidance of Dr. Ben Fitzpatrick. My research primarily focuses on the genetic impacts of mixed-source stocking in Brook Trout reintroductions in Great Smoky Mountains National Park. Specifically, I am investigating how mixing multiple source populations influences the genetic diversity and adaptive potential of restored populations. Using genomic data, I analyze patterns of ancestry and search for signatures of selection in these populations to better understand the dynamics of mixing different Brook Trout populations. This research not only enhances our understanding of the evolutionary dynamics of fragmented populations but also offers valuable insights for improving species restoration efforts.

I am incredibly grateful for the James E. Wright Award, which made it possible for me to attend my very first American Fisheries Society conference in Hawaii. Presenting my research at such a large meeting was an amazing experience—it allowed me to share my findings with a diverse group of fisheries scientists and managers, receive valuable feedback, and exchange ideas. Traveling to Hawaii was an unforgettable opportunity to connect with the broader fisheries community, and I am truly thankful for the support that made it all possible.

## 2024 Genetic Section Hall of Excellence Inductees

### Dr. Ruth Phillips

Dr. Ruth Phillips had a very long career as a geneticist, receiving Master's (1964) and PhD (1967) degrees in a time when it was uncommon for women to do so. Ruth was highly collaborative and deeply engaged in the salmonid research community. She was especially known for providing skills and tools that were essential for the earliest days of physical chromosomal mapping aiding in the characterization of salmonid genome evolution, particularly as the age of salmonid genomics took off. She was widely recognized as an expert in fluorescence *in situ* hybridization (FISH), and indeed, towards the end of her career, she was one of the only remaining researchers in fisheries genetics who practiced this technique. Her work laid an important foundation for what we now know about genome organization in salmonid genomes, which is important not only in evolutionary biology, but also in our broader understanding of the consequences of genome duplication. Her work has important ramifications for conservation and management as we learn more about the genomics of adaptation in a number of salmonid species. She mentored, directly and indirectly, countless students and postdocs throughout her long career. She was an inspiration to future generations of fisheries scientists, both men and women alike.



Dr. Ruth Phillips

### Dr. Mary Peacock

Dr. Peacock retired in 2023, after an almost 30-year career at the University of Nevada, Reno. Her academic appointments demonstrate that the path to a successful career is not always straight forward, but through persistence, resilience, commitment, and professionalism. She joined UNR in 1994 as a Postdoctoral Fellow, and established herself from a non-tenure track Assistant Research Professor to a tenured Professor position, with her acumen recognized and tapped through additional responsibilities, including Assistant Director of the Biological Resources Research Center and Director of the Graduate Program in Ecology, Evolution and Conservation Biology.



Dr. Mary Peacock

Her Conservation Genetics/Genomic research focused on ESA listed threatened and endangered fish species in the western United States and how movement patterns of organisms are shaped by landscape drivers and anthropogenic disturbance. She spent 30+ years working on the conservation of Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) and worked closely with federal and state land and species management agencies as well as non-governmental organizations such as Trout Unlimited, in formulating recovery strategies and implementing genetic monitoring of restoration activity outcomes.

A salient point of Dr. Peacock's career is her dedication to facilitate and helping other succeed. Her record exemplifies the work of a quiet leader: consistent support for her students, peers, and collaborators. Her accomplishments impress with the breath of her engagement in academic, agency, and cross-disciplinary teams, and not standing out as an individual claiming the lime-light. Such leaders are essential because they form the foundation of the cohesive network within which scientists collaboratively engage to make new discoveries, advance methodologies, and generate insights that educate future generations and guide policy and management.

Similarly, Dr. Peacock's service to AFS reflects a commitment to promote the success of others. As Treasurer/Secretary, she has assumed responsibility for the Genetic Section's business operations, liaising closely with members, AFS staff, the IRS financial staff. She serves as a key link between the Section and the bi-annual meeting of the Coastwide Salmonid consortium. She also provides an effective networking framework for the Graduate Students and Postdocs of our Section, thus ultimately enhancing their professional careers by organizing a dedicated Symposium at the annual AFS conference that not only heightens their visibility but also highlights their research.

## 2024 Early Career Award Winner - Dr. Steven Mussmann

*The Genetics Section Early Career Award is given annually and recognizes the contribution of early-career researchers to the field of fisheries genetics. The goal of this award is to promote innovative and particularly applicable genetics research, increase interest in fisheries genetics careers, and enhance professional connections among fisheries geneticists. The awardee's genetics work is shown to be applicable to the Society's mission to "improve the conservation and sustainability of fishery resources and aquatic ecosystems by advancing fisheries and aquatic science". For 2024, our winner was Dr. Steven Mussmann.*

I am a geneticist with the U.S. Fish and Wildlife Service (USFWS) at Abernathy Fish Technology Center in Longview, WA. My career with USFWS has so far taken me from the Desert Southwest to the Pacific Northwest, with each region experiencing uniquely challenging conservation issues. I apply genetic and genomic techniques to address conservation and management questions for threatened and endangered species for a variety of state, federal, and tribal partners. Most of my work has focused on non-game fishes of the western United States, with occasional work on other vertebrate taxa, mussels, and plants.

