**Early Professional Awards Presentations**

**Wednesday, August 2, 3:30 pm in the Kellogg Center Auditorium**

**2017 is the inaugural year for the SCO-SOC’s Early Career Researcher Award. The award honours fledgling ornithologists - in academia, industry, non-government or government agencies – that show strong potential for future leadership in Canadian ornithology. This year’s award was presented to Stefanie LaZerte*.***

**Dr. Stephanie LaZerte,** Thompson River University

**A tale of birds and data: How R saved a behavioural ecologist**Through studies on chipmunks, chickadees, sparrows, and finches, I have investigated animal activity, communication, and movement, and even have had the occasional foray into geomorphology. Although seemingly having nothing in common, the thread that links these topics is the complexity of the underlying data. Some projects simply had too much data, some had 'hidden' data, which needed to be extracted. These types of projects are becoming ever more common; as researchers, we have greater and more powerful techniques for data collection including physical tools (telemetry, GPS, Geo-Locators, RFID, Automated Recording Units, etc.) as well as social tools (citizen science). The conundrum that faces behavioural ecologists, accustomed to small sample sizes, is then how to manage and analyze these data: with great data comes the need for great management. While there are many tools for data management, R is one that has been growing in popularity. However, although R workshops and classes are cropping up everywhere, most users seem to focus on R for statistics, as opposed to R for data, and there often seems to be no middle ground between spreadsheet users and programming gurus. In this talk I will discuss my experiences with research in behavioural ecology and how using R software and programming language helped me address interesting questions that may otherwise have been out of my reach.

**BIOGRAPHY:** Stefanie (Steffi) LaZerte is an independent consulting biologist and R programmer, currently living in Brandon, Manitoba. Steffi received a B.Sc. in animal behaviour from the University of Toronto (2007), an M.Sc. in behavioural ecology from McGill University (2010) and an interdisciplinary Ph.D. in natural resources and environmental studies from the University of Northern British Columbia (2015). Her research interests focus on how humans influence the behaviour of animals, particularly through urbanization. Steffi’s PhD work addressed the effects of urbanization and noise on chickadee communication and her post-doctorates have focused on the development of an R package for tracking animal movements between RFID (radio frequency ID) loggers in urban environments. Steffi is also interested in the use of citizen science and R programming as tools to increase the quantity and quality of data in the field of behavioural ecology. As a way to encourage use of these tools, she teaches R to help researchers unfamiliar with large datasets become more comfortable with data management. She won the 2012 Baillie Award from the SCO-SOC for her student research, as well as the top Student Presentation Award at the SCO-SOC’s 2013 meeting in Winnipeg.

**Friday, August 4, 8:00 in Wells 115**

**The James G. Cooper Young Professional Award recognizes two early-career ornithological researchers (up to 3 years post-Ph.D.) for their outstanding contributions in any field of ornithology. This year’s winners are Nancy Chen and Riccardo Ton.**

**Dr. Riccardo Ton**, Department of Biological Sciences, University of Montana

**Proximate effects of temperature versus evolved intrinsic constraints for embryonic development times in songbirds**

The relative importance of intrinsic constraints imposed by evolved physiological trade-offs versus the proximate effects of temperature for interspecific variation in embryonic development time remains unclear. Understanding this distinction is important because slow development due to evolved trade-offs can yield phenotypic benefits, whereas slow development from low temperature can yield costs. We experimentally increased embryonic temperature in free-living tropical and north temperate songbird species to test these alternatives. Warmer temperatures consistently shortened development time without costs to embryo mass or metabolism. However, proximate effects of temperature played an increasingly stronger role than intrinsic constraints for development time among species with colder natural incubation temperatures. Long development times of tropical birds have been thought to primarily reflect evolved physiological trade-offs that facilitate their greater longevity. In contrast, our results indicate a much stronger role of temperature in embryonic development time than currently thought.

**BIOGRAPHY:** Riccardo Ton started his first ornithological experiments in the garden of his grandma in Italy at the age of 6. Later he explored the major migratory flyways in the alps north of Venice while getting his MS at the university of Padova. He finally received his Ph.D. in 2016 from the University of Montana working with Tom Martin. His research examined the effects of metabolism and temperature on embryonic development times and post-natal growth rates in temperate and tropical songbirds. His rooted passion for field biology took him to conduct his research in sites all over the world including U.S.A., Venezuela, Malaysia and South Africa. Riccardo is also actively involved in conservation projects that aim to restore the traditional rural habitats of his region that are quickly lost to urbanization and changes in agricultural practices. His work includes first-authored publications in Functional Ecology and Scientific Reports.

