Drew Sauve

Mitacs Elevate Postdoctoral Fellow
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Education

Queen's University, Ph.D. Evolutionary Ecology and Quantitative Genetics 2023

Queen's University, MSc. Evolutionary and Ecological Genetics 2018

Queen's University, B.Sc. (Hons) Biology 2016

Teaching

Teaching Fellowship

I taught a ~300 student undergraduate course on evolutionary genetics. The course is a required biology course at Queen's University and introduces population genetics, quantitative genetics, and evolutionary genomics.

Teaching Assistanceships

I've helped to teach five biology courses at Queen's University, topics included introductory genetics, evolutionary genetics, conservation biology, and evolutionary biology. I designed and taught a custom tutorial on quantitative genetics and conservation for an upper-year genetics course.

Student Supervision

I've helped co-supervise three honours thesis students at Queen's University on effective population size, phenotypic plasticity, and measuring selection in captivity. At African Lion Safari I help supervise and guide staff led research projects (~8 staff) that include work on artificial reproduction, nutrition, population genetics, and quantiative genetics of ex situ populations. I'm currently supervising a research assistant who is developing a PhD proposal for collaboration with a Canadian University.

Hana Thompson Genomics, plasticity, and selection in ex situ and in situ conservation programs. 2023- Present. Hana is funded by African Lion Safari and is working with me to develop a PhD in collaboration with an Ontario University.

Dominique Charland Measuring Unintentional Selection in a Captive Breeding Program for the Eastern Loggerhead Shrike (Lanius ludovicianus migrans) 2022. Dominique is now a JD candidate at the University of Ottawa.

Haley Turcotte Phenotypic plasticity of parental investment in early-life growth traits within black-legged kittiwakes (Rissa tridactyla) 2021. Haly is now a MSc student at Carleton University.

Ferris Nowlan Estimation of effective population size from demographic and genomic data for an Arctic seabird (Cepphus grylle) 2020. Ferris is now a PhD student at the University of Toronto.

Publications

In prep.

18.**Sauve, D.**, Chabot, A. A., Reale, D.(*In prep.*) Genetic adaptation in zoos and conservation breeding programs.

17.**Sauve, D.**, Friesen, V. L., Teplitsky, C., Hatch, S. A., Charmantier, A.(*In prep.*) Food supplementation decreases additive genetic variation in black-legged kittiwake nestling mass.

16.**Sauve, D.**, Rodriguez-Clark, K., Lacy, R. C., Helsen, P., (*In prep.*) Optimizing group managed conservation breeding programs with simulations.

15.Elliott, G. C., **Sauve, D.**, Thompson, H., Stanger-Guy, S. J., Hathaway, C. J., Moxley, K., Pearce, J., Sheridan, C., Vos, R., Chabot, A. A., Lougheed, S. C.(*In prep.*) Short-term storage of snake sperm.

14.Elliott, G. C., Thompson, H., Chabot, A. A., Boultè, G. Hathaway, J., Pierce, J., **Sauve, D.** (*In prep.*) A low-cost method for assessing body mass of Eastern Musk Turtles (*Sternotherus odoratus*)

13.Atkinson, M., Dales, J., Lefebvre, J., **Sauve, D.**, Morgan, G., Chabot, A. A.(*In prep.*) Vitamin E supplementation in red-tailed hawks (*Buteo jamaicensis*).

12.Green, A., **Sauve, D.**, Boccia, C., Friesen, V. L.(*In prep.*) Conditional Probabilities and population assignment.

In review

11.**Sauve, D.**, Charland, D., Solecki, A., Hudecki, J., Wheeler, H., Thompson, H., Steiner, J., Friesen, V. L., Chabot, A. A. 2024. Disentangling the contributions to phenotypic evolution in conservation breeding: a case study of morphological change in a breeding program of an endangered migratory songbird. *Animal Conservation*

2024

10.**Sauve, D.**, Charmantier A., Hatch, S. A., Friesen, V. L. 2024. The magnitude of selection on growth varies among years and increases under warming conditions in a subarctic seabird. *Evolution Letters* 8, 56-63.

2023

9.**Sauve, D.**, Friesen, V. L., A, Hatch, S. A., Elliott, K. H., Charmantier A. 2023. Shifting environmental predictors of phenotypes under climate change: a case study of growth in high latitude seabirds. *Journal of Avian Biology* e03062.

8.Kerr, K. C., **Sauve, D.**, Winton, S. Thorne, T. J., Chabot, A. A. 2023. Examining the representation of locally threatened species in North American zoos. *Animal Conservation* 26, 625-632.

2022

7.**Sauve, D.**, Hudecki, J., Steiner, J., Wheeler, H., Chabot, A. A. 2022. Improving species conservation plans under IUCN's One Plan Approach using quantitative genetic methods. *Peer Community Journal* 2, e50.

6.**Sauve, D.**, Charmantier, A., Hatch, S. A., Friesen V. L. 2022. Environmental conditions variably affect growth across the breeding season in a subarctic seabird. *Oecologia* 198, 307-318.

