Tristram O'Brien Dodge

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Profile

Fifth-year Ph.D. candidate in the Schumer Lab at Stanford University. Interested in the origin and maintenance of phenotypic variation, especially how structural variants contribute to these processes. Dissertation research investigates the genetic basis and evolution of pigmentation traits in a diverse group of freshwater fish (*Xiphophorus*) using long-read sequencing, functional genomics approaches, field collections, and behavioral experiments.

Education

2021 – **Ph.D. in Biology**, Ecology and Evolutionary Biology Track
Stanford University, Stanford, CA
Advisor: Molly Schumer
Committee: Nicolas Altemose, Dmitri Petrov, Jonathan Pritchard

2015 – 2019 **B.A. in Biology**, *summa cum laude*
Carleton College, Northfield, MN

Honors, Awards, & Grants

2026 Society for the Study of Evolution W. D. Hamilton Award Finalist
Stanford Center for Computational, Evolutionary, and Human Genomics Fellowship

2025 Society of Systematic Biologists Graduate Student Research Award
Society for Molecular Biology and Evolution Young Investigator Travel Award
Society for the Study of Evolution Rosemary Grant Advanced Award

2024 American Society of Naturalists Student Research Award
Genetics Society of America Early Career Poster Award
Society for Integrative Biology Grant in Aid of Research

2023 Excellence in Teaching Award, Stanford University Department of Biology

2022 National Science Foundation Graduate Research Fellowship

2020 Fulbright Future Scholarship, Australia

2019 Summa Cum Laude, Carleton College
Phi Beta Kappa Honor Society, Carleton College
Academic All-American, NCAA Division III Cross Country and Track & Field
All-American, NCAA Division III Outdoor Track & Field

2018 Central Region Athlete of the Year, NCAA Division III Cross Country

Publications

8. **Dodge, T.O.**, Farquharson, K.A., Ford, C., Cavanagh, L., Schubert, K., Schumer, M., Belov, K., and Hogg, C.J. (2025) Genomes of two Extinct-in-the-Wild reptiles from Christmas Island reveal distinct evolutionary histories and conservation insights. **Molecular Ecology Resources**, 25, e13780. doi: 10.1111/1755-0998.13780.

7. 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. (2025) Evolutionary adaptation under climate change: *Aedes* sp. demonstrates potential to adapt to warming. **PNAS**, 122: e2418199122. doi: 10.1073/pnas.2418199122.

6. **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., Rios-Cardenas, O., Morris, M.R., Schartl, M., Powell, D.L., and Schumer, M. (2024) Structural variation and behavioral interactions underpin a balanced sexual mimicry polymorphism. **Current Biology**, 34: 4662-4676.e9. doi: 10.1016/j.cub.2024.08.053.

5. 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., Schartl, M., Cummings, M., Thakur, S., Inman, C.M., Rios-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**, 78: 2017–2031. doi: 10.1093/evolut/qpae124.

4. 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 Schartl, M. (2024) Phylogenomic analyses of all species of swordtail fishes (genus *Xiphophorus*) show that hybridization preceded speciation. **Nature Communications**, 15: 6609. doi: 10.1038/s41467-024-50852-6.

3. 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., Schartl, 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.

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.

Unpublished

3. Given, L.A., Gozashti, L., Baczenas, J.J., Sood, R., Haghani, N.B., Hunnicutt, K.E., Gunn, T.R., Preising, G.A, Sudmant, P.H., Powell, D.L., **Dodge, T.O.***, and Schumer, M.* (*in review*) Two melanic pigment patterns are associated with a sex chromosome-linked oncogene in the mountain swordtail *Xiphophorus nezahualcoyotl*. doi: 10.64898/2026.06.08.730778. **Co-supervision.*

2. **Dodge, T.O.**[†], Ernst, M.[†], Oliver, P., and Blom, M.P.K. (*in review*) Suboptimal sampling strategy for high-quality genome assembly: A comparative view on the demise of an Extinct-in-the-Wild reptile. [†]*Equal contribution*.

1. Haghani, N.B., **Dodge, T.O.**, Baczenas, J.J., Gunn, T.R., He, Q., Pangburn, W., Sood, R., Fascinetto-Zago, P., Du, K., Kaatmann, A., Ou, Z., Dougan, S., Yang, T.T.L., Olmos-Santiago, N.S., Preising, G.A., Payne, C.Y., Haase Cox, S.K., Hunnicutt, K.E., Madrzyk, M., Moran, B., Stigloher, C., Powell, D.L., Schartl, M., Gifford, C.A., Han, G.-Z., and Schumer, M. (*in revision*) Insertion of an invading retrovirus regulates a novel color trait in swordtail fish. doi: 10.1101/2025.11.07.687308.

Oral & Poster Presentations

2026 **Evolution W.D. Hamilton Award Symposium**, Online conference
Oral presentation: Turnover and introgression shape the dynamic evolution of a balanced polymorphism involved in sexual mimicry. (Presented virtually)

Bay Area Population Genomics (BAPG XXV), Davis, C.A., United States
Oral presentation: Turnover and introgression shape the dynamic evolution of a sexual mimicry polymorphism shared across the genus *Xiphophorus*.

Center for Computational, Evolutionary, and Human Genomics (CEHG) Symposium, Stanford, C.A., United States
Oral presentation: Turnover and introgression shape the dynamic evolution of a sexual mimicry polymorphism shared across the genus *Xiphophorus*.

Plant and Animal Genomes (PAG33), San Diego, C.A., United States
Oral presentation: Turnover and introgression shape the dynamic evolution of a sexual mimicry polymorphism shared across the genus *Xiphophorus*.

2025 **UC Berkeley CTEG Seminar**, Berkeley, C.A., United States
Oral presentation: Turnover and introgression contribute to the maintenance of a sexual mimicry trans-species polymorphism.

Society for Molecular Biology and Evolution (SMBE2025), Beijing, China
Oral presentation: Origin and maintenance of a shared sexual mimicry polymorphism. (Presented virtually)

Biology of Genomes (BOG39), Cold Spring Harbor, N.Y., United States
Poster: Origin and maintenance of a shared sexual mimicry polymorphism.

2024 **Bay Area Population Genomics (BAPG XXIII)**, Berkeley, C.A., United States
Poster: Origin and maintenance of a shared sexual mimicry polymorphism.

Society for Molecular Biology and Evolution (SMBE2024), Puerto Vallarta, Mexico
Oral presentation: Intergenic structural variation and ancient gene duplication underpin pigmentation diversification in swordtail fish.

The Allied Genetics Conference (TAGC24), Washington, D.C., United States
Oral presentation: Ancient gene duplication and recent non-coding structural variation underpin pigmentation diversification in swordtail (*Xiphophorus*) fishes.
Received GSA Early Career Poster Award for PEQG section.

2023 **Society for Molecular Biology and Evolution (SMBE2023)**, