

KYLE T. DAVID

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Current Appointment

NSF Postdoctoral Fellow - Rokas Lab, Vanderbilt University

2022 - present

Department of Biological Sciences

Education

PhD Biology - Halanych Lab, Auburn University

2017 - 2022

Department of Biological Sciences

BS Biology & Marine Science - University of Miami

2012 - 2016

Rosenstiel School of Marine & Atmospheric Science, Chemistry Minor

Publications

17. **David, K. T.**, Schraiber, J. G., Crandall, J. G., Labella, A. L., Opulente, D. A., Harrison, M. C., ... & Rokas, A. (2025). Convergent expansions of keystone gene families drive metabolic innovation in *Saccharomycotina* yeasts. *Proceedings of the National Academy of Sciences*, 122(23), e2500165122.
16. Feng, B., Li, Y., Xu, B., Liu, H., Steenwyk, J. L., **David, K. T.**, ... & Li, Y. (2025). Unique trajectory of gene family evolution from genomic analysis of nearly all known species in an ancient yeast lineage. *Molecular Systems Biology*, 1-24.
15. Warner, J.F., Range, R.C., Fenner, J., Ka, C., Waits, D.S., Boddy, K., **David, K.T.**, Mahon, A.R. and Halanych, K.M. (2024). Chromosomal-Level Genome Assembly of the Antarctic Sea Urchin *Sterechinus neumayeri*: A Model for Antarctic Invertebrate Biology. *Genome Biology and Evolution*, 16(11), evae237.
14. **David, K. T.**, Harrison, M. C., Opulente, D. A., LaBella, A. L., Wolters, J. F., Zhou, X., ... & Rokas, A. (2024). *Saccharomycotina* yeasts defy longstanding macroecological patterns. *Proceedings of the National Academy of Sciences*, 121(10), e2316031121.
13. Sun, L., **David, K. T.**, Wolters, J. F., Karlen, S. D., Gonçalves, C., Opulente, D. A., ... & Hittinger, C. T. Functional and evolutionary integration of a fungal gene with a bacterial operon. *Molecular biology and evolution*, msae045.
12. **David, K. T.**, & Halanych, K. M. (2023). Unsupervised deep learning can identify protein functional groups from unaligned sequences. *Genome Biology and Evolution*, evad084.
11. **David, K. T.** (2022). Global gradients in the distribution of animal polyploids. *Proceedings of the National Academy of Sciences*, 119(48), e2214070119.
10. Tassia, M. G., **David, K. T.**, Townsend, J. P., & Halanych, K. M. (2021). TIAMMAT: Leveraging biodiversity to revise protein domain models, evidence from innate immunity. *Molecular Biology and Evolution*, 38(12), 5806-5818.

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*, 138(3), ukab022.
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 luymesii*. *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 gyrotilatus* (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

Awards & Honors

NSF Postdoctoral Research Fellowship in Biology - \$240,000	2023-2026
Evolutionary Studies Excellence in Outreach Award	2025
American Society of Naturalists Early Career Investigator Award - \$1,400	2024
Vanderbilt Evolutionary Studies Travel Award - \$500	2023
W. D. Hamilton Award, Finalist - \$500	2022
Antarctica Service Medal	2021
<u>Editors' Choice, <i>Journal of Biogeography</i></u>	2021
<u>PacBio Plant and Animal Sciences SMRT Grant, Semifinalist</u>	2020
Charlotte Magnum Student Support Award - \$115	2020
NSF Graduate Research Fellowship - \$138,000	2019 - 2022
<u>Cover Article, <i>Molecular Biology and Evolution</i></u>	2019
Wake Award for Best Student Oral Presentation - \$150	2019
Auburn Cellular & Molecular Biosciences Fellowship - \$22,500	2017 - 2018

Invited Talks

7. **Ecology & Evolution of Innovation.** University of Arizona. February 2025.
6. **Evolution of novelty.** *Evolution* meeting in Montreal, Canada. July 2024.
5. **Macroecological consequences of whole-genome duplication: a latitudinal polyploid gradient in three vertebrate clades.** *Society for Experimental Biology* Meeting in Prague, Czech Republic. July 2024.
4. **Responsible research conduct in bioinformatics: a case study in the cancer microbiome.** Vanderbilt University. January 2024.
3. **Global gradients in the distribution of animal polyploids.** *Plant & Animal Genomes* Conference in San Diego, California. January 2023.
2. **Environment and ploidy in South American frogs.** Polyploid Webinar organized by the University of Arizona. September 2021.
1. **Evolutionary consequences of gen(om)e duplication in animals.** Vanderbilt University. August 2021.

