The American Fisheries Society

Genetics Section Newsletter

Volume 21, Issue 3
September 2008

In This Issue:

President's Message

Dear Genetics Section Members,

It is an honor and privilege to serve as president of this outstanding Section. Former holders of this position represent a who's who in the Society and in allied fisheries and genetics fields. I hope these next few years measure up to their accomplishments.

Many Section members may not be familiar with individuals working on Section Committees or as Section Officials. I want to thank Past President **Ed Heist** for his outstanding efforts during the past two years. I'd also like to acknowledge the contributions of outgoing Secretary/Treasurer **Bill Templin**. Past President **Jeff Hard** has been an active participant in Section activities since he stepped down from the presidency. I would like to introduce **Bill Templin** and **Meredith Bartron** to our Section membership as newly elected President Elect and Secretary/Treasurer, respectively. I look forward to working with Bill and Meredith over the coming years. I would also like to thank members of the James E. Wright Graduate Award Committee including **Jeff Olsen**, **John Wenburg**, and **Mike Canino** and members of the Stevan Phelps Memorial Award Committee including **Ken Currens, Orlay Johnson**, and **Bernie May** for their contributions to the Section. Finally, I hope all Section members will join me to thank our Newsletter editor **Joel Carlin** for his continued service to the Section.

Several items from the meeting agenda are noteworthy. First, we had several outstanding student applicants for the James E. Wright Graduate Award. This year the Section made awards to 2 applicants, **Andrea Drauch** and **Joseph DiBattista**. Oral presentation made by Andrea and Joseph during the meeting were outstanding and reflect highly of the quality of the student scholars in our Section. Meeting attendees exchanged ideas regarding the desire to extend the Section's commitment to graduate participation in the annual meeting through travel awards. The attending members voted to increase the number of James E. Wright awards for travel to the annual meeting to 2 annually and to sponsor an additional award of smaller amount to another fisheries-related meeting.

The Stevan Phelps Memorial Award for Best Genetics Paper published in an AFS Journal in 2007 was awarded to **Harold Geiger, Ivan Wang, Pat Malecha, Kyle Hebert, William Smoker**, and **Anthony Gharrett** for their paper "What Causes Variability in Pink Salmon Family Size" in *Transactions of the American Fisheries Society* 136:1688-1698.

Section member **Robin Waples** was awarded the prestigious William E. Ricker Resource Conservation Award at the AFS meting in Ottawa, Ontario. Robin is a prolific and accomplished author of numerous outstanding peer-review papers pertaining to applications of population and evolutionary genetic theory to fisheries stewardship and conservation issues. This award is richly deserved! Congratulations to Robin and the many colleagues and coauthors who have worked on these projects.

The Genetics Section sponsored two highly successful symposia at the annual meeting. The symposia “Contributions of genetic principles and technology to sustainable fisheries: concepts, challenges, and case studies” organized by **Chris Wilson** and **Kim Scribner** brought together a stimulating and topically diverse group of speakers. A second symposium co-sponsored by the Genetics Section and Fish Culture Section “Cultured Aquatic Animals: Use and Implications for Stock Enhancement, Fisheries Management, and Species Diversity” organized by **Jesse Thrushenski, Kim Scribner** and **Mike Denson** attracted speakers from both AFS Sections speaking on topics of mutual interest pertaining to applications of genetics techniques and theory to fish culture practices. Topics covered in both symposia speak to the diversity of our Section’s membership, and to the breadth of fisheries groups who benefit from contributions of Genetics Section members. I look forward to working with President Elect and Program Committee chair Templin and others to continue to pursue opportunities to foster cooperation across Sections, including co-sponsorship of Symposia and workshops and to expose a broader constituency of the parent AFS Society to expertise represented by Genetics Section members.

