



THE Open Reading Frame

Newsletter of the
Genetics Section of the American Fisheries Society

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President's Message

Society and getting to meet new people. With a lot of help from the rest of the executive committee, Kristen Gruenthal, Andrew Whiteley, and Jeff Olsen, the Section has upgraded the web site, supported student travel to several conferences, and worked with the Coastwide Salmonid Genetics conference organizers to become a co-host of that meeting. These improvements are helping us attract new members and facilitate communication among all. I would also like to thank all the volunteers who keep the web site running, produce the newsletter, and help with our awards. It is your service that keeps this Section moving along.

Thank-you to everyone who voted in the elections and congratulations to the new executive committee members; Marlis Douglas is the new president-elect and Wes Larson is the new secretary-treasurer. Andrew Whiteley will start his term as the Section president.

Welcome to the summer 2018 edition of the Genetics Section newsletter. This will be my last President's message as my term will end with the final bang of the gavel at the business meeting next week. Two years has gone by quickly and I have enjoyed the experience; learning more about the operation of the



Dr. Wendylee Stott
AFSGS President

President's Message continued on page 4

Genetics Section Elects New ExComm Members



Dr. Marlis Douglas
AFSGS President-Elect

First, I wish to thank my fellow members for the opportunity to serve the Genetics Section in a leadership role. I am an endowed professor at the University of Arkansas. I received my education in Europe (University of Zurich/Switzerland), then moved postdoc and faculty positions to the US. I was drawn anecdotally to genetics when I realized it provided the best tools with which to address my dissertation research on species flocks of whitefish (*Coregonus*) in the Swiss Alps. My research has broadened considerably, and expanded via international collaborations. My study systems include freshwater and marine habitats and extend from mangrove flats to Himalayan rivers. Focal species span from commercial (whitefish), to sportfish (bonefish, cutthroat trout), and non-game species (sucker and minnow). Many projects deal with rare, threatened or endangered species, others focus on invasives, with climate change impacts a common thread. I hope my background will not only promote interactions within our diverse section, but also the AFS in general, particularly with regard to the professional development of our students and early-career members. The ongoing genomics/big-data revolution has expanded our field tremendously, and while

stimulating, it also obligates us to decipher these complicated techniques for colleagues and the lay public. We must not only strive to make these new approaches accessible to our colleagues but also as a means of promoting policy and legislation as we move into an uncertain future. I look forward to work with our members to broaden and extend our section within AFS and conservation outreach.

My name is Wes Larson and I'm the assistant Unit Leader of the USGS Wisconsin Cooperative Fishery Research Unit at the University of Wisconsin-Stevens Point. My primary research interest is the application of molecular techniques to inform conservation of natural resources. I am interested in traditional conservation genetics questions, such as designing hatchery programs to preserve diversity, as well as more genomics-oriented questions that focus around understanding and preserving adaptive diversity. I believe that interdisciplinary research is vitally important and work closely with resource managers to design and conduct research that combines genetics and ecology to address applied management questions. I grew up near the ocean in San Diego, California, earned my B.S. in Marine Biology from the University of California, Santa Cruz, and earned my Ph.D. at the University of Washington studying the genetics of Alaskan salmon with Drs. Jim and Lisa Seeb. My hobbies include boating, fishing, hiking, kayaking, and snowboarding. I am excited about my new role as Secretary-Treasurer of the Genetics Section. The Secretary-Treasurer assists with a number of functions in the section including accounting, meeting planning, and general organization. I believe that one of the most important functions of the section is to provide travel awards for students and young professionals. As Secretary-Treasurer I will do my best to ensure that the section is run in a financially responsible way and is able to award as many of travel grants as possible. I look forward to working with all the other section officers to ensure that the section continues to be a valuable resource for fisheries geneticists.



Dr. Wes Larson
AFSGS Secretary-Treasurer-Elect

James Wright Award Winners Announced



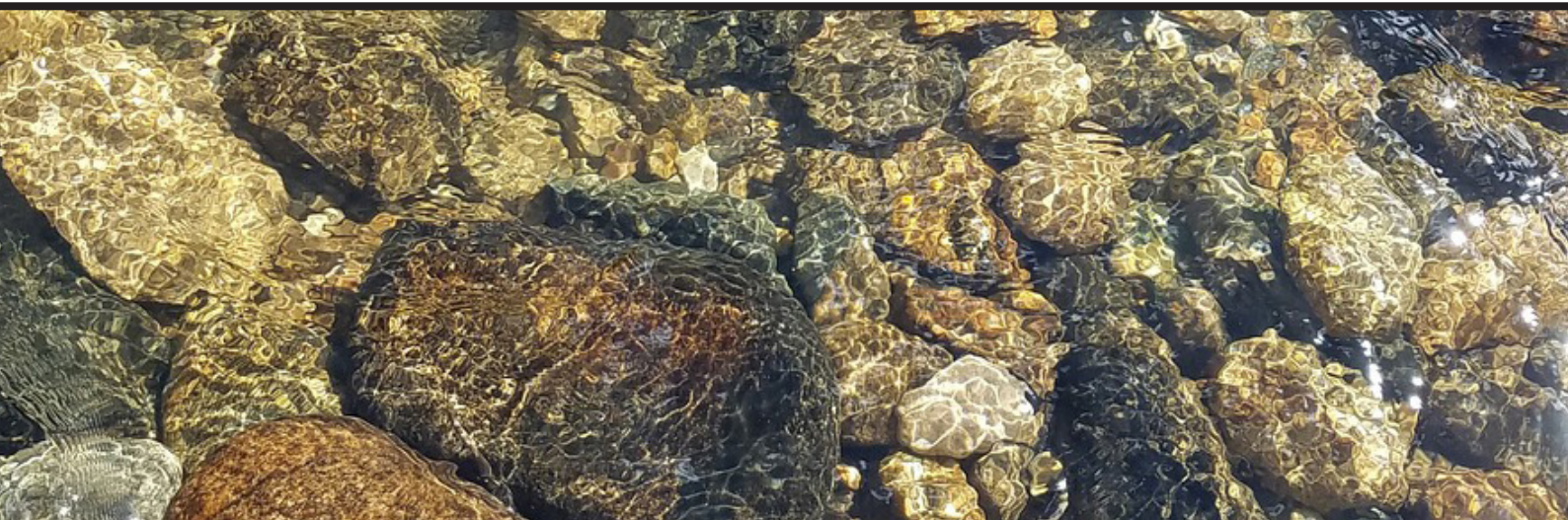
Shannon White
PhD Student
Penn State University

