KYLE T. DAVID

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Education

PhD Candidate - Halanych Lab, Auburn University 2017 - Present

Department of Biological Sciences

BS Biology & Marine Science - University of Miami 2012 - 2016

Rosenstiel School of Marine & Atmospheric Science, Chemistry Minor

Awards & Honors

Editors' Choice, *Journal of Biogeography* 2021

PacBio Plant and Animal Sciences SMRT Grant, Semifinalist 2020

Charlotte Magnum Student Support Award - $115 2020

NSF Graduate Research Fellowship - $138,000 2019 - 2022

Cover Article, *Molecular Biology and Evolution* 2019

Wake Award for Best Student Oral Presentation - $150 2019

Auburn Cellular & Molecular Biosciences Fellowship - $22,500 2017 - 2018

Departmental Honors 2016

Presidential Scholarship - $64,000 2012 - 2016

Publications

9. **David, K. T.**, Halanych, K. M. (2021). Spatial proximity between polyploids across South American frog genera. *Journal of Biogeography*, *48*(5), 991-1000.
8. Zhang, Y., Yap, K. N., **David, K. T.**, & Swanson, D. L. (2021). The high-energy aerial insectivore lifestyle of swallows does not produce clear thermogenic side effects. *Ornithology*.
7. Li, Y.*, **David, K. T.***, Shen, X. X., Steenwyk, J. L., Halanych, K. M., & Rokas, A. (2020). Feature frequency profile-based phylogenies are inaccurate. *Proceedings of the National Academy of Sciences*, *117*(50), 31580-31581.
6. **David, K. T.**, Oaks, J. R., & Halanych, K. M. (2020). Patterns of gene evolution following duplications and speciations in vertebrates. *PeerJ*, *8*, e8813.
5. Li, Y., Tassia, M.G., Waits, D.S., Bogantes, V. E., **David, K.T.**, & Halanych, K.M. (2019). Genomic adaptations to chemosymbiosis in the deep-sea seep-dwelling tubeworm *Lamellibrachia luymesi*. *BMC Biol* 17, 91.
4. **David, K.T.**, Wilson, A. E., & Halanych, K. M. (2019). Sequencing disparity in the genomic era. *Molecular Biology and evolution*, *36*(8), 1624-1627.

3. **David, K. T.**, & Halanych, K. M. (2017). Mitochondrial genome of *Dinophilus gyrociliatus* (Annelida: Dinophilidae). *Mitochondrial DNA Part B*, 2(2), 831-832.

2. McMahan, C. D., Ginger, L., Cage, M., **David, K. T.**, Chakrabarty, P., Johnston, M., & Matamoros, W. A. (2017). Pleistocene to holocene expansion of the black-belt cichlid in Central America, *Vieja maculicauda* (Teleostei: Cichlidae). *PLOS ONE*, *12*(5), e0178439.

1. **David, K. T.**, Tanabe, P., & Fieber, L. A. (2016). Resource availability drives mating role selection in a simultaneous hermaphrodite *Aplysia californica*. *The Biological Bulletin*, *231*(3), 199-206.

*these authors contributed equally to the work

Presentations

Presented by K.T. David unless otherwise noted

9. Are Two Genomes Better Than One? Ploidy Correlated Species' Distributions in South American Frogs. **David, K.T.**, Fan, Z., Halanych, C., Halanych, K.M. Talk presented at the *Society of Integrative and Comparative Biology* meeting in Austin, Texas. January 2020.

8. Innate Immunity Evolution in Underrepresented Metazoans and the Implications When Opting for Similarity-Metrics vs. Hidden Markov Models. Tassia, M.G., **David, K.T.**, Halanych K.M. Talk presented by M.G. Tassia at the *Society of Integrative and Comparative Biology* meeting in Austin, Texas. January 2020.