**Dr. Nancy Chen,** Center for Population Biology, University of California, Davis, andCornell Lab of Ornithology, Cornell University

**Evolutionary genomics of a pedigreed wild population**

Recent studies have demonstrated evolution on ecological timescales in a number of different organisms. Studying contemporary evolution is the only way to directly test many fundamental questions in evolutionary biology, and understanding the evolutionary processes that shape patterns of genetic variation in short timescales is directly relevant for conserving declining species in the face of rapid environmental change. While much attention has been given to phenotypic evolution on short timescales, investigations of short-term evolutionary dynamics at the genomic level are challenging and rare. A powerful approach for studying short-term evolution of natural populations is to combine evolutionary genomics with long-term demographic and pedigree data. Here, we investigate the genetic basis of rapid evolution using a 25-year genomic, phenotypic, and pedigree dataset in the Florida Scrub-Jay (*Aphelocoma coerulescens*), an iconic species on the U. S. Endangered Species List. A population of Florida Scrub-Jays at Archbold Biological Station has been studied since 1969, resulting in full records of individual lifespans as well as annual fecundity and lifetime fitness measures for thousands of individuals on a 12-generation pedigree. We used custom Illumina Beadchips to genotype every individual in our study population over the past two decades (3,838 individuals total) at 15,416 genome-wide SNPs. We used gene dropping to model drift on the known pedigree and identify SNPs whose frequency dynamics were driven by selection. We then tested for selection acting on specific life-cycle stages by modifying existing selection component analysis frameworks to take full advantage of exhaustive population sampling. We identified a number of loci that clearly exhibited male gametic selection, sexual selection, and viability selection. By combining sensitive pedigree-based inferences of net selection with fine-scale dissection of selection components, this study provides a detailed assessment of the role of selection in perturbing allele frequency dynamics in a rapidly declining population.

Co-authors: Elissa J. Cosgrove, Cornell University; Reed Bowman, , Archbold Biological Station; John W. Fitzpatrick, Cornell University; Graham Coop, Cornell University; Andrew G. Clark, University of California, Davis

**BIOGRAPHY**: Nancy Chen is currently a NSF Postdoctoral Research Fellow with Graham Coop at UC Davis and will be starting as an Assistant Professor at the University of Rochester in July 2018. Before joining the Coop lab, Nancy was a Postdoctoral Research Associate at the Cornell Lab of Ornithology and a Ph.D. student with Andy Clark and John Fitzpatrick. Her research seeks to understand the genomic basis of contemporary evolution in natural populations by combining genomic data with long-term demographic and pedigree data. Nancy's dissertation research concentrated on elucidating the genomic consequences of declining population size and developing bioinformatics tools for analyzing next-generation sequencing data in non-model organisms. Nancy is also interested in promoting diversity in the sciences. She organizes a women in science discussion group at UC Davis and is one of the organizers of the symposium Birds of Different Feathers: Increasing Diversity in Ornithology to be held during this year’s meeting.

**The Ned K. Johnson Young Investigator Award recognizes outstanding and promising work by a researcher early in his or her career (up to 5 years post-Ph.D.) in any field of ornithology. The 2017 award is given to Dr. Michael Butler.**

**Dr. Michael Butler,** Department of Biology, Lafayette College

**Physiological underpinnings of avian ecology**

Some of the most important breakthroughs in ornithology occur when scientists from different disciplines tackle phenomena from multiple vantage points. Here, I explore how ecological factors such as activity patterns, foraging, sexual selection, and signaling are informed by examining physiological processes. Specifically, I examine how variation in circulating nutrient levels, immune response, and oxidative physiology contributes to our understanding of behavioral ecology and other ecological patterns. For example, female mallards that circulate higher levels of antioxidants lay eggs with shells that are more chromatic, and these more colorful eggs contain more antioxidant-rich yolks, suggesting a signaling role for eggshell coloration. However, I also address a challenge experienced by many eco-physiologists; physiological data are frequently difficult to interpret and sometimes produce counter-intuitive conclusions. For example, in work with European starlings, I found that more chromatic eggshells were associated with yolks that were actually less antioxidant-rich, a result in direct opposition to my work with mallards. To reconcile these and other such seemingly contradictory results, I explore the concept of hormesis, which provides a compelling framework for interpreting many such discrepancies. A hormetic approach posits that small challenges confer a net fitness benefit relative not only to high-intensity stressors, but also relative to no stressor at all. After examining multiple data sets, it seems likely that hormesis is a potentially underappreciated phenomenon, and I explore several avenues for future investigation.

**BIOGRAPHY**: Michael Butler is currently an assistant professor at Lafayette College in Easton, Pennsylvania. Mike received his B.A. in Biology and Physics from Bowdoin College (2002), working heavily with Amy Johnson and Nat Wheelwright, his M.S. in Raptor Biology from Boise State University (2006; Al Dufty, Jr.), and his Ph.D. in Biology from Arizona State University (2012; Kevin McGraw). His research efforts fall into a wide range of categories, including biomechanics, ecoimmunology, physiology, and behavioral ecology, driven by an underlying research interest in examining how animals meet challenges posed by the environment. To investigate these topics, Mike has performed studies with species as diverse as mallards, Savannah sparrows, Gila monsters, American kestrels, corn snakes, great-tailed grackles, European starlings, chameleons, house finches, and on one occasion – sharks. In addition to research, Mike enjoys teaching undergraduates, and training the next generation of scientists. Mike has nearly 40 peer-reviewed publications, and received the Aaron O. Hoff Superior Teaching Award in 2015.