Shannon is a Ph.D student in the Ecology Program at Penn State University. Working with Tyler Wagner, her research explores the causes and future evolutionary benefits of individual variation in native brook trout populations. By merging the field of population genetics, behavioral ecology, and population dynamics, she seeks to develop novel conservation strategies for native fish populations. Her dissertation includes topics related to gene and microRNA expression, the development of novel assignment methods to assess wild-hatchery introgression, and the application of circuit theory to better understand brook trout metapopulation dynamics and identify movement corridors. She also conducts field and laboratory studies of trout behavior to understand how fish with different personalities (e.g., bold vs. shy) may cope with the stress of future climate change, and recently completed a yearlong field telemetry study tracking the seasonal movement behavior of 160 native brook trout. Shannon is extremely honored to be recognized with the 2018 James Wright Award, and gracious for the travel support to the annual meeting in Atlantic City, NJ. She also would like to thank members of the subsection for their collaborations and mentorship, which helped solidify her desire to continue pursuing projects in the field of fish genetics.

As a recipient of the Genetics Section James E. Wright Graduate Award, I am not only able to attend the national meeting of AFS in Atlantic City, but I am also given the opportunity to present in a special Environmental DNA symposium, as well as compete for the student best paper. My dissertation research focuses on developing new high-throughput sequencing (HTS) assays to detect and quantify the relative contributions of environmental (e)DNA from many macroinvertebrate taxa, including several invasive species, such as dreissenid mussels. This newly developed technology can evaluate community composition across sampling locations to provide invaluable information about habitat quality, while simultaneously identifying new and existing invasive species. Tremendous numbers of individuals can be rapidly and simultaneously assessed with eDNA, which provides a novel way to measure the representation of species and their respective population-level haplotypic diversity across spatial scales. This fast and inexpensive method to accurately identify and quantify planktonic and eDNA water samples demonstrates a useful approach for the analysis of the temporal and spatial trajectories of invasive species. I want to thank the Genetics Section for awarding me the James E. Wright Graduate Award, which has provided me an opportunity to network with some of the brightest minds in the field, ultimately shaping my future goals and progress as a scientist.



Nathaniel Marshall
PhD Student
University of Toledo



President's Message cont'd

The Section is getting ready for the [AFS annual meeting](#) in Atlantic City, NJ from August 20-24. The theme for this year's meeting is "Communicating the Science of Fisheries Conservation to Diverse Audiences". As always, Section members are contributing to many symposia and there will be plenty to see and do. Symposia sponsored by the Section or related to genetics include: "[Integration of Genetic Techniques with Quantitative Stock Assessment and Ecological Models for Resolving Fishery Management Issues](#)", "[Application and Innovation in the use of Environmental DNA \(eDNA\) for use with Aquatic Species](#)", "[Novel and Emerging Technologies in Species Identification and Conservation](#)", and "[Advances in Conservation Genetics and Genomics](#)". The Section's business meeting is scheduled for Monday, August 20th, at 5:30 in Atlantic City Convention Center, Room 414 (see the map below). The meeting will be followed by a group dinner at [Angelo's](#). As always, the Section will be presenting awards at the meeting. This year's Wright Award winners are: Nathaniel Marshall and Shannon White. The Phelps Award for best paper went to: A. F. Muttray, D. Sakhrani, J. L. Smith, I. Nakayama, W. S. Davidson, L. Park, R. H. Devlin for their paper "Deletion and Copy Number Variation of Y-Chromosomal Regions in Coho Salmon, Chum Salmon, and Pink Salmon Populations". Wes Larson won the Early Career Award went and Dr. Tim King was elected to the Hall of Excellence. Please come out to show your support for the award winners. The organizers are working hard to put together a great meeting and I hope to see you there!



Don't miss symposia sponsored by the Genetics Section!

Each session to be held in room 315 of the Atlantic City Convention Center

Advances in Conservation Genetics and Genomics

Organized by Meredith Bartron, Andrew Whiteley and Wendylee Stott

Thursday, August 23
8:00am - 5:40pm

Novel and Emerging Technologies in Species Identification and Conservation

Organized by Yvette Halley and Eric Merriam

Wednesday, August 22
9:40am - 3:00pm

Integration of Genetic Techniques with Quantitative Stock Assessment and Ecological Models for Resolving Fishery Management Issues

Organized by Travis Brenden and Kim Scribner

Monday, August 20
10:00am - 5:40pm



In case you missed it...

Recent genetics papers from AFS journals and beyond



Survival and reproductive success of hatchery YY male brook trout stocked in Idaho streams. P.A. Kennedy, K.A. Meyer, D.J. Schill et al. TAFS 147:419-430.

Combining genetic, isotopic, and field data to better describe the influence of dams and diversions on burbot movement in the Wind River drainage, Wyoming. Z. Hooley-Underwood, E.G. Mandeville, P. Gerrity, et al. TAFS 147:606-620.

River-specific gene expression patterns associated with habitat selection for key hormones-coding genes in American glass eels (*Anguilla rostrata*). M. Gaillard, S.A. Pavey, L. Bernatchez, C. Audet. TAFS, in press.

Genetic divergence of nearby walleye spawning groups in central Lake Erie: Implications for management. C.A. Stepien, M.R. Snyder, C.T. Knight. NAMJFM, in press.



These aren't the loci you're looking for: Principles of effective SNP filtering for molecular ecologists. S.J. O'Leary, J.B. Puritz, S.C. Willis, et al. Molecular Ecology, in press.

Comparing methods for detecting multilocus adaptation with multivariate genotype-environment associations. B.R. Forester, J.R. Lasky, H.H. Wagner, D.L. Urban. Molecular Ecology 27:2215-2233.

On the roles of landscape heterogeneity and environmental variation in determining population genomic structure in a dendritic system. C.J. Brauer, P.J. Unmack, S. Smith, et al. Molecular Ecology, in press.



Photo E. Peter Steenstra/USFWS

Genotyping-by-sequencing of genome-wide microsatellite loci reveals fine-scale harvest composition in a coastal Atlantic salmon fishery. I.R. Bradbury, B.F. Wringe, B. Watson, et al. Evolutionary Applications 11:918-930.

Synthesizing the role of epigenetics in the response and adaptation of species to climate change in freshwater ecosystems. G. Jeremias, J. Barbosa, S.M. Marques, et al. Molecular Ecology, 27:2790-2806.

Genomewide association analyses of fitness traits in captive-reared Chinook salmon: Applications in evaluating conservation strategies. C.D. Waters, J.J. Hard, M.S.O. Brieuc, et al. Evolutionary Applications, 11:853-868.

Evaluating methods to visualize patterns of genetic differentiation on a landscape. G.L. House and M.W. Hahn. Molecular Ecology Resources, 18:448-460.

Upcoming or recent paper you'd like to share with colleagues?

Send a synopsis or citation to jaredhomola20@gmail.com for inclusion in the next issue of The Open Reading Frame

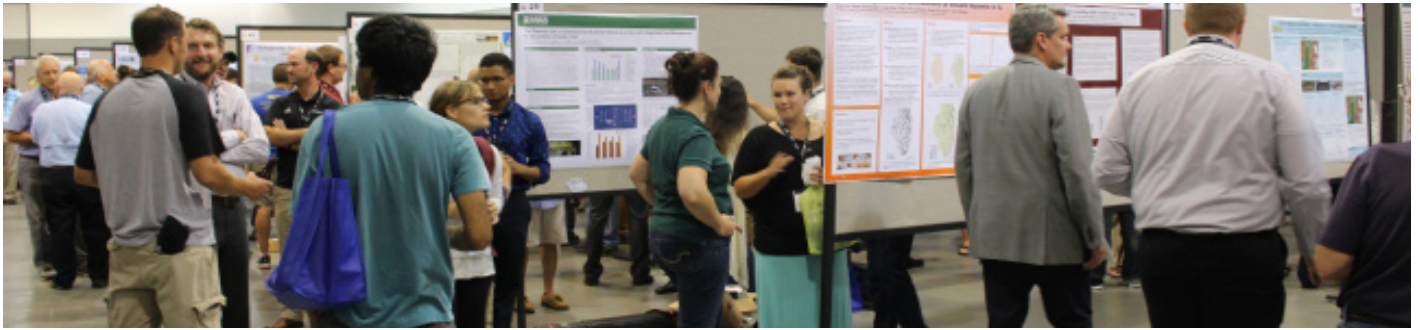


Photo by Beth Beard, AFS

Calendar

September 2018

2nd - 7th: *Meeting:* 8th International Symposium on Aquatic Animal Health
Charlottetown, Prince Edward Island, Canada

24th - 27th: *Meeting:* ICES 2018 Science Conference
Hamburg, Germany

October 2018

1st: *Grant deadline:* Sigma Xi Grants-in-Aid of Research

16th - 18th: *Meeting:* Institute of Fisheries Management
49th Annual Conference
Hull, UK

21st - 24th: *Meeting:* Southeast Association of Fish and Wildlife Agencies 72nd Annual Conference
Mobile, Alabama

November 2018

5th - 9th: *Meeting:* Gulf and Caribbean Fisheries Institute
71st Annual Conference
San Andres, Colombia

14th - 18th: *Meeting:* Desert Fishes Council 50th
Annual Meeting
Furnace Creek, California

December 2018

4th-5th: *Meeting:* 16th Flatfish Biology Conference
Westbrook, Connecticut

10th - 14th: *Meeting:* Fish Passage 2018 International
Conference on River Connectivity
Albury, Australia

January 2019

27th - 30th: *Meeting:* 79th Midwest Fish and Wildlife
Conference
Cleveland, Ohio

February 2019

24th - March 1st: *Meeting:* Association for the Sciences
of Limnology and Oceanography 2019 Aquatic
Sciences Meeting
San Juan, Puerto Rico

June 2019

10th - 14th: *Meeting:* 62nd International Association of
Great Lakes Research Annual Conference
Brockport, New York

21st - 25th: *Meeting:* Evolution Meeting
Providence, Rhode Island

July 2019

21st - 25th: *Meeting:* Annual Meeting of the Society for
Molecular Biology and Evolution
Manchester Central, England

August 2019

11th - 16th: *Meeting:* 104th Annual Meeting of the
Ecological Society
Louisville, Kentucky