Presentations

10. Discovery of two ancient genome duplications that shaped *Saccharomycotina* yeast evolution. Talk presented at the *Evolution* meeting in Athens, Georgia. June 2025.
9. Convergent genome evolution underlies metabolic and ecological innovation in *Saccharomycotina*. Poster presented at the *Fungal Genetics* meeting in Monterey Bay, California. March 2024.
8. The yeast subphylum *Saccharomycotina* defies longstanding macroecological patterns. Talk presented at the *Evolution* meeting in Albuquerque, New Mexico. June 2023.
7. Global gradients in the distribution of animal polyploids. Talk presented at the *Evolution* meeting in Cleveland, Ohio. June 2022.
6. Bad role models: can deep learning save us from the tyranny of mouse, worm, and fly? Talk presented at the virtual *Evolution* meeting. June 2021.
5. Are two genomes better than one? Ploidy correlated species' distributions in South American frogs. Talk presented at the *Society of Integrative and Comparative Biology* meeting in Austin, Texas. January 2020.
4. Sequencing disparity in the genomic era. Talk presented at the *Evolution* meeting in Providence, Rhode Island. June 2019.
3. Much ado about orthologs: consequences of duplication and speciation in gene evolution. Talk presented at the *Society of Integrative and Comparative Biology* meeting in Tampa, Florida. January 2019.

2. Orthologs vs. paralogs, what's the difference? Talk presented at the *Society of Systematic Biologists* standalone meeting in Columbus, Ohio. June 2018.
1. Mating role choice in a simultaneous hermaphrodite. Poster presented at the *Undergraduate Research, Creativity, and Innovation Forum* in Miami, Florida. June 2016.

Teaching

Certificate in College Teaching 2024

I have a teaching certificate from Vanderbilt's Center for Teaching, having completed the required 16-week combined seminar and practicum.

Guest Lecturer - Principles of Evolution 2023-2024

Presented a guest lecture on whole genome duplication and my research into polyploid environmental gradients in the Principles of Evolution (PCB4673) course at the University of West Florida.

Guest Lecturer - History of Life 2022

Presented a guest lecture and accompanying class activity for History of Life (BSCI 3890/6890) at Vanderbilt University, designed to introduce students to evolutionary concepts and "tree thinking".

Lecturer - Sparks Science and Mathematics Series 2022

The Sparks series is a collaborative effort to bring STEM programming to people who are currently incarcerated in Alabama. Prepared and presented a 2hr lecture and lesson plan at the Julia Tutwiler Prison for Women.

Guest Lecturer - Science Forward 2021

Presented a guest lecture in the Macaulay Honors College Seminar course, "Science Forward" (MHC 20301) at Brooklyn College. Lecture focused on the importance of open data in scientific research.

Co-Instructor - Evolution and Systematics 2020

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

Guest Lecturer - Alabama Prison Arts + Education Project 2019

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

Teaching Assistant - Organismal Biology 2019

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

Teaching Assistant - Invertebrate Biodiversity 2018

Responsible for running lab sections for Invertebrate Biodiversity (BIOL 4010) at Auburn University. 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.

Service & Outreach

Interviews

All Things Considered, Hakai Magazine, Tiny Living Beings podcast

Reviews

Evolution Letters, *Oikos*, *Nature Ecology & Evolution*, *Ecology Letters*, *Molecular Ecology*, *Journal of Heredity*, *Systematic Biology*, *Journal of Molecular Evolution*, *Journal of Biogeography*, *PeerJ*, *Mitochondrial DNA Part B: Resources*

Invited Panels

NSF Systematics and Biodiversity Science Panel 2025

W.D. Hamilton award, *Evolution* 2023

Undergraduate Travel Award, *The Allied Genetics Conference* 2023 & 2024

Envision Ecology, Evolution, and Behavior Graduate Preview Weekend at Michigan State University 2021

Labs Behind Bars, Committee Member

2023 - 2025

Serving on the committee for Labs Behind Bars, a Clinton Global Initiative Project to adapt and develop STEM labs from Vanderbilt's curricula to a prison setting.

Dismas House

2023 - 2025

Developed, organized, and operate a collaboration between the Evolutionary Studies Initiative at Vanderbilt and the Dismas House residential reentry program for Tennessee state correctional facilities. Dismas House residents are regularly hosted on Vanderbilt's campus to tour facilities and participate in educational programming and outreach.

Evolutionary Studies Initiative, Outreach Co-coordinator

2022 - Present

An interdepartmental initiative at Vanderbilt engaged in evolutionary research, education, and outreach. Participated in multiple outreach events, as well as developed and led an interactive teaching module at k-12 schools in underserved communities.

Skype a Scientist

2018 - 2022

Engage in ~60 minute Q&A and lecture sessions with k-12 classrooms virtually.

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.

Auburn University Museum of Natural History

2017 - 2022

Participated in several engagement opportunities through the museum including open houses and outreach events with underprivileged schools.

Curious Curators Camp

2019

Counselor for 5th-6th grade summer camp that teaches the importance of natural history museums. Oversaw educational exercises and activities.

Field Museum of Natural History

2016 - 2017

Participated in "Talk to a Scientist Hour" and "Meet a Scientist" programs while interning at the Field Museum's DNA Discovery Center.

Selected Field Experience

Costa Rica

2022

7 days at La Selva Biological Station and 5 days at Palo Verde Research Station as part of advanced coursework.

Antarctic Peninsula & Weddell Sea

2020

84 days on the *RVIB Nathaniel B. Palmer* sampling benthic invertebrate diversity.

Galapagos Islands

2015

~75 days on Isabela and surrounding islands for study abroad.

References

Dr. Antonis Rokas

Professor

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Current Mentor

Dr. Matt Pennell

Associate Professor

626-318-6287

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Current Co-mentor

Dr. Ken Halanych

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PhD Advisor

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Interim PhD Advisor

~Updated June 2025~