My research interests broadly include phylogenetics, population genetics, and hybridization and introgression. I primarily apply principles from these fields to address conservation questions related to management of hatchery and wild fish populations. I also enjoy learning about new and emerging technologies to identify ways in which they can be applied to address conservation questions. This work also spurred development of various resources, including bioinformatic pipelines, molecular markers, and genomic resources.

I am honored to receive the 2024 Early Career Award. Past recipients of the award have made substantial contributions to our knowledge of conservation, biodiversity, and fisheries management, and I am honored to be included among this group. The genetics section offers a great forum to interact with and learn from researchers studying a diverse set of systems and projects while simultaneously working towards similar conservation goals. I look forward to continued involvement with the American Fisheries Society Genetics Section in the years to come.

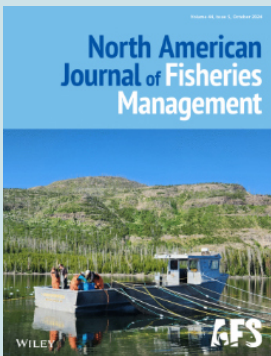


Dr. Steven Mussmann

# In case you missed it...

## Recent genetics papers from AFS journals and beyond

Click link to read each paper



Breault et al. Evidence for extirpation of native kokanee in a large impounded watershed following introduction of a conspecific. *North American Journal of Fisheries Management*. <https://doi.org/10.1002/nafm.11038>

Stack et al. A genetic assessment of natural barriers for isolating a proposed Greenback Cutthroat Trout reintroduction area. *North American Journal of Fisheries Management*. <https://doi.org/10.1002/nafm.11033>

Blasko et al. Rapid identification of invasive Brook Trout through CRISPR-based environmental DNA detection. *Transactions of the American Fisheries Society*. <https://doi.org/10.1002/tafs.10494>

Kuhl et al. Multi-genome comparisons reveal gain-and-loss evolution of *anti-Mullerian hormone receptor type 2* as a candidate master sex-determining gene in Percidae. *BMC Biology*. <https://rdcu.be/d2yGJ>

Rajab et al. Combinatorial metabolomic and transcriptomic analysis of muscle growth in hybrid striped bass (female white bass *Morone chrysops* x male striped bass *M. saxatilis*). *BMC Genomics*. <https://doi.org/10.1186/s12864-024-10325-y>

Backenstose et al. Origin of the Laurentian Great Lakes fish fauna through upward adaptive radiation cascade prior to the Last Glacial Maximum. *Communications Biology*. <https://doi.org/10.1038/s42003-024-06503-z>

Le Gall et al. Development of a microhaplotype panel for steelhead/rainbow trout (*Oncorhynchus mykiss*) and application for phylogenetic analysis in California. *Conservation Genetics Resources*. <https://doi.org/10.1007/s12686-024-01374-2>

Rehill et al. Detection differences between eDNA and mid-water trawls are driven by fish biomass and habitat preferences. *Environmental DNA*. <https://doi.org/10.1002/edn3.586>

Eaton et al. The chromosome-scale reference genome for the pinfish (*Lagodon rhomboides*) provides insights into their evolutionary and demographic history. *G3 Genes|Genomes|Genetics*. <https://doi.org/10.1093/g3journal/jkae096>

Sadeghi et al. Genetic architecture and correlations between the gut microbiome and gut gene transcription in Chinook salmon (*Oncorhynchus tshawytscha*). *Heredity*. <https://doi.org/10.1038/s41437-024-00692-3>

Wiggins et al. Leveraging environmental DNA (eDNA) to optimize targeted removal of invasive fishes. *Journal of Freshwater Ecology*. <https://doi.org/10.1080/02705060.2024.2378841>

Kühn et al. Machine Learning Applications for Fisheries—At Scales from Genomics to Ecosystems. *Reviews in Fisheries Science & Aquaculture*. <https://doi.org/10.1080/23308249.2024.2423189>

Bauhus et al. Tapeworm infection affects sleep-like behavior in three-spined sticklebacks. *Scientific Reports*. <https://rdcu.be/d2yGH>

Zhu et al. Whole genome resequencing reveals the correlation between selection signatures and adaptability of *Micropterus salmoides* to artificial fed [sic]. *Scientific Reports*. <https://doi.org/10.1038/s41598-024-80904-2>