September 2019

29th - October 3rd: *Meeting:* American Fisheries Society
and The Wildlife Society 2019 Joint Annual Conference
Reno, Nevada

To find dates and information for AFS chapter meetings, visit fisheries.org/about/units/chapters/

2018 Genetics Section Business Meeting

Monday, August 20, 5:30pm
Room 414

Atlantic City Convention Center

2018 Genetics Section Social

Immediately following
business meeting

Angelo's Fairmont Tavern
2300 Fairmont Ave, Atlantic City

Jobs

Professional positions

Fisheries Geneticist Closing Date: August 31, 2018 <http://www.critfc.org/blog/jobs/fisheries-geneticist-4/> The Columbia River Inter-Tribal Fish Commission (CRITFC) is seeking a Fisheries Geneticist with experience in population genomics, association mapping, and mixed stock analyses. Positions are part of the Fishery Science Department, but will be located with the genetics group at the Hagerman Fish Culture Experiment Station in Hagerman, ID. This research group is involved in testing conservation, evolution, and ecological theories related to salmonids and other fishes. The employee will work under the Lead Geneticist, in association with CRITFC geneticists and technicians, as well as staff of the Fishery Science Department in Portland, OR. Efforts will focus on applying empirical genetics/genomics data to address questions related to conservation and recovery of steelhead, chinook, sockeye, and coho salmon, white sturgeon, Pacific lamprey, and other fishes of the Columbia Basin. Position Details: <http://www.critfc.org/blog/jobs/fisheries-geneticist-4/> - Starting Salary: \$57,098 - \$88,974 (CRITFC equivalent to GS11/12) - Department: Fishery Science, Genetics - Classification: Full-time, Regular, Exempt - Location: Hagerman, Idaho.

The Sheehan lab in the department of Neurobiology and Behavior at Cornell is looking to hire a lab technician/manager position for integrative work combining ecology, evolution, genomics and neurobiology to understand the social behavior. Work will include overseeing and maintaining the lab and facilitating a diversity of on going projects using cutting edge functional and population genomics, behavioral analyses and neurobiological imaging. The lab's work focuses on understanding the evolution of social behavior and communication in animals and is supported by grants from NIH and NSF. We maintain close connections with other labs in Neurobiology and Behavior as well as nearby departments on Cornell's campus including Ecology and Evolution and Molecular Biology and Genetics. Ithaca is consistently rated a top place to live and work! Anticipated start date would be some time before the end of the year or in the beginning of next year. Please get in touch (msheehan@cornell.edu) if you have any questions. Job posting is available here: https://www.glassdoor.com/job-listing/technician-iii-department-of-neurobiology-and-behavior-cornell-university-JV_IC1132041_KO0,54_KE55,73.htm?jl=2855211537&utm_campaign=google_jobs_apply&utm_source=google_jobs_apply&utm_medium=organic

Two full-time lectureships are available in Ecology and Conservation biology to support the delivery of teaching across our range of existing undergraduate modules within our BSc Biology, BSc Ecology and Conservation and BSc

Zoology programmes. For candidate one, we are looking for a candidate with research interests and teaching experience in ecology, with a preference for broad scale and ecosystem level approaches. We would particularly welcome applicants working at the agri-environment interface, community ecology or biogeography in its broadest sense. For candidate 2, we are seeing a candidate with a strong academic profile related to ecology, biodiversity conservation or environmental sustainability which complements our existing expertise. Candidates with experience in teaching and/or using a range of field skills, GIS and remote sensing or conservation management would be particularly welcome. We particularly encourage applications from candidates who will complement our existing strengths within the Evolution and Ecology research group (www.lincoln.ac.uk/home/lifesciences/research/evolutionandecology). If you would like to know more about this opportunity please email Professor Stuart Humphries, Professor of Evolutionary Biophysics and Head of the Ecology and Evolution Research Group at shumphries@lincoln.ac.uk or Dr Carl Soulsbury, Programme Leader for BSc Ecology and Conservation at csoulsbury@lincoln.ac.uk for more information or to arrange an informal conversation about the position. <<http://www.lincoln.ac.uk/opendays>> The University of Lincoln, located in the heart of the city of Lincoln, has established an international reputation based on high student satisfaction, excellent graduate employment and world-class research. The information in this e-mail and any attachments may be confidential. If you have received this email in error please notify the sender immediately and remove it from your system. Do not disclose the contents to another person or take copies. Email is not secure and may contain viruses. The University of Lincoln makes every effort to ensure email is sent without viruses, but cannot guarantee this and recommends recipients take appropriate precautions. The University may monitor email traffic data and content in accordance with its policies and English law. Further information can be found at: <http://www.lincoln.ac.uk/legal>.

Please send information on
symposia, jobs, articles, and
calendar events to
jaredhomola20@gmail.com
to see it in the next newsletter!

