

Ph.D. position in Atlantic Salmon Ecological Genomics and Genomic selection beginning in January or May 2010 and funded for three years.

The project is led by Dr. Elizabeth Boulding (Integrative Biology, U. Guelph) with co-investigators Dr. Larry Schaeffer (Animal and Poultry Science, U. Guelph and 2009 recipient of the Hermann-von-Nathusius-Medaille) and Dr. Patricia Schulte (Zoology, U.B.C.). We are collaborating with Drs. Brian Glebe and Patrick O'Reilly and of the Department of Fisheries and Oceans, Canada (DFO), Dr. Keng Pee Ang and Jake Elliot of Cooke Aquaculture Canada, and Dr. Sigbjørn Lien's group from CIGENE at the Norwegian University of Life Sciences.

The Ph.D. project with Dr. Boulding involves looking for correlations between thousands of Single Nucleotide Polymorphisms (SNPS) and morphological, behavioural, life history, and physiological traits in Atlantic salmon, and determining the extent to which these correlations have an underlying genetic basis. These correlations are the basis of genomic selection which will be validated using historical DNA samples, and breeding records along with new statistical software that has been developed at the University of Guelph. We will use Fst outlier analysis to identify SNPs that show more differences in allele frequencies between the wild and aquacultural salmon populations than expected under neutral theory which may allow us to identify the genome regions that have responded to domestication selection when the Saint John's aquacultural strain was founded. These SNP genetic markers may eventually enable the aquaculture industry to practice genomic selection for complex traits within the St. John's Aquaculture strain of Atlantic salmon that is authorized for use in New Brunswick.

Atlantic salmon from the inner Bay of Fundy (iBoF) are listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Researchers at DFO have used molecular markers to demonstrate that some smolts obtained from the Upper Salmon River in the iBoF are F1 hybrids between European aquaculture and North American fish. We will genotype families from backcrossed North American and European aquacultural strains that have been held in a common hatchery tanks at St. Andrews Biological Station. This will enable us to document statistical associations between SNPs in candidate genes and genetic differences in complex traits among these endangered salmon populations which, may assist in their conservation.

The Ph.D. position with Dr. Boulding requires a background in evolutionary/computational biology or population/quantitative/statistical genetics, and preferably at least one peer-reviewed paper in population or quantitative genetics, or genome biology or molecular animal breeding. The position would either suit molecular ecologists interested in ecological genomics, or molecular animal breeders, or bioinformatics students with statistical or computational biology interests. However, experimentalists must demonstrate an aptitude for analytical methods (e.g., UNIX, Perl, R, QTL Express) given the massive phenotype/SNP genotype datasets that must be analyzed whereas bioinformatics students must demonstrate an aptitude for salmon biology.

Please apply for the Ph.D. position with Dr. Boulding (boulding@uoguelph.ca) by emailing her a short resume, an unofficial electronic transcript of all your university grades, and a statement that you are willing to travel from your home university in Guelph to New Brunswick or to Norway as needed for the proposed research. To be selected for a Ph.D. position you need to be eligible for admission to our graduate program. Dr. Boulding is in the Department of Integrative Biology at the University of Guelph: <http://www.uoguelph.ca/ib/> . Check the appropriate website for Ph.D. admission requirements; note that non-Canadians may have to write and receive a passing grade on the TOEFL test if English is not your first language.