

Benjamin Furman

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PhD Candidate, Evans Lab,
Department of Biology
McMaster University
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Canada

Education

- 2012 – Pres. **Ph.D. Candidate**, *McMaster University*, Hamilton, Ontario, Canada, Ben Evans Lab.
Evolutionary Genetics, transferred from M.Sc. with distinction
- 2008 – 2012 **B.Sc.**, *University of Alberta*, Edmonton, Alberta, Canada.
Specilization in Animal Biology

Research

- Phd Dissertation I am working on African clawed frogs (*Xenopus spp.*) studying the evolution of sex chromosomes, understanding genome evolution following whole genome duplication, and assessing basic phylogeography and patterns of speciation of the genus. These projects have involved a wide array of sequencing techniques (whole genome, reduced representation, transcriptome and Sanger sequencing), field work in Africa, and generating numerous lab-reared *Xenopus* families.
- Undergraduate Thesis I conducted a fine-scale genetic analysis of a wood frog population inhabiting an urban environment. This was an attempt to understand how urbanization impacts connectivity of populations and the role that artificial wetlands play in maintaining gene flow. This project involved field collections and microsatellite sequencing and analysis.

Publications

(Grey journal title link to PDFs)

- Furman, B. L. S.**, Cauret, C. M. S., Colby, G. A., Measey, J., and Evans, B. J. (2016) Limited genomic consequences of hybridization between two African clawed frogs, *Xenopus gilli* and *X. laevis* (Anura: Pipidae). *Scientific Reports* In Review.
- Furman, B. L. S.** and Evans, B. J. (2016) Sequential turnovers of sex chromosomes in African clawed frogs (*Xenopus*) suggest some genomic regions are good at sex determination. *Genes, Genomes and Genetics (G3)* 6(11), 3625–3633.
- Furman, B. L. S.**, Scheffers, B. R., Taylor, M., Davis, C., and Paszkowski, C. A. (2016) Limited genetic structure in a wood frog (*Lithobates sylvaticus*) population in an urban landscape inhabiting natural and constructed wetlands. *Conservation Genetics* 17(1), 19–30.

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- Furman, B. L. S.**, Bewick, A. J., Harrison, T. L., Greenbaum, E., Gvoždík, V., Kusamba, C., and Evans, B. (2015) Pan-African phylogeography of a model organism, the African clawed frog *Xenopus laevis*. *Molecular Ecology* 24(4), 909–925.
- Scheffers, B. R., **Furman, B. L. S.**, and Evans, J. P. (2013) Salamanders continue to breed in ephemeral ponds following the removal of surrounding terrestrial habitat. *Herpetological Conservation and Biology* 8(3), 1–9.
- Furman, B. L. S.**, Scheffers, B. R., and Paszkowski, C. A. (2011) The use of fluorescent powdered pigments as a tracking technique for snakes. *Herpetological Conservation and Biology* 6(3), 473–478.

Scholarships

- 2015 – 2018 **Natural Sciences and Engineering Research Council Alexander Graham Bell Canada Graduate Scholarship (CGS-D)**, \$105 000, Academic and Research Achievement, National Scholarship.
- 2014 – 2015 **Clifton W. Sherman Ontario Graduate Scholarship**, \$15 000, Academic and Research Achievement, Provincial Scholarship.
- 2013 – 2014 **The Joseph and Joanne Lee Ontario Graduate Scholarship**, \$15 000, Academic and Research Achievement, Provincial Scholarship.
- 2012 **University of Alberta Undergraduate Scholarship**, \$750, Academic Achievement, University Scholarship.
- 2011 **Jason Lang Scholarship**, \$1 000, Academic Achievement, Provincial Scholarship.
- 2010 **Jason Lang Scholarship**, \$1 000, Academic Achievement, Provincial Scholarship.

Awards And Certificates – monetary and non-monetary

- 2016 **McMaster Teaching Assistant Award, nomination**, Nominated by students.
- 2016 **McMaster Biology Department Travel Award**, \$1 600, For conference travel.
- 2015 **McMaster Biology Graduate Research Day Presentation, Non-monetary**, Honourable mention best presentation.
- 2015 **McMaster Biology Department Achievement Award, Non-monetary**, Best publication of the year in ecology and evolution.
- 2015 **McMaster Biology Department Travel Award**, \$1 000, For conference travel, declined.
- 2014 **McMaster Biology Department Achievement Award, Non-monetary**, For departmental involvement.
- 2014 **McMaster Biology Department Travel Award**, \$850, For conference travel.
- 2014 **Principles and Practicing of University Teaching, Non-monetary**, Graduate level certificate course in university level teaching.