Professional positions cont'd

Assistant Professor of Evolutionary Biology University of South Carolina Department of Biological Sciences The Department of Biological Sciences invites applications for a tenure-track, assistant professor position in Evolutionary Biology to begin August 16, 2019. We seek to hire an evolutionary biologist studying mechanisms governing evolutionary dynamics in natural or experimental systems. Individuals using empirical and theoretical approaches are encouraged to apply. Faculty positions require a commitment to research, teaching, and service. Duties include developing a creative and vibrant research program in evolutionary biology, teaching that advances our graduate program in ecology and evolution, undergraduate teaching and advising, and mentoring graduate students. Minimum qualifications include a PhD in evolutionary biology or related discipline and evidence of established scholarship including a strong record of publishing in peer-reviewed journals. Post-doctoral experience is preferred. The Department of Biological Sciences (www.biol.sc.edu) is a multidisciplinary unit of approximately 1,600 undergraduate students, 50 graduate students, and 35 tenure-faculty members representing a broad range of research areas, including Ecology and Evolution, Marine Biology, Molecular and Cellular Biology, Plant Science, and Neuroscience. The department has excellent core technical support facilities and strong links with the Belle W. Baruch Institute for Marine and Coastal Sciences (www.baruch.sc.edu) and the School of the Earth, Ocean, and Environment (seoe.sc.edu) in the College of Arts and Sciences. The University of South Carolina System is comprised of the state's flagship university in Columbia (founded in 1801 and currently one of the top 50 "Best Colleges" according to U.S. News and World Report), three regional comprehensive universities (USC Aiken, USC Beaufort and USC Upstate), and Palmetto College consisting of four two-year campuses (USC Lancaster, USC Salkehatchie, USC Sumter, USC Union and Fort Jackson/Extended University). Together, the USC System institutions offer more than 450 degree programs on campus and online and are uniquely positioned to meet the state's educational, cultural, health and research needs. Our diverse engaged faculty and staff enjoy a dynamic and intellectually stimulating work environment. All applicants must fill out an online application at the USC employment website at: <http://uscjobs.sc.edu/postings/37360>. Candidates should be prepared to upload a full CV, statement of research interests, statement of teaching interests, and the names and contact information, including telephone number, of three references. Please have your reference providers send your recommendation letters to hilbish@biol.sc.edu. Questions may be directed to Dr. Jerry Hilbish, Search Committee Chair, at hilbish@biol.sc.edu (put "Evolution Search" in the subject line). To ensure full consideration, complete applications should be received by October 1, 2018. Files will be reviewed until a candidate is selected. The University of South Carolina is an affirmative action, equal opportunity

employer. Minorities and women are encouraged to apply. The University of South Carolina does not discriminate in educational or employment opportunities on the basis of race, color, religion, national origin, sex, sexual orientation, gender, age, disability, veteran status or genetics.

Tenure Track Faculty Position Assistant Professor of Biology Eckerd College invites applications for a new, tenure-track position at the assistant professor level beginning September 2019. We seek a Molecular Ecologist/Ecological Geneticist, who uses molecular/genetic techniques on animals to explore questions in ecology, including, but not limited to phenotypic plasticity, community ecology, molecular adaptations, population biology, landscape genomics, reproductive strategies, or conservation genetics. We seek a broadly trained scientist-educator who is strongly committed to teaching and mentoring undergraduates, and training them in a program of research and publication. A Ph.D. in the biological sciences is required, preferably with postdoctoral research and teaching experience. The college is situated on a 188 acres waterfront campus on Tampa Bay, allowing direct access to an extraordinary diversity of terrestrial, marine and freshwater species. The James Center for Molecular and Life Sciences houses the Biology and Chemistry departments and features the latest in laboratory instrumentation. Eckerd College is part of a large scientific research community located in St. Petersburg, Florida. The candidate will teach seven courses per academic year (3-1-3), including Principles of Ecology, Genetics & Molecular Biology and our first-year introductory course on Ecology, Evolution, & Diversity. The successful candidate will also be expected to develop an upper-level course in their area of expertise. Participation in an interdisciplinary, values-oriented general education program is required, including a regular rotation in the two-semester first-year program. Eckerd College, the only independent national liberal arts college in Florida, has a tradition of innovative education and teaching/mentoring excellence. Submit a letter of application, vita, teaching evaluations, statement of teaching philosophy, description of research plans, graduate and undergraduate transcripts, and contact information for three references so that letters of recommendation can be requested, via <https://eckerd.hirecentric.com/jobs/>. Applications must be complete by October 12, 2018. Inquiries may be sent to Dr. Liza Conrad (conradlj@eckerd.edu). EOE. Applications from women/minorities encouraged.

AFS Genetics Section Job Board

For additional job postings, be sure to watch the job board on the Section website

genetics.fisheries.org/jobs

Postdoc positions

Oregon State Postdoc - Salmonid domestication.

Candidate will work with Michael Blouin's lab (<http://people.oregonstate.edu/~blouinm/>) to identify the behavioral, physiological, or other traits associated with domestication (adaptation to hatchery culture) in salmonid fish. The long-term goal of the work is to identify ways in which hatchery culture could be changed to reduce the intensity of domestication selection. A background in fish behavior and physiology, and with an evolutionary focus, would be most desirable. Experience designing behavior trials would be an asset. We are looking for a creative, well-read person who can bring new ideas to this question, in addition to executing current projects. This research is funded by the Bonneville Power Administration, and by the Oregon Department of Fisheries and Wildlife (ODFW) through the Oregon Hatchery Research Center (a joint venture between OSU and the ODFW: <https://olis.leg.state.or.us/liz/2015R1/Downloads/CommitteeMeetingDocument/76849>). Candidate will have access to facilities at the OHRC, and to production hatcheries run by the ODFW. The intellectual environment at OSU includes colleagues in ODFW and in the departments of Integrative Biology and of Fisheries and Wildlife at OSU. This is a full-time (1.0 FTE), 12-month, fixed-term Postdoctoral Research Scholar position, renewable yearly. The position is available starting November 1st, 2018. Mentors and Affiliations: Michael Blouin, Department of Integrative Biology, College of Science, Oregon State University Open Date: Now Close Date: Until filled. Start date: Any time after November 1st, 2018. Required qualifications and experience: PhD in relevant field. Good quantitative skills, including experimental design Excellent written and verbal communication skills are critical, as the candidate will need to work in a research team and closely with agency staff at hatcheries. Must be within 5 years of PhD to qualify for the postdoctoral research scholar position. A more experienced candidate could be hired under a different position, so don't hesitate to inquire if that is your situation. Preferred Qualifications and Experience: A background in fish behavior and physiology, and in evolution (background in quantitative genetics would be very desirable) Experience working with salmon Experience with hatcheries Demonstrated ability to publish their work Information and Application: For more information or to apply, contact Michael Blouin at blouinm@science.oregonstate.edu, and include "hatchery postdoc position" in the title of your email. To apply, please send to Mike a cover letter describing your background and interests, and why you are interested in this position. Also include a curriculum vitae that includes the names of at least three professional references, their email addresses and telephone contact numbers. I will consider inquiries until the position is filled. The position could start as early as November 1st, 2018.

Evolutionary Genomics Postdoc Cluster Hire University of California Santa Cruz We are pleased to announce our first ever postdoc cluster hire in evolutionary genomics at UC Santa Cruz! The Shapiro, Green, and Corbett-Detig

labs UC Santa Cruz are hiring SIX postdoctoral fellows. This cluster hire will bring in a cohort of fellows to collaborate on several projects in the Evolutionary Genomics. Project topics will include ancient DNA, population genomics, genome assembly, and sequencing technology development. Ideal candidates have strong team working skills, are excited about evolution, have a background in evolutionary biology, bioinformatics and/or molecular biology, and have an established record of achievement in research demonstrated in publications. Post-docs will join the UC Santa Cruz research community which has a strong presence in genomics, computational biology, and evolutionary biology. We have a strong postdoctoral fellow association with lots of career development workshops and social events. Santa Cruz is a fabulous place to live with lots of outdoor recreation and easy access to the San Francisco Bay Area. We are committed to enhancing diversity in our community and in science more generally. Applicants from backgrounds that are underrepresented in the sciences are therefore strongly encouraged to apply. More details: http://evol.mcmaster.ca/~brian/evoldir/PostDocs/UCalifornia_SantaCruz.EvolutionaryGenomics

The Paaby lab at Georgia Tech is seeking a creative and enthusiastic postdoctoral scholar in evolutionary biology. Our lab explores the evolution of populations and complex traits using genetics, molecular biology, cell biology, genomics and field work. Our strength is using creative engineering approaches to test the functional consequences of natural genetic variation. (For more information, please visit my website: <http://genaamics.org/>.) The successful candidate will be a critical thinker pursuing research in evolutionary genetics, ecological genetics, quantitative genetics or evo-devo and have a PhD in one of these, or a related, area. The research project will include both experimental benchwork and computational research or analysis, may include field work, and will be defined jointly by the postdoc and myself, Annalise Paaby. The project could originate entirely from the candidate, from an existing project in the lab (which currently includes research in *C. elegans* and related *Caenorhabditis* species), or it could be something in between. The postdoc will be free to develop an independent research program with the support and expertise of the lab. **WHY GEORGIA TECH?** The School of Biological Sciences at Georgia Tech is a medium-sized department with an outstanding group of evolutionary biologists. We include at least seven highly interactive labs with a primary focus on the genetic basis of evolutionary dynamics, and additional labs using computational approaches in evolutionary genomics or field- and lab-based approaches in ecological genetics. Located within a world-class engineering institute, we have truly unique opportunities for collaboration, especially for experimental model systems. **WHY ATLANTA?** Atlanta is a lush, green city with loads of restaurants and great quality of life. The city offers all the perks of a major metropolis but is affordable. The North Georgia mountains are only an hour's drive and the region includes some of the most beautiful outdoor landscapes on the east coast. **WHY THE PAABY LAB?** My lab is young (established fall 2015) and what I can't yet offer in reputation I aim to make up for as an engaged colleague! I am committed to working productively with all members of

Graduate student positions

The Laboratory of Biodiversity and Evolutionary Genomics (KU Leuven) is inviting excellent candidates to apply for a PhD grant from the Research Foundation Flanders. We are looking for a strongly motivated student to work on population genomics and metabarcoding of Antarctic fish. In this context we aim to develop a competitive grant application that the candidate will submit in Sept. and defend in Nov.-Dec. 2018. The candidate will be enrolled as pre-doctoral student for three months. The subsequent PhD position is dependent on the success of this application. Topic Population genomics of Antarctic fish

The successful candidate must have - Master's in biology or equivalent from a European university with excellent study results - Interest in fish biology and polar ecosystems - Strong experience with and knowledge in molecular ecology - Background in population genomics, metabarcoding and/or dispersal and ecological niche modelling techniques - Preparation of a Research Foundation - Flanders grant for strategic basic research (SB) by 15th September 2018. If the application is successful, the applicant will start a PhD at the KU Leuven Arenberg Doctoral School on 1st January 2019 with a 100% salary for 4 years. - Willingness to prepare and participate in long sampling campaigns Applications must include a cover letter explaining the qualifications and motivations for the position, a transcript of the Ba and Ma courses, a curriculum vitae and the names of two referees. The position is available immediately and remains open until filled (latest 15th of August). Please send an email with your application to Filip.volckaert@kuleuven.be and LBEGKUL@gmail.com with the Subject "PhD Position Antarctica".

The marine ecosystem of the Southern Ocean provides an exceptional natural laboratory to study evolution and biodiversity. Increasing rates of environmental change, pollution, and other anthropogenic stressors challenge organisms to adapt or migrate to avoid extinction. The project "Refugia and ecosystem tolerance in the Southern Ocean (RECTO)" aims to characterize the adaptive capacities of Antarctic key taxa, necessary for these organisms to cope with climate change. In the past few years the Laboratory of Biodiversity and Evolutionary Genomics has assembled an extensive collection of Antarctic fish suitable for genomic and metagenomic analyses. It provides also a strong base for biophysical modelling. This expertise contributes to questions on the diversity and distribution of life in the Southern Ocean and its adaptive potential. You will develop a highly competitive integrated and multidisciplinary PhD proposal with a strong potential for application (e.g. conservation and fisheries management). The final focus will depend on the strengths and interests of the candidate. Franz Maximilian Heindler, PhD Candidate University of Leuven Laboratory of Biodiversity and Evolutionary Genomics Charles Deberiotstraat 32, box 2439 B-3000 Leuven, Belgium Mobile: +49 160 288 10 49 Franz Maximilian Heindler franzmaximilian.heindler@kuleuven.be

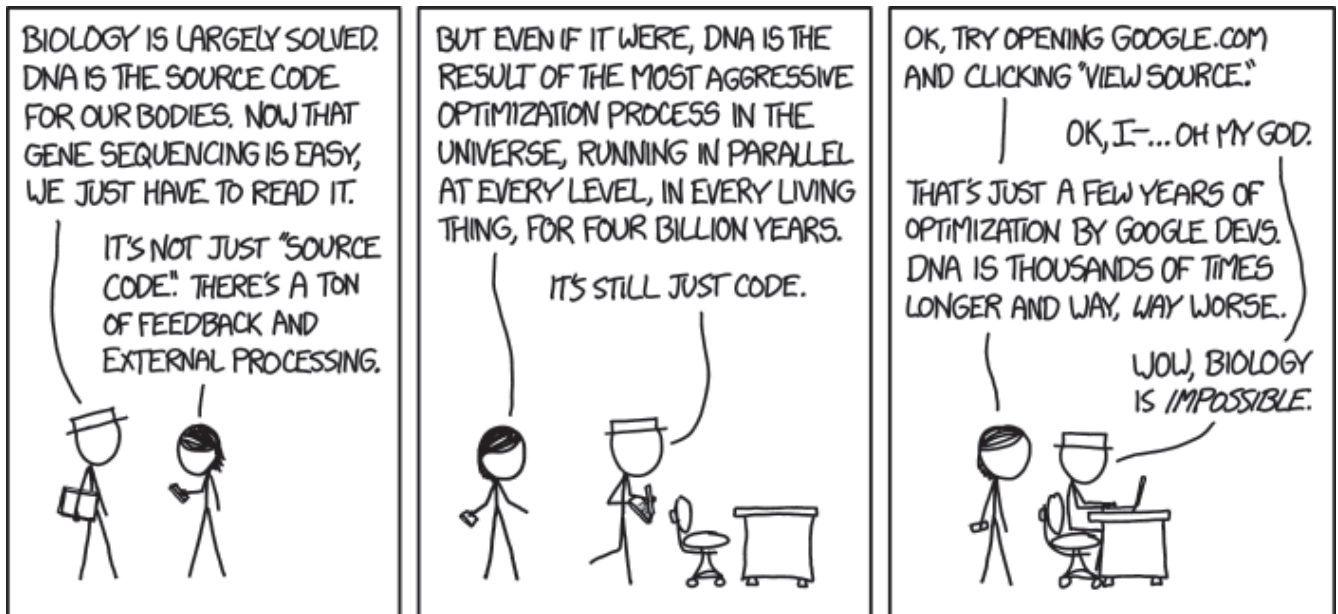
Applications open for graduate studies in ecology and evolution and QuEST Doctoral Training program, Department of Biology, University of Vermont -The Department of Biology, University of Vermont, seeks qualified PhD and MS applicants for the Fall of 2019 to join our interdisciplinary research program in ecology and evolution. We are a medium-sized, integrative biology department (most labs typically have 3 to 5 graduate students) with a passion for our research and our teaching. We will work with you to design a successful research program that will prepare you for your career in academic, medical or private sector research; government work; or teaching at the baccalaureate level. Our department has recently been awarded a major NSF-funded National Research Training grant in Quantitative and Evolutionary STEM training (QuEST). The QuEST grant provides doctoral students with foundational training in quantitative data analysis and modeling, fellowship support, and internship placements to apply evolutionary principles toward solving real-world problems. Potential faculty mentors in the Department of Biology include: Ingi Agnarsson (systematics), Alison K. Brody (plant-animal interactions), Charles J. Goodnight (evolutionary theory), Nicholas J. Gotelli (community ecology), Sara Helms Cahan (sociobiology), Brent L. Lockwood (physiological ecology), Melissa Pespeni (ecological genomics), Lori Stevens (population genetics). The department and campus have excellent facilities for research, and there are opportunities for collaboration with faculty and graduate students in other units on campus, including Complex Systems, Plant Biology, The Rubenstein School of Environment and Natural Resources, and The Gund Institute for the Environment. Our faculty conduct their field research at sites around the globe, but there are also exciting projects ongoing in Lake Champlain and the nearby Green Mountains and Adirondacks. Founded in 1791, UVM is consistently ranked as one of the top public universities in the United States. The University is located in Burlington, Vermont, a vibrant and environmentally-minded small city rich in cultural and recreational activities for graduate students and their families. We only admit students for whom we have secured financial support through graduate teaching fellowships, QuEST fellowships, or external grants. Before you apply, you should directly contact individual faculty members to explore mutual research interests and projects. This link will give you an overview of graduate life in the Biology Department: (<https://www.uvm.edu/cas/biology/graduate-programs-overview>) This link will let you explore the web pages and research interests of individual faculty: (<https://www.uvm.edu/cas/biology/faculty-staff>) This link will give you information about the QuEST program: (<https://www.uvm.edu/quest>) This link will let you begin the application process: (<https://www.applyweb.com/uvmg/index.ftl>) If you have any additional questions, please contact the Chair of Graduate Affairs, Dr. Nicholas J. Gotelli (ngotelli@uvm.edu).