Briefly I would like to outline several goals for the Presidency and Section over the next two years. First I would like to increase the visibility of the Section and parent society to professionals and students in allied genetics fields. First and foremost, the Section should serve the needs of our members. Traditionally, this mission has been fulfilled in part by providing a forum for exchange of ideas through sponsored symposia and contributed scientific sessions at meetings. Fostering participation of younger student members has also been emphasized and hopefully the increased financial commitment of our Section to sponsor student participation at meetings will help.

Increasingly, the field of genetics is impacting society and the fisheries community. Our discipline consists of numerous sub-disciplines. Though we share a common interest in fishes as a taxonomic focus, genetic technology and theory transcend many fields including physiology and developmental biology, pathology and epidemiology, behavioral ecology, as well as population and evolutionary genetics which have traditionally been our Section’s strength. I hope to work with geneticists both within and outside the Section to increase opportunities for dialog across sub-disciplines. There are numerous meetings within our respective sub-disciplines that vie for our time and support and for participation by students. I would like to work with Section members and others to increase membership and to use the Section and Section-

sponsored activities as a means of cross-disciplinary interaction.

The relevance of Genetics Section member's expertise and scientific achievements to the greater fisheries research and management community has never been greater. I would like to work with our Sections members to increase awareness of the relevance of our field to other fisheries professionals. Solutions to present and future issues will increasingly depend on cutting-edge technology, cross-disciplinary cooperation and innovative problem solving. Our Section is uniquely placed to make foundational contributions to allied fisheries sciences and to society.

Sincerely,

Kim Scribner
AFS Genetics Section President

Photos from the 2008 Annual Business Meeting

Joseph DiBattista receives the James E. Wright Graduate Award from President Ed Heist

Andrea Drauch receives the James E. Wright Graduate Award from President Ed Heist

Bill Templin receives a Certificate of Appreciation from incoming President Kim Scribner.

Past President Ed Heist receives a Certificate of Appreciation from the much shorter incoming President Kim Scribner.

Lab Profile: Evolutionary and Ecological Genetics Lab

Dr. Trevor Pitcher, University of Windsor, Windsor Canada

Our lab uses a variety of fish species (including Chinook salmon, coho salmon, brown bullhead, and Redside dace) as model systems to investigate natural and sexual selection in relation to genetic quality. Genetic quality has two components, good genes and compatible genes: A good gene is defined as an allele that increases fitness independent of the architecture of the remaining genome, which, in diploid organisms, includes the homologue to the particular 'good allele'. Across the genome, good genes will show additive genetic variation. A compatible gene is defined as an allele that increases fitness when in a specific genotype; i.e., when paired with a specific homologue (overdominance) or allele at another gene locus (epistasis). Across the genome, compatible genes will show non-additive genetic variation.

Our lab's main research aims are to; (i) examine the genetic architecture of fitness using quantitative genetics (i.e. genetic quality of offspring, including candidate genes such as the major histocompatbility complex), (ii) provide insights into the selective forces involved in the evolution of mate choice for genetic quality (e.g. sperm competition and cryptic female choice as they relate to good genes and compatible genes), and (iii) examine the relative importance of male and female roles/genotypes in terms of determining the outcome of paternity. We are also conducting research to assess the extent to which genetic quality can be incorporated into captive and supportive breeding programs in an attempt to improve the fitness of offspring produced for conservation purposes. Finally, we are currently examining the relationship between genetic quality and aquatic contaminant stress.

Evolutionary ecology of genetic quality in salmon

Our research focuses on sperm competition, cryptic female choice, and the genetic architecture of fitness (i.e. additive genetic effects (good genes) and non-additive genetic effects (genetic compatibility)) in salmon. This research investigates genetic compatibility at the gamete level and the interacting effects of male and female genotypes on various offspring fitness traits.