7. The Genome of the Deep-Sea Seep-Dwelling *Lamellibrachia luymesi* (Siboglinidae) and Clues on Chemosynthetic Symbiosis. Halanych, K. M., Li, Y., Tassia, M. G., Waits, D. S., Bogantes, V. E., **David, K. T.** Talk presented by K. M. Halanych at the *Society of Integrative and Comparative Biology* meeting in Austin, Texas. January 2020.

6. Use of Genomics Technologies to Explore Adaptations to Chemosymbiosis in the Deep-Sea Seep-Dwelling Siboglinid (Annelida) Tubeworms. Halanych, K. M., Li, Y., Tassia, M. G., Waits, D. S., Bogantes, V. E., **David, K. T.** Poster presented by K. M. Halanych at the *AGU* Fall Meeting in San Francisco, CA. December 2019.

5. Sequencing Disparity in the Genomic Era. **David, K.T.**, Wilson, A. E., & Halanych, K. M. Talk presented at the *Evolution* meeting in Providence, Rhode Island. June 2019.

4. Another Story of Database Bias: Detecting Protein Domains Beyond Biomedical Model-Species. Tassia, M. G., **David, K. T.**, Halanych, K. M. Talk presented by M. G. Tassia at the *Evolution* meeting in Providence, Rhode Island. June 2019.

3. Much Ado About Orthologs: Consequences of Duplication and Speciation in Gene Evolution. **David, K. T.**, Oaks, J. R., Halanych, K. M. Talk presented at the *Society of Integrative and Comparative Biology* meeting in Tampa, Florida. January 2019.

2. Orthologs vs. Paralogs, What's the Difference? **David, K. T.**, Oaks, J. R., Halanych, K. M. Talk presented at the *Society of Systematic Biologists* standalone meeting in Columbus, Ohio. June 2018.

1. Mating Role Choice in a Simultaneous Hermaphrodite. **David, K. T.**, Tanabe, P., & Fieber, L. A. Poster presented at the *Undergraduate Research, Creativity, and Innovation Forum* in Miami, Florida. June 2016.

Research History

Kenneth M. Halanych Lab - Auburn University 2017 - Present

Comparative phylogenomics and the evolution of gene duplicates. Leveraging bioinformatic methods and high-throughput sequence data to develop methods and explore trends across the animal tree of life, with a focus on gene duplication and polyploidization events.

Jamie R. Oaks Lab Rotation - Auburn University 2018

Testing the ortholog conjecture. Using custom bioinformatic scripts and pipelines this project explored divergence between orthologs and paralogs through models of gene evolution.

Caleb McMahan Lab - Field Museum of Natural History 2016 - 2017

Phylogenetic and biogeographical analyses of diadromous fishes utilizing museum collections.

Douglas L. Crawford & Marjorie Oleksiak Labs - University of Miami 2015 - 2016

Used an adapted genotyping by sequencing (GBS) protocol to examine species and population structure between the two coral morphospecies across regions of high and low upwelling.

Lynne A. Fieber Lab - University of Miami 2013 - 2016

Independently designed and ran a senior thesis on mating role selection in the California sea hare. Collected data on food intake, growth, egg yield, fertilization, as well as records of sexual history for a cohort of 22 animals for ~200 days over the course of their mature lives.

Skills & Experience

Computational

- Proficiency in Julia, Python, R, Bash
- Machine Learning: Proficient with PyTorch, experience with unsupervised learning, variational autoencoders, residual neural networks
- Phylogenomics: Genome and transcriptome scale alignment, assembly, and annotation, homology/orthology inference, tree building, phylogenetic comparative methods, biological databases
- Population Genomics: SNP processing, population delimitation, variant calling

Lab

- C. elegans culture
- DNA/RNA extraction, PCR, nanodrop/Qubit quantification, gel electrophoresis
- Library prep for high-throughput and Sanger sequencing
- Experience with preserving, cataloguing, and extracting tissue and DNA from museum collections, including historical specimens

Field

- NBP 20-10 Research Cruise (2020): a three month research cruise from California to the Antarctic Peninsula, assisted in the sampling, identification, and processing of Antarctic marine invertebrates.