Teaching & Mentorship

- 2012 – Pres. **Teaching Assistant:** Biol 3FF3 Evolution, Biol 3SS3 Population Ecology, Biol 3SO3 Introduction to Bioinformatics, Biol 4DD3 Molecular Evolution
- 2015 **Teaching assistant:** Ontario Universities Program in Field Biology course in Tanzania. Field Ecology.
- Guest lecturer fourth year Molecular Evolution (Biol 4DD3)
 - Guest lecturer first year introductory biology (Biol 1A03)
 - Mentoring multiple fourth year undergraduate students doing thesis projects
 - Mentoring many volunteer undergraduate students

Community Involvement

- 2016 – Pres. IUCN Amphibian Specialist Group Canada member
- 2016 – Pres. L^AT_EX adviser with Overleaf (a collaborative writing platform, with an emphasis on scientific writing)
- 2013 - Pres. Organizing committee member for Department of Biology Graduate Student Research Day
- 2013 – Pres. Judge for Biology Undergraduate Symposium
- 2013 – 2015 Associate Editor – *Journal of Student Science and Technology* (formerly *Canadian Young Scientists Journal*)
- 2013 – 2015 President of the Biology Graduate Students Society
- 2013 – 2015 Department of Biology Graduate Student Studies Committee member
- 2012 – 2013 Outreach Coordinator Biology Graduate Student Society

Academic Peer Review

Reviewer for: PeerJ, Molecular Ecology, Journal of Applied Ecology, PloS One

Select Conference Presentations

(* indicates presenter)

- ***Furman, B. L. S.** and Evans, B. J. (2016) Talk: Sequential turnovers of sex chromosomes in African clawed frogs (*Xenopus*) suggest some genomic regions are good at sex determination. *Evolution* Austin, Texas, USA. Video, Slides.
- ***Furman, B. L. S.** and Evans, B. J. (2015) Talk: Sex Chromosome Evolution in *Xenopus*. *Canadian Herpetological Society* Saint John, New Brunswick, Canada.
- ***Furman, B. L. S.** and Evan, B. J. (2014a) Talk: Phylogenetics of Polyploid African Clawed Frogs Using RNAseq; Inferences for Sex Chromosome Evolution. *Genomes to Biomes* Montreal, Quebec, Canada.
- ***Furman, B. L. S.** and Evan, B. J. (2014b) Talk: Phylogenetics of Polyploid African Clawed Frogs Using RNAseq; Inferences for Sex Chromosome Evolution. *OE3C* Guelph, Ontario, Canada.

- *Evans, B. J., Bewick, A. J., Chain, F. J. J., **Furman, Benjamin L S**, Wiens, J., and Pyron, A. (2013) Talk: Sex Chromosome Evolution in Frogs. *Society for Molecular Biology and Evolution* Chicago, Illinois, USA.
- ***Furman, B. L. S.**, Bewick, A. J., and Evans, B. J. (2013) Poster: Sex Chromosomes in *Xenopus borealis*. *Evolution* Snowbird, Utah, USA.
- ***Furman, B. L. S.**, Davis, C., and Paszkowski, C. A. (2012) Talk: Fine-scale genetic analysis of wood frogs in an urban landscape. *University of Alberta Undergraduate Thesis Symposium* Edmonton, Alberta, Canada.
- ***Furman, B. L. S.** (2011) Poster: The use of fluorescent powdered pigments as a tracking technique for snakes. *University of Alberta Undergraduate Research Symposium* Edmonton, Alberta, Canada.

Skills

Sequencing and Analyses	Illumina (whole genome, GBS, RADseq, RNAseq) and Sanger sequence analysis, phylogenetics, general evolutionary analyses, variant calling and mutation discovery
Computation	Perl, Bash, R, R/Shiny, L ^A T _E X, Git, Cloud/cluster computing
Laboratory	PCR, primer design, Sanger sequence prep, gel electrophoresis, DNA/RNA extraction, cloning (genes and microsatellites), maintaining large scale amphibian housing and care facility
Field	Radio telemetry, fluorescent trailing, amphibian and reptile capture, tagging and tissue collection, some bird and small mammal experience, biodiversity monitoring (water quality, soil sampling, lichen survey, bird/amphibian call surveys), work in remote areas and foreign countries

Field Excursions

- 2017 Kenya. Sampling *Xenopus borealis* and *X. victorinus* to assess sex linkage of the new sex determining system we found (see [this publication](#)) in wild populations. Also, we aim to address the claims of a hybrid zone between these species.
- 2016 Ghana. Sampling *X. tropicalis* and *X. fishbergi*, but also collecting other amphibian species encountered to explore genetic structure and assess sex linkage in wild populations.
- 2014 Argentina. Sampling *Octodontidae* rodents to explore a possible mammalian genome duplication. Included museum sampling and wild captures.
- 2012 South Africa. Sampling *X. laevis* populations from across the country to explore genetic structure and species delineation. These efforts resulted in a [publication](#).

Work Experience

- May – Sept. 2012 **Field Technician**, *Alberta Biodiversity Monitoring Institute*, Biodiversity Monitoring.
- Province wide field work
 - Aquatic and terrestrial sampling
 - Soil and water sampling
 - Invertebrate, lichen, moss, plant sampling and identification

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- Bird call recording
 - Bird and amphibian identification
- April – Oct. 2011 **Research Assistant**, *University of Alberta*, Worked with Mudoch Taylor (M.Sc.) and Cynthia Paszkowski (Ph.D.), Amphibian Research.
 - Radio telemetry
 - Call and egg mass surveys
 - Adult capture
 - Water quality assessment
- May – July 2010 **Field Biologist**, *Parks Canada*, Jasper National Park, Amphibian Monitoring.
 - Amphibian monitoring study
 - Adult, larval stage and Egg mass identification
 - Public education on amphibians
 - Data management
 - Bird netting and banding
- April – Sept. 2009 **Research Assistant**, *University of Alberta*, Worked with Brett Scheffers (Ph.D.) and Cynthia Paszkowski (Ph.D.), Amphibian and Reptile Research.
 - Snake and amphibian tracking with fluorescent powder
 - Survey of all life stages for snakes and amphibians
 - Pit fall trapping
 - Amphibian call surveys