The major histocompatibility genes, that code for proteins that present pathogens to the immune system and therefore have a direct effect on how well an individual survives disease, provides an excellent example of both good and compatible genes. In fish, the MHC alters body odor thereby allowing individuals to choose mates based on genetic quality through olfactory cues. Individuals can therefore, in theory, optimize MHC genes in their offspring by choosing mates with high MHC diversity, specific well-adapted MHC alleles, or MHC genes that complement their own. Our research has shown that specific MHC alleles and certain combinations thereof have significant impacts on the growth and survival of chinook salmon. This research also produced a novel genetic algorithm that can be used to partition variation in fitness related values to specific MHC alleles or genotypes and the algorithm was used to show simultaneous additive and non-additive effects of specific MHC class IIB alleles and genotypes on offspring survivorship. This algorithm is a major advancement over traditional genetic models that only partition variance in fitness to additive and non-additive genetic effects and do not allocate these effects to specific alleles and

genotypes. This algorithm is particularly innovative because it points out that the typical comparison between MHC homozygotes and heterozygotes is meaningless because there exists allele specific additive and non-additive genetic effects. Finally, our research found evidence of a post-mating bias that promotes an MHC allele that is associated with higher survivorship. Preliminary data suggest that physiological mechanisms at the level of the sperm and egg account for this bias in paternity.

Incorporating genetic quality into captive breeding programs

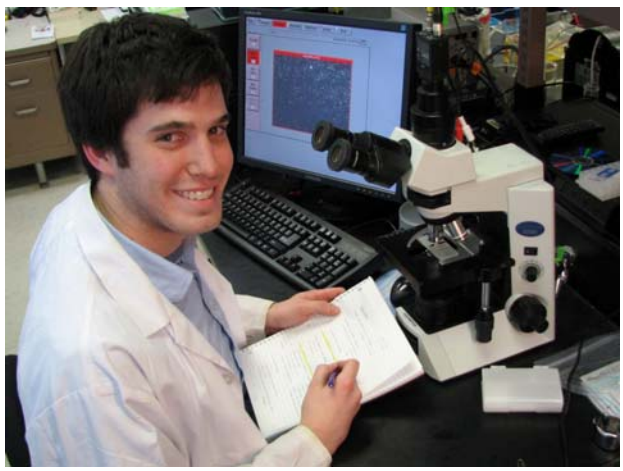
The importance of genetic quality to conservation biology recently has been recognized. However, few captive/supportive breeding programs have been developed that capitalize on natural biological mechanisms such as sexual selection. The research program investigates the merits of incorporating sexual selection into captive breeding programs for fishes. For example, we have empirically assessed the potential value of incorporating good genes and compatible genes mate choice in increasing the effectiveness of breeding programs through increased offspring performance in Chinook salmon. Our research has shown that the inclusion of optimal good and compatible genes genetic quality in salmon conservation breeding programs can increase juvenile survivorship by as much as 19%. Finally, we are also testing these kinds of questions with respect to adult survivorship and applications to a threatened and endangered species of freshwater fish, the Redside Dace.

Genetic quality, reproduction and aquatic contaminant stress

We have recently begun to investigate the link between aquatic contaminant stress, reproductive parameters (sperm & egg quality) and genetic quality (via quantitative genetic analyses) in brown bullhead.

Be sure to check out the EEG website at www.uwindsor.ca/pitcher, or e-mail Tony at tpitcher@uwindsor.ca!

Photos from the Pitcher Lab



Jean-Marc Beausoleil (MSc student) examining sperm quality (above left) and Trevor Pitcher (above right) holding one of the very few Atlantic salmon found returning in Lake Ontario.

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Near right: Michelle Farwell examining reproductive traits of brown bullhead

Top far right: Developing larva of Redside dace.

Bottom far right: Redside dace in Ohio.