2021

5.**Sauve, D.**, Friesen, V. L., Charmantier, A. 2021. The effects of weather on avian growth and implications in the context of climate change. *Frontiers in Ecology and Evolution* 9.

4.Friesen, V. L., Brunt, R., Morris-Pocock, J. A., **Sauve, D.**, Baker, A. J., Birt, T. P., Davidson, W. S., Elliott, K. H., Montevecchi, W. A. 2021. A test of mechanisms of population differentiation in gannets (genus Morus) using comparative phylogeography and morphometrics. *Marine Ornithology* 49, 275-291.

2020

3.**Sauve, D.**, Dale, C. A., Tigano, A., Ratcliffe, L. M., and Friesen V. L. 2020. Do candidate genes for migration and behaviour explain migratory variation in bluebirds (*Sialia spp.*)? *The Wilson Journal of Ornithology* 132, 820-829.

2019

2.**Sauve, D.**, Divoky, G., and Friesen V. L. Phenotypic plasticity or evolutionary change? An examination of the phenological response of an Arctic seabird to climate change. 2019. (*Cepphus grylle mandtii*) *Functional Ecology* 33, 2180-2190.

1.**Sauve, D.**, Patirana, A., Chardine, J., and Friesen V.L. 2019. Mitochondrial DNA reveals genetic structure within Atlantic but not Pacific populations of a holarctic seabird *Marine Ornithology* 47, 199-208.

Presentations

17.**Sauve, D.** Chabot, A. A., Reale, D. Genetic adaptation in zoos and conservation breeding programs. Species360 Conservation Science Alliance Research Symposium 2024. Presentation. Online symposium.

16.Vitamin E supplementation in red-tailed hawks (*Buteo jamaicensis*). 2024. Atkinson, M., Dales, J., Lefebvre, J., **Sauve, D.**, Morgan, G., Chabot, A. A. American Association of Zookeepers. Poster. Omaha, Nebraska.

15.Elliott, G. C., **Sauve, D.**, Thompson, H., Stanger-Guy, S. J., Hathaway, C. J., Moxley, K., Pearce, J., Sheridan, C., Vos, R., Chabot, A. A., Lougheed, S. C. Short-term storage of snake sperm. 2024. Canadian Herpetological Society. Presentation. Sidney, Britisch Columbia.

14.Thompson, H., Chabot, A. A., **Sauve, D.** Investigating variation in fecundity in conservation breeding programs. Joint Evolutionary Congress 2024. Poster. Montreal, Quebec.

13.**Sauve, D.** Chabot, A. A., Reale, D. Genetic adaptation in zoos and conservation breeding programs. Symposium on Conservation Genetics Across Multiple Species at the joint Evolutionary Congress 2024. Presentation. Montreal, Quebec.

12.**Sauve, D.** Chabot, A. A., Reale, D. Genetic adaptation in zoos and conservation breeding programs. Universite du Quebec a Montreal. Presentation. Montreal, Quebec.

11.**Sauve, D.**, Friesen, V. L., Teplitsky, C., Hatch, S. A., Charmantier, A. Food supplementation decreases additive genetic variation in nestling mass. *Wild Animal Modelling Biannual Meeting*. Presentation. Okehampton, England.

10.**Sauve, D.**, Friesen, V. L., Teplitsky, C., Hatch, S. A., Charmantier, A. Exploring the influence of food supplementation on variance components of early life traits of black-legged kittiwakes. *Evolution*. Presentation. Albuquerque, New Mexico.

9.**Sauve, D.**, Friesen, V. L., Teplitsky, C., Hatch, S. A., Charmantier, A. 2021. Impacts of fluctuating environmental conditions and experimental feeding on selection of growth in black-legged kittiwakes. *Virtual Evolution*. Presentation.

8.**Sauve, D.**, Friesen V. L., Divoky G. J., Hatch, S. A., Elliott, K. H., Gaston, A. J., Charamantier, A. 2020. Ecological and evolutionary impacts of climate change on the phenology and growth of seabirds. Presentation. *Seminars in Ecology and Evolution*. Presentation. Centre d'Ecologie Fonctionelle & Evolutive,Montpellier, France.

7.**Sauve, D.**, Chabot, A. The value of quantitative genetics for managing captive breeding populations. 2019. *Loggerhead Shrike Recovery Meeting* Presentation. African Lion Safari, Cambridge, Ontario.

6.**Sauve, D.**, Charmantier, A., Divoky, G., Hatch, S. A., Elliott, K., Gaston, A. J., Friesen V. L. 2019. *Evolution*. Variation in chick growth in response to climate change in three high latitude seabird species. Poster. Providence, Rhode Island.

5.**Sauve, D.**, Divoky, G., and Friesen V. L. 2018. Queen's University. *Biology Graduate Student Day*. Phenological change in Mandt's Black Guillemot is driven by phenotypic plasticity. Presentation. Kingston, Ontario.