Workshops

Population genetics of polyploids, from theory to practice. This hands-on course will take place in the Drøbak Marine Research Station (near Oslo, Norway) from the 1st to the 7th of December 2018. Location info: <https://www.mn.uio.no/ibv/english/research/sections/aqua/Infrastructure/biological-station/> Confirmed teachers: Filip Kolář*, Patrick Meirmans*, Marc Stift*, Olivier Hardy, Camille Roux, Patrick Monnahan *course organisers Course dates: 1-7 Dec 2018 Application deadline: September 1st 2018. More details and preliminary program: <https://www.forbio.uio.no/events/courses/2018/polyploids.html> Objectives: Polyploidy is widespread and frequent in plants (including many crops), but also occurs in animals such as fish and amphibians. However, our understanding of the genetics of polyploid populations and populations of mixed ploidy is still poor. This is mainly because population genetics theory was originally developed for diploids. Moreover, there is often a gap between theory developed for polyploids and its practical implementation. This practically-oriented course will attempt to bridge this gap. Simulation-based exercises (among others using R) will elucidate theoretical foundations of both diploid and polyploid population genetics. Additionally, analyses of real or realistic example datasets (microsatellite and SNP markers) will give participants hands-on training in several available methods for the population genetic analysis of polyploids. The exact course contents are not cast in stone, but will include clustering methods with specific attention for the problem of mixed ploidy, evolutionary history reconstruction of polyploid complexes, the effect of mating system variation, and detection of linked selection in polyploid genomes. Participants will also devote time to a group project focused on application of gathered knowledge in further modelling or on analyses of sample or own datasets and discussion of further prospects and methods limitations. Prerequisites: Basic knowledge of R programming language and general knowledge of population genetic foundations of diploid populations (diversity, differentiation, inbreeding). Experience in scripting in R is useful, but for the beginners there will be an extra R-introductory day before the workshop start. Costs: course participation is free (!) and includes food and accommodation, but travel arrangements are at own cost. Please apply to participate using the link to the registration form on <https://www.forbio.uio.no/events/courses/2018/polyploids.html> where you should upload a ca 200-500 word summary of your research and motivation and the CV, merged in a single PDF file. This should be done no later than September 1st 2018 (we may only consider later applications in case the course is not fully booked). In case the participant is willing to provide his/her own data for the project work (not obligatory), please also upload a short description of your data set (organism, type of markers, analyses done/in progress) and scientific questions addressed. There is a maximum of 16 participants. If needed, we will select participants based on topical relevance and motivation). Members of ForBio and PhD students will be prioritized (but MSc students and postdocs will also be considered). For non-ForBio members we require registration as ForBio associates (free of charge). We look forward to your application, Filip, Patrick and Marc. marcstift@gmail.com

eDNA Metabarcoding Workshop When: 19-23 November 2018 Where: Institut de Biologie Integrative et des Systemes (IBIS), Laval University, Quebec City (Quebec), Canada Instructors: Dr. Vasco Elbrecht (University of Guelph, Canada) Eric Normandeau (Laval University, Canada) Website: <https://www.physalia-courses.org/courses-workshops/course40/> Course Overview Obtaining environmental DNA (eDNA) from water, soil, air, gut content or other sample types holds great promises for biodiversity research and assessment. Targeted species specific markers, and broader, more inclusive metabarcoding approaches using universal primer sets can detect invasive and rare rare species, or the range of taxa present in ecosystems from trace amounts of DNA. eDNA can capture sample diversity using non-invasive or minimally invasive methods/techniques. However, due to the low quantity of DNA present in samples, these approaches often require specialized laboratory protocols, careful sample handling to prevent contamination, as well as specialized bioinformatic processing due to high levels of noise and the presence of non-target taxa. After completing the workshop, students should be in a position to (1) understand the potential and capabilities of eDNA barcoding and metabarcoding, (2) run complete analyses of eDNA metabarcoding pipelines and obtain diversity inventories and ecologically interpretable data from raw next-generation sequence data and (3) design their own eDNA projects, including bioinformatic data analysis and planning of laboratory work. All course materials (including copies of presentations, practical exercises, data files, and example scripts prepared by the instructing team) will be provided electronically to participants. While this course will focus on eDNA metabarcoding, however targeted single species detection and other alternatives will also be explored, as they can sometimes be suitable metabarcoding alternatives. This workshop is mainly aimed at researchers and technical workers with a background in ecology, biodiversity or community biology who want to use molecular tools for biodiversity research, and researchers in other areas of bioinformatics who want to learn ecological applications for biodiversity-assessment. No programming or scripting experience is necessary, but some previous expertise using the Linux console and/or R will be most welcome. All examples will be run either in Linux or Mac environments. Please make sure to have linux installed if you bring a Windows based laptop. Among the software and tools we will be using is R or Rstudio (+ the JAMP & PrimerMiner package), FastQC, Usearch, Vsearch, Cutadapt, and mBRAVE.net. No prior knowledge of these software packages is required. TEACHING FORMAT The workshop is delivered over 5 days (see the detailed curriculum below). The lectures are interactive with active discussion where asking questions is strongly encouraged. A key aspect of this course are practical sessions in primer development, bioinformatic analysis of high throughput sequence data, and data visualization as well as a project planning exercise to apply what you learned in this course. Session content: <https://www.physalia-courses.org/courses-workshops/course39/curriculum39/> Here is the full list of our courses and Workshops: <https://www.physalia-courses.org/courses-workshops/> Should you have any questions, please do not hesitate to contact us: info@physalia-courses.org

Comic



“XKCD” by Randall Munroe. www.kcd.com

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