Member Spotlight: Joshua Brown

PhD student **Joshua Brown**, and **Dr. Carol Stepien**, Director of the University of Toledo's Lake Erie Center and the Great Lakes Genetics Laboratory, have been analyzing the genetic structure of the invasive round goby. During the past two decades, the round goby *Apollonia melanostoma* (=*Neogobius melanostomus*) expanded its range via shipping transport and canals, extending north and west from the Ponto-Caspian region of Eurasia and to the North American Great Lakes. Exotic populations of the round goby have been very successful in the Baltic Sea and the Great Lakes regions, exerting significant ecological changes. Our study evaluated the population genetic and biogeographic structure of the round goby across its native and nonindigenous ranges, in light of geological history and its expansion pathways. We analyzed seven new nuclear microsatellite loci and mitochondrial DNA cytochrome *b* gene sequences from 432 individuals in 22 locations. Population structure was tested using F_{ST}-analogs, phylogenetic trees, clustering diagrams, Bayesian assignment tests, and nested clade analyses. Results showed that native populations in the Black versus the Caspian Sea basins diverge by 1.4% and ~350,000 years, corresponding to closure of their prior connections and supporting the taxonomic separation of the Black Sea subspecies *A. m. melanostoma* from the Caspian Sea subspecies *A. m. affinis*. The within-basin populations diverge by ~0.4% and 100,000 years. Nonindigenous populations in the Baltic Sea and Danube and Dnieper Rivers trace to separate northern Black Sea origins, whereas the upper Volga River system houses mixed populations of *A. m. melanostoma* and *A. m. affinis*. Native populations average twice the genetic diversity of most exotic sites, however, sites in the Volga River system have high diversity due to mixing of the two taxa. These results highlight how vicariance and anthropogenic disturbances have shaped a rapidly expanding species' genetic heritage. The full article is available in the June 2008 issue of *Molecular Ecology*.

In February 2009, Joshua will be leaving Toledo to participate in the NOAA Sea

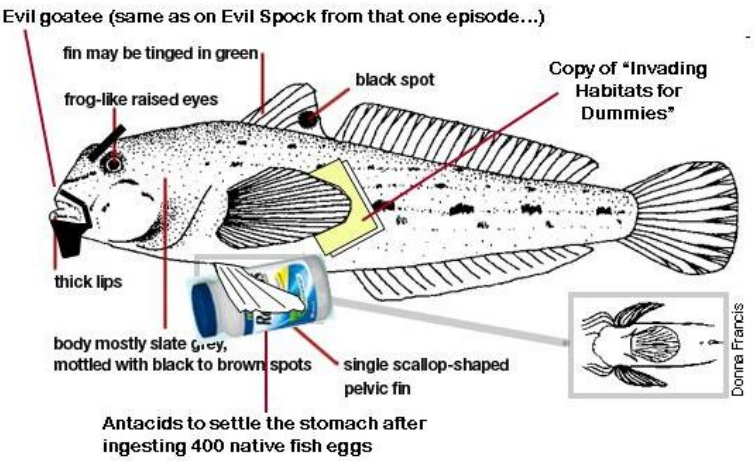
Grant Knauss Fellowship, which matches graduate students to host offices in the Legislative and Executive branches of the United States federal government in Washington, D.C. While in Washington, the Fellows participate in shaping marine and coastal policy. This paid Fellowship lasts for one year, and provides an unparalleled opportunity to educate graduate students on federal policy issues.

More information about the work being done at the Great Lakes Genetics Laboratory can be found on its website (www.utoledo.edu/as/lec/research/glgl/index.html).

Top Left: Dr. Carol Stepien, Director, University of Toledo Lake Erie Center and the Great Lakes Genetics Laboratory.

Top Right: PhD student and Knauss Fellow Joshua Brown.

Bottom: Useful characters for recognizing the invasive round goby *Apollonia melanostoma.*



Editor's Note: Congratulations, Joshua!!!