4.**Sauve, D.**, Divoky, G., and Friesen V. L. 2018. Queen's University. *American Genetics Associations: Quantitative Genetics in the Wild*. Phenological change in Mandt's Black Guillemot is driven by phenotypic plasticity. Presentation. Toronto, Ontario.

3.**Sauve, D.**, Divoky, G., and Friesen V. L. 2017. Disentangling evolutionary and plastic change in the laying date of an Arctic seabird. *Wild Animal Modelling Biennial Meeting*. Presentation. Saint-Michel-Des-Saints, Quebec.

2.**Sauve, D.**, Divoky, G., and Friesen V. L. 2017. Phenotypic plasticity drives phenological change in Mandt's Black Guillemot. *ArcticNet*. Poster. Quebec City, Quebec.

1.**Sauve, D.**, Dale, C. A., Tigano, A., Ratcliffe, L. M., and Friesen V. L. An investigation into the genetic basis of partial migration in Western Bluebirds (Sialia mexicana) using candidate genes 2016. *North American Ornithological Conference*. Poster. Washington, DC.

Media

Sixty Second Seabird Science Youtube Series https://www.youtube.com/watch?v=sNLRIqPfNFE

Spotlight Article in Functional Ecology https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/1365-2435.13430?af=R

National Geographic Coverage of 2019 Functional Ecology Paper https://www.nationalgeographic.com/environment/2019/08/many-animals-can-adapt-climate-change-just-not-fast-enough-/

Blog post on Proteus (Storytelling for a blue planet). https://proteusscicomm.org/2018/08/15/long-term-data-collection-serves-many/

Service

Evolution in zoos and conservation programs symposium organizer 2024

Conservation Planning Specialist Group - Group Management Simulations Team 2023-Present

Contributor to the Wild Animal Modelling Website 2023-Present

IUCN Species Conservation Planning Team for Eastern Loggerhead Shrike 2019-Present

Advisor for Creation of an Online Resource Library for Inclusive Science Communication 2021-2024

SciNapse Undergraduate Case Study Judge 2021-2022

OE3C 2017 Organizing Committee 2016-2017

Queen's University Biology Graduate Student Co-Chair 2016-2017

Awards & Funding

Mitacs Elevate Postdoctoral Research Fellowship 2023-2025 **$160,000CAD**

NSERC Michael Smith Foreign Study Supplement 2022 **$6,000CAD**

NSERC Alexander Graham Bell Canada Graduate Scholarship 2020-2023 **$105,000CAD**

Haldane Prize Shortlist - Best Early Career Paper in Functional Ecology 2020

TD Fellowship in Arctic Environmental Issues 2019-2020 **$30,000CAD**

Northern Studies Training Program. Canadian Polar Commission. 2019. **$2,343CAD**

Northern Studies Training Program. Canadian Polar Commission. 2018. **$2,890CAD**

Society for the Study of Evolution Travel Grant. Society for the Study of Evolution. 2018. **$500USD**

Northern Studies Training Program. Canadian Polar Commission. 2017. **$2,263CAD**

Canadian Society for the Study of Ecology and Evolution Travel Grant. 2016. **$750CAD**

Undergraduate Student Research Award. NSERC. 2016. **$4,500CAD**

North American Bluebird Society Grant. North American Bluebird Society. 2015. **$1,000USD**

Certifications & Courses

MITACs Elevate Courses in Leadership, Research, EDI, and Industry Careers 2023 - Ongoing

Breeding Program Modelling with AlphaSimR 2022

Wilderness First Responder 2022

Basic Life Support Certification/CPR-C 2022

*Pleasure Craft Operator Card:*18032589508 2016

Canadian Firearms Safety Course 2016

Research Skills

Statistics and Bioinformatics

I have used R throughout my academic career and I am comfortable with generalized linear models, mixed models, and non-linear models. I familiar with the population modelling software Vortex and running individual based demographic models. I am proficient in basic bioinformatics (filtering and preparing ddRADseq or whole genome data) and I am comfortable navigating and submitting jobs on a UNIX computer cluster. I have done basic programming in Python and have run non-linear and custom Bayesian models using STAN. I am happy and eager to learn and work with the best statistical software for any given analysis.

Fieldwork

Currently, I am leading a team in the collection of reproductive data on an ex situ breeding program of Northern Bobwhite with a planned future reintroduction in collaboration with the Nature Conservancy of Canada in Southern Ontario. I have spent three field seasons working with numerous seabird species in Northern Alaska, Newfoundland, and the Gulf of Alaska. I have worked with both small and large teams under difficult weather conditions to collect blood samples, make field observations, and capture and record morphometrics. I led the field team on Middleton Island for part of the 2019 field season. I have worked with teams in France to help maintain long-term data sets on great and blue tits near Montpellier and Corsica.

Labwork

I am proficient in DNA extraction, PCR, microsatellite analysis, and preparing DNA samples for next-generation sequencing. I am currently learning to extract, preserve, culture, and donate primordial germ cells from avian embryos.