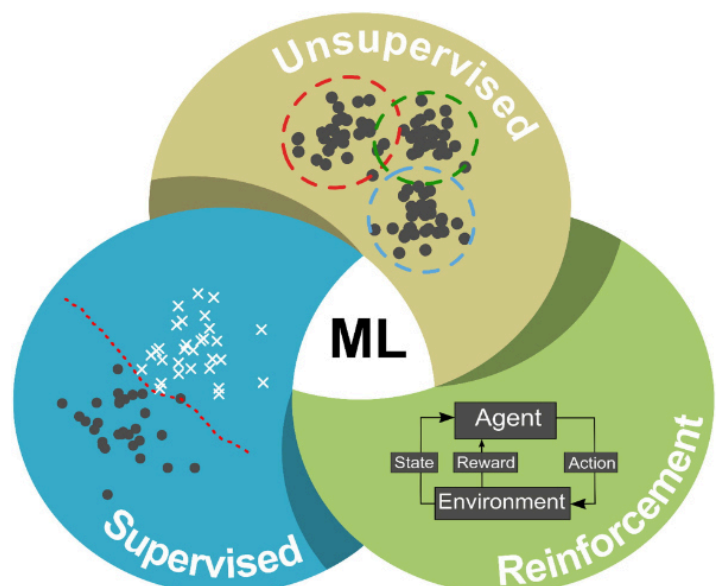


Figure 1. schematic by Kühn et al. showing the three divisions of Machine Learning (ML).

# Calendar

*Click listings for more info*

## January 2025

12–17: 17<sup>th</sup> Deep Sea Biology Symposium. Hong Kong SAR, China.

19–22: 85<sup>th</sup> Midwest Fisheries and Wildlife Conference. St. Louis, Missouri.

## February 2025

19–22: Society of Canadian Aquatic Sciences. Hamilton, Ontario, Canada.

## March 2025

6–10: Aquaculture 2025 Triennial Conference. New Orleans, Louisiana.

9–14: North American Wildlife and Natural Resources Conference. Louisville, Kentucky.

26–31: ASLO 2025 Aquatic Sciences Meeting. Charlotte, North Carolina.

## April 2025

21–24: 80<sup>th</sup> Annual Northeast Fisheries and Wildlife Conference. Bretton Woods, New Hampshire.

## May 2025

12–15: 2025 Coastwide Salmonid Genetics Conference. Anchorage, Alaska.

## June 2025

2–6: IAGLR 68<sup>th</sup> Annual Conference on Great Lakes Research. Milwaukee, Wisconsin.

2–6: Western Association of Fish and Wildlife Agencies Summer Meeting. Provo, Utah.

8–13: International Conference on Fish Telemetry. Traverse City, Michigan.

9–13: One Ocean Science Conference. Nice, France.

To find dates and information for AFS chapter meetings, visit [fisheries.org/about/units/chapters/](https://fisheries.org/about/units/chapters/)

# Job Postings

*Click titles for more info*

## [Biological Science Technician - U.S. National Parks Service](#)

Pacific West Region is recruiting summer seasonals at Yosemite National Park, California for Biological Science Technician - Aquatic Wildlife. Crews may be assigned to work on aquatic restoration projects (including removing nonnative fish and bullfrogs from alpine and sub-alpine lakes), amphibian and reptile projects (including surveys for Sierra Nevada yellow-legged frogs or other imperiled amphibians), and Northwestern Pond turtle projects (including surveys, radio telemetry, and trapping of turtles). Projects may take place in the front country remote field settings (day field work, accessed by hiking and/or riding) or in remote wilderness settings (accessed via multi-night backpacking) and will involve night and weekend work. Duties may also include collecting aquatic eDNA samples. Open to the first 250 applicants or December 23<sup>rd</sup>, 2024.

## [Stock Assessment Scientist - Atlantic States Marine Fisheries Commission](#)

The Stock Assessment Scientist will participate as a member of the Commission's stock assessment subcommittees and support technical committees, working closely with state and federal agency scientists, in the compilation and analysis of data, the development and application of stock assessment models, and the dissemination of stock assessment results and other technical information to fishery managers and stakeholders. The successful applicant will also assist in guiding species assessment priorities, developing stock assessment trainings, and contributing to an ecosystem-based approach to assessment and management. Preference will be given to applicants with stock assessment and statistical programming experience. Open until January 7<sup>th</sup>, 2025.

## [Freshwater Fisheries Biologist - Florida Fish & Wildlife Conservation Commission](#)

This position is part of a regional team with FWC's Division of Freshwater Fisheries Management and serves as the Fisheries Biologist III in the Ocala Regional Office. Duties and responsibilities include designing, supervising, and implementing biological studies on aquatic resources; compiling, analyzing, and interpreting biological data and compiling technical reports; and coordinating and implementing management activities, e.g. fisheries habitat manipulations, fish stocking, angler surveys, formulation and implementation of regulations, fish population sampling, and water quality monitoring. Open until January 5<sup>th</sup>, 2025.

## [Hutton Junior Fisheries Biology Program](#)

The Hutton Junior Fisheries Biology Program is an eight-week paid summer internship and mentoring program for high school students sponsored by the American Fisheries Society. Our vision is to stimulate interest in fisheries and aquatic science among underrepresented groups in the profession today. Participating students receive a \$3,000 stipend and an all-expense paid trip to the Hutton Scholars Summit. Through our network of mentors, we can place students in all 50 states, Canada, Mexico, and Puerto Rico within a 45-minute commute of the student's home. Student application are due by January 19<sup>th</sup>, 2025 and mentor applications are due March 1<sup>st</sup>, 2025.





Yukon River. Keith Williams.

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