New USGS Genetics Website

The US Geological Survey is pleased to announce the new **Genetics and Genomics Web Site** found at http://biology.usgs.gov/genetics_genomics/. This site was developed by USGS scientists who provided the capabilities of USGS Science Centers and Cooperative Research Units, as well as summaries of their own research related to genetics and genomics. The home page includes links to the various centers showcasing their specific scientific expertise, laboratory capabilities, and available equipment. A glossary explaining commonly used words in this field is located

immediately below the capabilities section. By scrolling down to the bottom of the home page and clicking on the various links highlighted by a photo image or moving toward the left side of the home page and clicking on any of the topics highlighted in pale green, links show summaries of USGS research projects by general category, for example, conservation genetics or epidemiology of fish and wildlife disease. Clicking on these links may reveal sublinks such as conservation genetics research conducted on amphibians and reptiles, mammals, birds or others. The site will be updated periodically to house additional research and update capabilities as USGS science grows in this arena!

Please contact Kay Briggs kmbriggs@usgs.gov if you have further questions or would like more information about the site.

Submitted by Robin M. Schrock

Course: Recent Advances in Conservation Genetics

January 18th through January 31st, 2009; STRI Panama

The American Genetic Association in conjunction with the National Cancer, Institute, The Laboratory of Genomic Diversity, Frederick, Maryland, NOAHS-Smithsonian Institute and the Smithsonian Tropical Research Institute is presenting a 13 day intensive course January 18th through January 31st, 2009, at the Smithsonian Tropical Research Institute in the Republic of Panama.

The course will be directed by Dr. Stephen J. O'Brien, and taught by renowned scientists in methods, interpretation, and applications of molecular genetic analyses for conservation of endangered species, who will also share a variety of their personal experiences in this important field. Applicants should be conservation-minded scientists (advanced graduate students, post-docs, teachers, and researchers with advanced degrees) from academia, government, non-government organizations, or industry who are studying the genetics of endangered species and who will apply the knowledge gained from this course to the conservation of such species.

Interested individuals can contact us at congen@ncifcrf.gov or visit the website at http://home.ncifcrf.gov/ccr/lgd/congen2009/index.asp for course details.

Wanted: Fish Molecular Ecologist

The Stroud Water Research Center, Fish Molecular Ecology Group is searching for a **Research Technician**. The primary duties of this position are: 1) to maintain day to day operations of the new Fish Molecular Ecology lab and 2) perform sample analysis for ongoing and proposed studies in areas of fish physiology, population genetics, and fish monitoring surveys. The first duty includes purchasing supplies and organizing the new Fish Molecular Ecology lab. This duty may also include coordinating seasonal interns and volunteers. The second duty includes sample analysis using established protocols to investigate questions in fish physiology and population genetics, and assisting or leading fish surveys. A currently funded project will use enzymatic assays to detect levels of cortisol, glucose and triglycerides in whole fish homogenates.

Requirements: A Bachelors degree in fisheries, ecology, biology, or related field and three years of experience, and good written and oral communication and organizational skills are required. A Masters degree in fisheries or related field may be substituted for two of the three years of experience. Experience in the following is desired: 1) population or quantitative genetics, 2) fish physiology, 3) fish field surveys and knowledge of East Coast fresh water and diadromous fish species, 4) population dynamics, 5) fish culture, 6) other areas of fish ecology. Salary commensurate with experience. The appointment is for two years and may be extended.

How to Apply: To apply for this position mail or email a cover letter describing your qualifications, CV and three references to Willy Eldridge (weldridge@stroudcenter.org) and indicate Research Technician Position in the subject heading. Applications will be accepted through **September 12**, 2008. Please contact Dr. Eldridge if you have questions.

About Stroud Water Research Center: The Stroud Water Research Center seeks to advance the global knowledge of fresh water streams, rivers and lakes through research, education and public outreach, and to promote stewardship of fresh water among businesses, landowners, policy makers and individuals, around the world. The SWRC is an independent, 501(c)(3) not-for-profit organization. More information on the SWRC is available at www.stroudcenter.org.

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Job and PhD Position in Fish Genetics Research available at Queen's University Belfast

1- **Senior Researcher in Fish Population Genetics**: The School of Biological Sciences, Queen's University Belfast, Northern Ireland UK, is seeking to employ ONE Postdoctoral Senior Research Fellow in Fish Population Genetics under the Beaufort Marine Science Awards. The successful applicant will join the Beaufort Fish Population Genetics Research Centre, which also involves researchers from University College Cork and the Marine Institute, Ireland. This position is available for up to 7-years, from the date of appointment.

The Senior Researcher will participate in the practical implementation of an all-Ireland programme in Fish Genetics, aiming to generate high-level of research activity and to produce publications in the area of population and evolutionary genetics initially of brown trout and European lobster, and in conjunction with University College Cork, Atlantic salmon and Atlantic cod. Research on these species will be primarily focused on questions related to: local adaptation; stock management; phylogeography; identification of conservation units; the genetic impact of fishing; farm escapes; stock enhancement and commercial ranching on local populations; the effects of habitat fragmentation and climate change on local populations. The successful candidate will be expected to produce a regular output of first author publications in ranking journals, and collaborate on those of the rest of the research group.

There will be good opportunity for the development and implementation of independent research projects within the remit of the programme of the Beaufort Fish Population Genetics Research Centre (Salary range: £28,290 - £36,912 per annum, including contribution points - see www.qub.ac.uk/sites/QUBJobVacancies/ResearchJobs/ for further details on the position and how to apply).

2- **One PhD Studentship**. The holder of this four year PhD studentship, based at Queen's University Belfast, will undertake a research project in line with the research programme of the Beaufort Fish Population Genetics Research Centre. Depending on the student's aptitudes, research will be focused either on brown trout or European lobster population genetics. Research topic will address a number of issues including: local adaptation; stock management; phylogeography; identification of conservation units; the genetic impact of fishing; farm escapes; stock enhancement and commercial ranching on local populations; the effects of habitat fragmentation and climate change on local populations. Highly motivated and interested applicants should have a good degree or equivalent in Biological Sciences, or related subject. They are also expected to have good theoretical background and interest in population and evolutionary genetics; good writing skills, and practical experience generating and analyzing molecular data. This position is particular suited for students with an aptitude/interest in developing skills in statistical genetics. The successful applicant will receive a stipend of approximately £13,771 - 14,610 per annum plus tuition fees (£3,541-3,757 per annum). As part of the PhD studentship, limited funding is available for stays in international centres of excellence. It is envisaged that this PhD will begin in September/October 2008.

Applications should be made by 4pm Friday 5 September 2008, preferably through the University admissions portal at https://pg.apply.qub.ac.uk/home or via submission of a short cover letter (max 500 words) outlining the reasons why they are particularly suited for a PhD and C.V. (less than 2 pages), via e-mail email, to Paulo A. Prodohl (email: p.prodohl@qub.ac.uk). A one page abstract describing final year undergraduate project or MSc Project should also be included if available.

PhD position on Lake Sturgeon Genetics

PhD position - Field and experimental validation of environment and genetic factors affecting lake sturgeon recruitment and survival during early life-history stages in heterogeneous stream landscapes

Location – Department of Fisheries and Wildlife, Michigan State University

Timing – The position can begin as early as January 2009

Scope – The student will develop environmental suitability indices based on field studies of physical and biotic components of stream systems that are tied to adult lake sturgeon spawning time and location and estimates of adult reproductive success. Research will also involve use of generalized mix models and animal breeding models to analyze experimental data on covariation in egg and early larval development and survival as a function of genotype and biotic and physical features of stream

environments. Experimental portions of the project will be conducted in newly constructed stream-side research facility on the Black River in the northern portion of Michigan's lower peninsula. Genetic data will be used to estimate annual and inter-annual variation in reproductive contributions of adults as a function of timing and location of spawning.

For further information contact:
Professor Kim T. Scribner, Department of Fisheries & Wildlife and Department of Zoology, 13 Natural Resources Building, Michigan State University, East Lansing, Michigan 48824-1222. Tel: (517)-353-3288 (office); email: scribne3@msu.edu ; website: www.fw.msu.edu/~scribne3/.

PhD position on Speciation in Neotropical Cichlids

A position is available for a PhD student to work on the **molecular basis of speciation** with KR Elmer in Axel Meyer's Evolutionary Biology working group, University of Konstanz. This position is funded for the first year by a Young Scholar's award from Univ. Konstanz and funding for future years is anticipated from other sources.

A variety of research topics are available relating to biodiversity and speciation in Nicaraguan cichlids using genetic and ecological approaches. At least one project will involve transcriptomic or genomic methods, facilitated by the up-coming release of four cichlid genomes. The cichlid fish species complex *Amphilophus citrinellus* offers unparalleled opportunities for evolutionary and ecological research because they are part of a system of young, isolated volcanic crater lakes and have demonstrated rapid ecological speciation in situ (e.g. see Barluenga *et al*. 2006 Sympatric speciation in Nicaragua crater lake cichlid fish. *Nature* 439:719-723). Research will involve the extensive collections currently existing in our laboratory and may include opportunities for field research in Nicaragua.

Start date is flexible but ideally would begin autumn 2008 or January 2009. An aptitude for independent research, an excitement about biology, and some experience with bioinformatics are a must. Experience in laboratory work and/or field work would be a benefit but are not required.

University of Konstanz is one of nine excellent universities in Germany and has a strong focus in biology. The working group of Axel Meyer is a dynamic international laboratory with an impressive record in an array of evolutionary biology research. We have a well-equipped molecular laboratory, extensive fish aquaria facilities, and a genomics and proteomics facility (coming fall 2008). Konstanz is a scenic and historical small city located on the shores of Lake Constance and at the foot of the Swiss Alps.

Interested applicants should have a Bachelors and Master's in biology/zoology. Under exceptional circumstances (i.e. extensive experience in bioinformatics) the position could be available as a 2-year Master's project. The working language of the lab is English. Please send a letter of interest, CV, and contact information for three

references as a single PDF to kathryn.elmer@uni-konstanz.de. Review of applications will begin August 30 and continue until a suitable candidate is found. Please see our lab webpage for more information, current researchers, and publications: www.evolutionsbiologie.uni-konstanz.de/.

Other student positions are also available in our lab, particularly in the field of Phylogenomics/Evo-Devo. For details, see http://www.evolutionsbiologie.uni-konstanz.de/index.php?section=116.

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Have Your Voice Heard on the AFSGS Newsletter!

Well, not *heard* really, not until we get an audiobook-style newsletter, but you can have your voice *seen* at least. Well, not your voice, but your *ideas* will be *read*. Or briefly *skimmed*, before members go on to the email about the overdue TPS reports. Whatever.

I was very glad to receive so many submissions for this issue -- I am grateful to our members!!! I hope that this issue encourages others to step up and be recognized. Have your lab profiled by emailing the AFS Genetics Section newsletter editor at jcarlin@gustavus.edu. The editor also welcomes opinion pieces, suggestions, ideas, and insane rants. Submissions are due **November 24**.

Joel Carlin, Newsletter Editor

Calendar of Upcoming Events

September 2008

Sep 22-26 — 2008 **ICES Annual Science Conference**. World Trade and Convention Centre, Halifax, Nova Scotia, Canada. See www.ices.dk/iceswork/asc/2008/index.asp.

Sep 25 — Early registration deadline for **IUCN World Conservation Congress**, Oct 5-14, Barcelona, Spain. See cms.iucn.org/news_events/events/congress/index.cfm.

October

Oct 3 — Abstract deadline for **ASLO'09**, the American Society of Limnology and Oceanography Aquatic Sciences Meeting to be held Jan 25-30 at the Center de Congres Acropolis, Nice, France. See http://www.aslo.org/nice2009/.

Oct 5-14 — **IUCN World Conservation Congress**. Barcelona, Spain. See cms.iucn.org/news_events/events/congress/index.cfm.

Oct 12-15 — **SEAFWA 2008**: 62nd Annual Southeastern Association of Fish and Wildlife Agencies. Corpus Christi, Texas. See www.seafwa2008.org.