- Galapágos Study Abroad (2015): Five accelerated fieldwork intensive courses concerning relevant scientific issues surrounding the Galápagos as well as its local ecology, including a research project on shoal dynamics in the Panamic sergeant major.
- Fieldwork experience in South Florida, South Carolina, the Caribbean, the Galápagos islands, and the Southern Ocean
- Sampling with quadrats and transects, collection *via* seining, cast netting, and straining
- Experience working with freshwater and saltwater aquarium systems from 10-150 gallon single tank setups to large scale fishery and hatchery operations
- Advanced SCUBA certified with nitrox, 50+ hours

Teaching

Evolution and Systematics Co-Instructor 2020

Units for Evolution and Systematics (BIOL 3030) were divided between myself and the primary instructor, Dr. Ken Halanych. Prepared and presented lectures, co-wrote, administered, and graded exams.

Evolutionary Biology Guest Lecturer - Alabama Prison Arts + Education Project 2019

Prepared and presented a 2.5hr lecture on metazoan diversity and phylogenetics to a class of inmates at Staton Correctional Facility as part of Auburn University's Alabama Prison Arts + Education Project.

Organismal Biology Teaching Assistant 2019

Managed five weekly lab sections for Organismal Biology (BIOL 1031). Presented weekly lectures, facilitated in-lab exercises, proctored and graded entrance and exit exams for each section in addition to lab midterms and finals.

Invertebrate Biodiversity Teaching Assistant 2018

Responsible for running lab sections for Invertebrate Biodiversity (BIOL 4010). Ordered living and preserved specimens for students to dissect and observe, created and presented weekly lectures, wrote, administered, and graded lab practicals. Also provided review sessions and occasionally lectured for class sections.

Science Tutor 2016 - 2017

Certified tutor for high school and college students in a variety of science fields, specializing in evolutionary biology.

Service & Outreach

Interviews

All Things Considered, Hakai Magazine

Reviews

Systematic Biology, *Journal of Molecular Evolution*, *Journal of Biogeography*, *PeerJ*

Summer Science Institute 2021

Counselor for Auburn University's Summer Science Institute, a weeklong sleep away camp for 11th and 12th grade students with an aptitude and interest in science and math.

Skype a Scientist 2018 - Present

Engage in 30-60 minute Q&A and lecture sessions with k-12 classrooms 4-8 times each semester. Gives students the opportunity to get to know a "real scientist" in a semiformal setting.

Auburn University Museum of Natural History 2017 - Present

Participate in several engagement opportunities through the museum including open houses and outreach events with underprivileged schools. Display specimens and engage visitors with questions and informative talks.

Curious Curators Camp 2019

Counselor for 5th-6th grade summer camp that teaches the importance of natural history museums. Oversaw educational exercises and activities in addition to supervising "collection" trips in the field, exploring local swamps, streams, forests, and grasslands.

Field Museum of Natural History Outreach 2016 - 2017

Participated in "Talk to a Scientist Hour" and "Meet a Scientist" programs at the Field Museum's DNA Discovery Center, educating tour groups and the general public on the fundamentals of molecular biology as well as my own research.

Galápagos Tortoise Breeding Center 2015

Fed, cleaned, and otherwise cared for a variety of captive-bred giant Galapágos tortoise subspecies for eventually repatriation back into the wild. Volunteered mornings while studying abroad in the Galapágos.

University of Miami Aquarium Club 2013 - 2016

As president, managed dozens of freshwater and marine systems campus-wide as well as provided our 70+ members with the means to care for their own aquariums. Responsible for all the club's major events and projects including club trips to aquariums all across the country. Also managed social media profiles and email correspondence.

References

Dr. Ken Halanych	**Dr. Jamie Oaks**	**Dr. Laurie Stevison**	**Dr. Nathan Whelan**
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Primary Advisor	*Interim Advisor*	*Committee Member*	*Committee Member*

~Last Updated May 2021~