

Tristram O'Brien Dodge

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Profile

Fourth-year PhD candidate in the Schumer Lab at Stanford University. Interested in adaptation, hybridization, conservation genomics, and structural variation. Dissertation research integrates genome sequencing with fieldwork and behavioral studies to better understand the origin and maintenance of shared pigmentation polymorphisms in swordtail (*Xiphophorus*) fishes.

Education

- 2021 – **Ph.D. in Biology**, Ecology and Evolutionary Biology Track
Stanford University, Stanford, CA
Advisor: Molly Schumer
- 2015 – 2019 **B.A. in Biology**, *summa cum laude*
Carleton College, Northfield, MN

Publications

7. **Dodge, T.O.**, Kim, B.Y., Baczenas, J.J., Banerjee, S.M., Gunn, T.R., Donny, A.E., Given, L.A., Rice, A.R., Haase Cox, S.K., Weinstein, M.L., Cross, R., Moran, B.M., Haber, K., Haghani, N.B., Machin Kairuz, J.A., Gellert, H.R., Du, K., Aguillon, S.M., Tudor, M.S., Gutiérrez-Rodríguez, C., Ríos-Cardenas, O., Morris, M.R., Scharl, M., Powell, D.L., and Schumer, M. (2024) Structural variation and behavioral interactions underpin a balanced sexual mimicry polymorphism. *Current Biology*, *32*: 1-15. doi: 10.1016/j.cub.2024.08.053.
6. Preising, G.A., Gunn, T.R., Baczenas, J.J., Powell, D.L., **Dodge, T.O.**, Sewell, S.T., Pollock, A., Machin Kairuz, J.A., Savage, M.L., Lu, Y., Fitschen-Brown, M., Meyer, A., Scharl, M., Cummings, M., Thakur, S., Inman, C.M., Ríos-Cardenas, O., Morris, M., Tobler, M., and Schumer, M. (2024) Recurrent evolution of small body size and loss of the sword ornament in Northern swordtail fish. *Evolution*, *qpae124*. doi: 10.1093/evolut/qpae124.
5. Du, K., Ricci, J.M.B., Lu, Y., Garcia-Olazabal, M., Walter, R.B., Warren, W.C., **Dodge, T.O.**, Schumer, M., Park, H., Meyer, A. and Scharl, M. (2024) Phylogenomic analyses of all species of swordtail fishes (genus *Xiphophorus*) show that hybridization preceded speciation. *Nature Communications*, *15*(1): 6609. doi: 10.1038/s41467-024-50852-6.
4. Langdon, Q.K., Groh, J.S., Aguillon, S.M., Powell, D.L., Gunn, T.R., Payne, C.Y., Baczenas, J.J., Donny, A., **Dodge, T.O.**, Du, K., Scharl, M., Ríos-Cárdenas, O., Gutierrez-Rodríguez, C, Morris, M., and Schumer, M. (2024). Swordtail fish hybrids reveal that genome evolution is surprisingly predictable after initial hybridization. *PLoS Biology*, *22*(8): e3002742. doi: 10.1371/journal.pbio.3002742.
3. **Dodge, T.O.**, Farquharson, K.A., Ford, C., Cavanagh, L., Schubert, K., Schumer, M., Belov, K., & Hogg, C.J. (2023). Genomes of two Extinct-in-the-Wild reptiles from Christmas Island reveal distinct evolutionary histories and conservation insights. *Molecular Ecology Resources*, *00*: 1–17. doi: 10.1111/1755-0998.13780.
2. Aguillon, S.M., **Dodge, T.O.**, Preising, G.A., and Schumer, M. (2022) Introgression. *Current Biology*, *32*(16): 865-868. doi: 10.1016/j.cub.2022.4.

1. Langdon, Q.K., Powell, D.L., Kim, B., Banerjee, S.M., Payne, C.Y., **Dodge, T.O.**, Moran, B., Fascinetto-Zago, P., and Schumer, M. (2022) Predictability and parallelism in the contemporary evolution of hybrid genomes. *PLoS Genetics* 18(1): e1009914. doi: 10.1371/journal.pgen.1009914.

Preprints

1. Couper, L.I., **Dodge, T.O.**, Hemker, J.A., Kim, B.Y., Exposito-Alonso, M., Brem, R.B., Mordecai, E.A., and Bitter, M.C. (2024) Evolutionary adaptation under climate change: *Aedes* sp. demonstrates potential to adapt to warming. *bioRxiv*. doi: 10.1101/2024.08.23.609454.

Talks

- 2024 Intergenic structural variation and ancient gene duplication underpin pigmentation diversification in swordtail fish.
SMBE, Puerto Vallarta, Mexico.
- 2022 The genetic architecture of sexual mimicry in swordtail (*Xiphophorus*) fishes.
Bay Area Population Genomics (BAPG), Berkeley, United States.
- Genomes of endangered reptiles provide insights into evolution and conservation.
Australian Society of Herpetologists, Adelaide, Australia.
- Crossing the Pacific to develop insights into genomes, evolution, and conservation.
SOLES Research Showcase, Sydney, Australia.
Received honorable mention for best talk.
- 2021 The genetic architecture of a female mimicry trait in male swordtail fish.
Evolution, Presented Virtually

Poster Presentations

- 2024 **Dodge, T.O.**, Powell, D.L., Baczenas, J.J., Gunn, T.R., Banerjee, S.M., Schartl, M., and Schumer, M. Ancient gene duplication and recent non-coding structural variation underpin pigmentation diversification in swordtail (*Xiphophorus*) fishes. TAGC24, Washington, D.C., March 2024.
Received GSA Early Career Poster Award for PEQG section.
- 2023 **Dodge, T.O.**, Powell, D.L., Baczenas, J.J., Gunn, T.R., Banerjee, S.M., Schartl, M., and Schumer, M. The genetic architecture of adaptive pigmentation traits in swordtail (*Xiphophorus*) fishes. SMBE 2023, Ferrara, Italy, July 2023.
- 2022 **Dodge, T.O.**, Powell, D.L., Banerjee, S.M., Gunn, T.R., Baczenas, J.J., Preising, G.A., Rice, A., Jofre, G.I., Rosenthal, G.G., and Schumer, M. The genetic architecture of adaptive pigmentation traits in swordtail (*Xiphophorus*) fishes. HHMI Science Meeting, Chevy Chase, MD, December 2022.
- 2021 **Dodge, T.O.**, Powell, D.L., Jofre, G.I., Rosenthal, G.G., Schartl, M., and Schumer, M. The genetic architecture of a female mimicry trait in male swordtail fish. SMBEv2021, *Presented Virtually*, July 2021.

- 2019 **Dodge, T.O.**, LaScaleia, M.J., Richardson, L.K., and Wagenius, S. Little cost of reproduction in the long-lived perennial, *Echinacea angustifolia*. Midwest Ecology and Evolution Conference, Terre Haute, IN, April 2019.
- 2017 **Dodge, T.O.**, Faust, R., Harvey, C., Hoyt, A., Libby, K., Pruszenski, J., Hernández, D.L., and McKone, M.J. Mammalian herbivores differentially affect light availability and species richness in restored prairies. Carleton College Student Research Symposium, Northfield, MN, October 2017.

