Joseph McGirr, PhD

Evolutionary Biologist
Postdoctoral Researcher

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Summary

I'm a bioinformatics scientist specializing in evolutionary genetics and population biology. I have a Ph.D. in biology from the University of North Carolina and have published research in prominent journals including *Molecular Biology and Evolution, Evolution Letters,* and *Molecular Ecology*. My projects combine evolutionary theory with next generation sequencing data to answer questions at the intersection of basic and applied research.

Education

University of North Carolina, Chapel Hill	2015-2020	Ph.D. Biology
University of Colorado, Colorado Springs	2010-2014	B.S. Biology *magna cum laude*

Experience

2020 - **Postdoctoral Researcher, Whitehead Lab, Dept. of Environmental Toxicology, University of California, Davis, CA**

- Conducted temporal and spatial genomic contrasts to understand population collapse and recovery.
- Identified cross-species differential gene expression in response to osmotic stress.

2015-2020 **PhD Student, Martin Lab, Dept. of Biology, University of North Carolina, Chapel Hill, NC**

- Research on the genetic basis of adaptive traits and reproductive isolation in young species.
- Identification of novel candidate genes influencing craniofacial development.
- Discovered alleles under divergent selection contributing to gene misregulation in hybrids.
- Taught labs in evolution, animal behavior, anatomy, and course-based undergraduate research (CURE).

Selected Publications

full list at: https://scholar.google.com/citations?user=BaXHXekAAAAJ&hl=en

Few fixed variants between trophic specialist pupfish species reveal candidate *cis*-regulatory alleles underlying rapid craniofacial divergence. McGirr JA and Martin CH. 2020. *Molecular Biology and Evolution.* https://doi.org/10.1093/molbev/msaa218

Ecological divergence in sympatry causes gene misregulation in hybrids. McGirr JA and Martin CH. 2020. *Molecular Ecology*. https://doi.org/10.1111/mec.15512

Parallel evolution of gene expression between trophic specialists despite divergent genotypes and morphologies. McGirr JA and Martin CH. *Evolution Letters.* https://doi.org/10.1002/evl3.41

Service

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.

Funding and Awards

NSF-XSEDE Startup Allocation. 2020. $2,000.

Triangle Center for Evolutionary Medicine Graduate Fellowship. 2018. $10,500 stipend.

Rosemary Grant Travel Award, Society for the Study of Evolution. 2017. $1,630.

L.I. Gilbert Travel Award, University of North Carolina Chapel Hill. 2017. $750.

Best Graduate Student Presentation, Southeastern Population Ecology and Evolutionary Genetics Conference. $100.

Skills

Code: R, python, bash.
Bioinformatics: Illumina whole genome and transcriptome alignment, annotation, and SNP calling with BWA, STAR, Trinity, GATK, samtools, ANGSD and R-Bioconductor packages.

Computing: SLURM, Amazon EC2, LSF, git.

Statistics: Linear models, mixed models, classical stats, GWAS, genetic demographic modeling.

Bench: Designed and performed CRISPR/Cas9 gene editing experiments.