

# Benjamin Furman

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benjamin.ls.furman@gmail.com  
PhD Candidate, Evans Lab,  
Department of Biology  
McMaster University  
Hamilton, Ontario  
Canada

## Research Interests

Sex chromosome evolution  
Polyploid genome evolution  
Phylogenetics and phylogeography

## Education

- 2012 – Pres. **Ph.D.**, *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

## Publications

- 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)* Availabe Online September 7.
- 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.
- 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.

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## Scholarships

- 2015 – 2018 **Natural Sciences and Engineering Research Council Alexander Graham Bell Canada Graduate Scholarship (CGS-D)**, \$105000, Academic and Research Achievement, National Scholarship.
- 2014 – 2015 **Clifton W. Sherman Ontario Graduate Scholarship**, \$15000, Academic and Research Achievement, Provincial Scholarship.
- 2013 – 2014 **The Joseph and Joanne Lee O.G. Scholarship**, \$15000, Academic and Research Achievement, Provincial Scholarship.
- 2012 – 2013 **McMaster Biology Scholarship**, \$8000, Institutional Scholarship.
- 2012 **University of Alberta Undergraduate Scholarship**, \$750, Academic Achievement, University Scholarship.
- 2011 **Jason Lang Scholarship**, \$1000, Academic Achievement, Provincial Scholarship.
- 2010 **Jason Lang Scholarship**, \$1000, Academic Achievement, Provincial Scholarship.

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## Awards And Certificates – monetary and non-monetary

- 2016 **McMaster Biology Department Travel Award**, \$1600, 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**, \$1000, 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.

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## Community Involvement

- 2016 – Pres. IUCN Amphibian Specialist Group Canada member
- 2016 – Pres. L<sup>A</sup>T<sub>E</sub>X adviser with Overleaf
- 2013 – Pres. Associate Editor – *Journal of Student Science and Technology* (formerly *Canadian Young Scientists Journal*)
- 2013 - Pres. Organizing committee member for Department of Biology Graduate Student Research Day
- 2013 – 2015 President of the Biology Graduate Students Society
- 2013 – 2015 Department of Biology Graduate Student Studies Committee member

📞 1 - (289) 925 2362 • ✉ [benjamin.ls.furman@gmail.com](mailto:benjamin.ls.furman@gmail.com)

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- 2012 – 2013 Outreach Coordinator Biology Graduate Student Society  
2013 Judge for Biology Undergraduate Symposium

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## Academic Peer Review

PeerJ, Molecular Ecology, Journal of Applied Ecology, PloS One

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## 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 for a Ontario Universities Program in Field Biology course in Tanzania
- Mentoring multiple fourth year undergraduate students doing thesis projects
  - Mentoring many volunteer undergraduate students

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## Select Conference Presentations

- \***Furman, B. L. S.** and Evans, B. J. (September 2015, Saint John, New Brunswick, Canada). Talk: Sex Chromosome Evolution in *Xenopus*. *Canadian Herpetological Society*.
- \***Furman, B. L. S.** and Evan, B. J. (May 2014, Montreal, Quebec, Canada). Talk: Phylogenetics of Polyploid African Clawed Frogs Using RNAseq; Inferences for Sex Chromosome Evolution. *Genomes to Biomes*.
- \***Furman, B. L. S.** and Evan, B. J. (May 2014, Guelph, Ontario, Canada). Talk: Phylogenetics of Polyploid African Clawed Frogs Using RNAseq; Inferences for Sex Chromosome Evolution. *OE3C*.
- \***Furman, B. L. S.**, Bewick, A. J., and Evans, B. J. (June 2013, Snowbird, Utah, USA). Poster: Sex Chromosomes in *Xenopus borealis*. *Evolution*.
- \*Evans, B. J., Bewick, A. J., Chain, F. J. J., **Furman, Benjamin L S**, Wiens, J., and Pyron, A. (July 2013, Chicago, Illinois, USA). Talk: Sex Chromosome Evolution in Frogs. *Society for Molecular Biology and Evolution*.
- \***Furman, B. L. S.** and Evans, B. J. (July 2016, Austin, Texas, USA). Talk: Sequential turnovers of sex chromosomes in African clawed frogs (*Xenopus*) suggest some genomic regions are good at sex determination. *Evolution*.
- \***Furman, B. L. S.** (April 2011, Edmonton, Alberta, Canada). Poster: The use of fluorescent powdered pigments as a tracking technique for snakes. *University of Alberta Undergraduate Research Symposium*.
- \***Furman, B. L. S.**, Davis, C., and Paszkowski, C. A. (April 2012, Edmonton, Alberta, Canada). Talk: Fine-scale genetic analysis of wood frogs in an urban landscape. *University of Alberta Undergraduate Thesis Symposia*.
- (\* indicates presenter)

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## Skills

- Sequencing Illumina (whole genome, GBS, RADseq, RNAseq) and Sanger sequence analysis, phylogenetics, general evolutionary analyses
- Computation Perl, Bash, R, L<sup>A</sup>T<sub>E</sub>X, Git

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- Laboratory PCR, primer design, Sanger sequence prep, gel electrophoresis, tissue 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

## Research Experience

- Phd Working on African clawed frogs (*Xenopus spp.*) to characterize the evolution of novel sex chromosomes, understand genome evolution following whole genome duplication, and basic phylogeography and patterns of speciation of the genus. These project have involved a wide array of sequencing techniques (whole genome, reduced representation, transcriptome and Sanger sequencing), generating numerous lab-reared *Xenopus* families, and field work in Africa.
- Dissertation
- Undergraduate 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.
- Thesis

## Field Excursions

- 2017 Kenya. Sampling *Xenopus borealis* and *Xenopus victorianus* 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 *Xenopus tropicalis* and *Xenopus fishbergi*, but also collecting other amphibian species encountered to explore genetic structure and assess sex linkage in wild population.
- 2014 Argentina. Sampling *Octodontidae* rodents to explore a possible mammalian genome duplication. Included museum sampling and wild captures.
- 2012 South Africa. Sampling *Xenopus laevis* populations from across the country to explore genetic structure and species delineation. These efforts resulted in a publication.

## Work Experience

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

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April – Oct. **Research Assistant**, *University of Alberta*, Worked with Mudoch Taylor  
2011 (M.Sc.) and Cynthia Paszkowski (Ph.D.), Amphibian Research.

- Radio telemetry
- Call and egg mass surveys
- Adult capture
- Water quality assessment

May – July **Field Biologist**, *Parks Canada*, Jasper National Park, Amphibian Monitoring.  
2010

- Set up amphibian monitoring study
- Adult, larval stage and Egg mass identification
- Public education on amphibians
- Data management
- Bird netting and banding

April – Sept. **Research Assistant**, *University of Alberta*, Worked with Brett Scheffers  
2009 (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