Research Experience

- 2021 – **Stanford University**, *Ph.D. Student*
 Supervisor: Molly Schumer (PI)
- Investigate the genetic architecture and maintenance of pigmentation traits in swordtail fish, focusing on the roles of introgression and balancing selection.
 - Create genomic resources for fish and other species, focusing on sex chromosomes and other structurally complex genomic regions.
- 2022 **University of Sydney**, *Fulbright Future Scholar*
 Supervisors: Carolyn Hogg (co-PI) and Katherine Belov (co-PI)
- Assembled and annotated reference genomes for two extinct-in-the-wild reptiles.
- 2019 **University of California, Berkeley**, *Staff Research Associate II*
 Supervisor: Benjamin Blackman (PI)
- Phenotyped sunflower mapping panel and built models to identify genetic and environmental controls on late-stage floral development timing.
 - Quantified constitutive gene expression differences to understand adaptation to serpentine soils in monkeyflowers.
- 2019 **Carleton College**, *Undergraduate Research Assistant*
 Supervisor: Jennifer Wolff (PI)
- Investigated nematode community structure in restored tallgrass prairies using sequence metabarcode data.
- 2018 **Rocky Mountain Biological Laboratory**, *Summer Research Assistant*
 Supervisors: Lauren Carley & Thomas Mitchell-Olds (PI)
- Contributed phenotypic data to GWAS of survival, growth, chemical defense, and phenology of a rocky-mountain plant.
- 2017 **Carleton College**, *Summer Research Assistant*
 Supervisors: Daniel Hernández (co-PI) & Mark McKone (co-PI)
- Contributed plant census and phenology data to studies of herbivore exclusion effects in prairies.

Teaching Experience

- Stanford University Evolution (BIO 85) — Professor Molly Schumer
- Led weekly sections of 15 students, designed lecture to review class content, and graded assignments and exams.
Received Departmental Excellence in Teaching Award

Genetics (BIO 82) — Professors Dominique Bergmann & Michael Simon

- Led two weekly sections of 20 students each, designed lecture to review class content, and facilitated group problem solving.

Carleton College

Population Ecology (BIOL 352) — Professor Mark McKone

- Designed review problem sets, hosted practice sessions for students, graded homework assignments.

Service and Outreach

- 2023 – Stanford Biology Preview Program (BPP) organizer. Create and organize programming for Stanford BPP, a program aiming to demystify PhD application process, particularly for students historically underrepresented in science.
- 2022 – Building Up Developing Scientists in Biology (BioBUDS) mentor. Supervise first- and second-year students from Stanford in evolutionary biology research.
- 2022 Designed and implemented evolution activity called “spot the differences,” about identifying phenotypic polymorphisms in collaboration with non-profit organization Deadly Science for primary school students in New South Wales, Australia.
- 2021 – Stanford Biology Preview Program mentor. Workshop and provide feedback on graduate school personal statements and CVs.
- 2021 Taught 2 AP Biology classes at Leland High School about current research and what daily life looks like for a scientist.
- 2020 Taught 3 middle classes at Friendship Academy of the Arts in Minneapolis about the role of hybridization in nature (title: Hybrids, hybrids everywhere!).

Additional Experience

- 2020 – 2021 **Assistant Cross Country and Track Coach**, *The College Preparatory School*
- 2015 – 2019 **Cross Country and Track Captain**, *Carleton College*
- 2016 – 2019 **NCAA Student-Athlete Advisory Committee**, *Carleton College*

Honors & Awards

- 2024 American Society of Naturalists (ASN) Student Research Award, \$2000
Genetics Society of America (GSA) Early Career Poster Award, \$400
Society for Integrative Biology (SICB) Grant in Aid of Research, \$1000
Stanford Ecology and Evolution Travel Grant, \$1000
- 2023 Excellence in Teaching Award, Stanford University Department of Biology
- 2022 National Science Foundation Graduate Research Fellowship, \$138,000
- 2020 Fulbright Future Scholarship
National Science Foundation Graduate Research Fellowship, Honorable Mention
- 2019 Summa Cum Laude, Carleton College
Phi Beta Kappa Honor Society, Elected Member
All-American, NCAA Division III Outdoor Track & Field
Dean of the College Student Academic Travel Grant, \$460

- Academic All-American, NCAA Division III Cross Country and Track & Field
Elite 22 Academic Award, Minnesota Intercollegiate Athletic Conference Indoor
Track & Field
- 2018 Cross Country Athlete of the Year, NCAA Division III Central Region
Annual Dean's List, Carleton College
William S. and Mary Agnes Kelly Memorial Award
Towsley Endowment Support for Summer Research, *\$3,600*
- 2017 Annual Dean's List, Carleton College