

Joseph A. McGirr

Education and Experience

- 2020- **Postdoctoral Researcher**, University of California, Davis
- 2015-2020 **Ph.D. Biology**, University of North Carolina, Chapel Hill
- 2014 **B. S. Biology**, University of Colorado, Colorado Springs

Publications

- In review* Richards EJ, **McGirr JA**, Wang J, St. John ME, Poelstra JW, et al. Major stages of vertebrate adaptive radiation are assembled from a disparate spatiotemporal landscape. *bioRxiv preprint* doi.org/10.1101/2020.03.12.988774
- 2020 **McGirr JA** and Martin CH. Few fixed variants between trophic specialist pupfish species reveal candidate *cis*-regulatory alleles underlying rapid craniofacial divergence. *Molecular Biology and Evolution* *early access* doi.org/10.1093/molbev/msaa218
- 2020 **McGirr JA** and Martin CH. Ecological divergence in sympatry causes gene misregulation in hybrids. *Molecular Ecology* 29: 2707–2721.
- 2019 Martin CH, **McGirr JA**, Richards EJ, St. John ME. How to investigate the origins of novelty: insights gained from genetic, behavioral, and fitness perspectives. *Integrative Organismal Biology*. doi:10.1093/iob/obz018
- 2019 **McGirr JA** and Martin CH. Hybrid gene misregulation in multiple developing tissues within a recent adaptive radiation of *Cyprinodon* pupfishes. *PLoS One*. 14(7): e0218899.
- 2019 St. John ME, **McGirr JA**, and Martin CH. The behavioral origins of novelty: did increased aggression lead to scale-eating in pupfishes? *Behavioral Ecology*. 30:557–569.
- 2018 **McGirr JA** and Martin CH. Parallel evolution of gene expression between trophic specialists despite divergent genotypes and morphologies. *Evolution Letters*. 2:62–75.
- 2017 Turissini DA, **McGirr JA**, Patel SS, Matute DR. The rate of evolution of postmating-prezygotic reproductive isolation in *Drosophila*. *Molecular Biology and Evolution*. 35:312–344.

- 2017 **McGirr JA** and Martin CH. Novel candidate genes underlying extreme trophic specialization in Caribbean pupfishes. *Molecular Biology and Evolution*. 34:873–888.
- 2017 **McGirr JA**, Johnson LM, Kelly W, Markow TA, Bono JM. Reproductive isolation among *Drosophila arizonae* from geographically isolated regions of North America. *Evolutionary Biology*. 44:82–90.

Fellowships and Awards

- 2020 NSF-XSEDE Startup Allocation: The impacts of the Exxon Valdez oil spill on Pacific herring population collapse and lack of recovery in Prince William Sound, Alaska. \$2,000
- 2018 Triangle Center for Evolutionary Medicine Graduate Fellowship. \$10,446
- 2017 Rosemary Grant Travel Award, Society for the Study of Evolution. \$1,630
- 2017 L.I. Gilbert Travel Award, University of North Carolina Chapel Hill. \$750
- 2017 Best Graduate Student Presentation, Southeastern Population Ecology and Evolutionary Genetics (SEPEEG) Conference. \$100
- 2015 NSF Graduate Research Fellowship Program: Honorable Mention.
- 2014 College of Letters, Arts, and Sciences Research Award, University of Colorado Colorado Springs. \$1,500

Presentations and Invited Seminars

- 2019 *Contributed talk*. Society for the Study of Evolution meeting. Providence, RI.
- 2018 *Invited speaker*. Research in Progress Seminar Series. East Carolina University. Greenville, NC.
- 2018 *Contributed talk*. Society for Integrative and Comparative Biology meeting. San Francisco, CA.
- 2017 *Contributed talk*. Southeastern Population Ecology and Evolutionary Genetics Conference. Laurel Hill NC.
- 2017 *Contributed talk*. Society for the Study of Evolution meeting. Portland, OR.

Teaching and Service

Teaching Assistant:

Ecology and Evolution BIOL 201

Animal Behavior BIOL 278

Course-based Undergraduate Research Experience BIOL 102L

Comparative Vertebrate Anatomy BIOL 315

Journal reviewer: *Genetics*, *Proceedings of the Royal Society B*, *Molecular Ecology*, *G3: Genes, Genomes, Genetics*.

Society memberships: Society for the Study of Evolution, Society for Molecular Biology and Evolution

MarineOmics working group: Member of a committee providing guidance on applying genomic tools in marine science while emphasizing data availability, code accessibility, and reproducibility.

Graduate student peer mentor

Mentored first year graduate students entering the Biological and Biomedical Sciences Program at UNC. Helped develop departmental talks, write manuscripts, and navigate their first year at UNC as they choose thesis labs.

Contributor to the Scientific Research and Education Network

Developed and distributed a high school lesson plan based on my research with the help of educators from North Carolina K-12 schools.

DNA Day volunteer

Taught DNA related lesson plans in three classes (ranging 9-11 grade) at a rural high school in NC.

Darwin Day volunteer

Annual science fair open to the public held at the North Carolina museum of natural history.

Technical Skills

Computational Experience

- Proficient in R and Python.
- Comfortable with cloud computing in a Unix/Linux environment.
- Analyzed next generation sequencing datasets (whole genome, RNAseq, and CHIPseq) with industry standard pipelines and software including GATK, Samtools, VCFtools, PLINK, BWA, PICARD, and R-Bioconductor packages.
- Applied machine learning statistical methods and bioinformatic approaches to study the genetic basis of complex traits (genome-wide association mapping, differential expression, allele specific expression, and population genomic analyses).

Laboratory Experience

- Designed and performed CRISPR/Cas9 gene editing experiments in a non-model organism.
- Maintained a breeding population of tropical fishes.
- Used standard genetic protocols for DNA/RNA extractions, PCR, gel electrophoresis, and Sanger sequencing.
- Designed *in situ* hybridization probes.
- Performed immunohistochemistry experiments and visualized results with fluorescence microscopy.