Oct 15 — Grant deadline for **Sigma Xi Grants-in-Aid of Research**. See www.sigmaxi.org/programs/giar/index.shtml.

Oct 15 — Student abstract submission deadline for **Sigma Xi Annual Meeting** and Student Research Conference to be held Nov 20-23, Marriott Renaissance Hotel, Washington DC. See www.sigmaxi.org/meetings/annual/index.shtml.

Oct 16 — Registration deadline for **SEPEEG 08**, the SouthEastern Population Ecology and Evolutionary Genetics annual meeting to be held Oct 24-26 in Eatonton, Georgia, USA. See http://mendel.genetics.uga.edu/index.php?page=sepeeg-2008.

Oct 20-24 — **Fifth World Fisheries Congress**. Pacifico Yokohama, Japan. See www.5thwfc2008.com.

Oct 24-26 — **SEPEEG 08**, the SouthEastern Population Ecology and Evolutionary Genetics annual meeting. Eatonton, Georgia, USA. See http://mendel.genetics.uga.edu/index.php?page=sepeeg-2008.

November

Nov 1 — Abstract deadline for **World Aquaculture 2009** to be held May 25-29, World Trade Center, Veracruz Mexico. See https://www.was.org/WasMeetings/meetings/Default.aspx?code=WA2009.

Nov 8-12 — 15th Annual Conference of **The Wildlife Society**. Miami FL. See joomla.wildlife.org/Miami08/.

Nov 10 — Early bird registration deadline for the **State of the Salmon 2009** Conference to be held Feb 2-5 2009 at the Fairmont Waterfront Hotel, Vancouver BC Canada. See http://www.stateofthesalmon.org/conference2009/index.html .

Nov 11-14 — **NALMS 2008**: North American Lake Management Society Symposium. Lake Louise, Alberta, Canada. See www.nalms.org/Conferences/2008LakeLouise/Default.aspx.

Nov 14-16 — 6th Annual "**Genes in Ecology, Ecology in Genes**" Symposium. Intercontinental Hotel, Kansas City, Kansas USA. See www.ecogen.ksu.edu.

Nov 20-23 — **Sigma Xi Annual Meeting** and Student Research Conference. Marriott Renaissance Hotel, Washington DC. See www.sigmaxi.org/meetings/annual/index.shtml.

Nov 24 — **Submission deadline for the AFS Genetics Section Newsletter**. Contact the editor at jcarlin@gustavus.edu.

December

Dec 3-4 — 11th **Flatfish Biology Conference**. Water's Edge Resort and Spa, Westbrook, Connecticut, USA. See mi.nefsc.noaa.gov/flatfishbiologyworkshop.

January 2009

Jan 3-7 — **SICB 2009**: Society of Integrative and Comparative Biologists Annual Meeting. Westin Boston Waterfront Hotel, Boston MA. See www.sicb.org/meetings/2009/index.php3.

Jan 8-12 — 4th Biennial International Conference of the **International Biogeography Society**. Mérida, México. See www.biogeography.org/4th%20conference.html.

Jan 9 — Full proposal target date for **NSF Grants** in Population and Evolutionary Processes and for Systematic Biology and Biodiversity Inventories. See www.nsf.gov/funding/pgm_summ.jsp?pims_id=12824.

Jan 14 — Early registration deadline for **Aquaculture America** 2009 to be held Feb 15-18 in Seattle Washington USA. See www.was.org/WasMeetings/meetings/Default.aspx?code=AA2009.

Jan 21 — Abstract deadline for the 2009 Annual Meeting of the **Society for Conservation Biology** will be held in Beijing, China, 11-16 July 2009. www.conbio.org/Activities/Meetings/2009.

Jan 25-30 — **ASLO '09**, the American Society of Limnology and Oceanography Aquatic Sciences Meeting. Center de Congres Acropolis, Nice, France. See www.aslo.org/nice2009/.

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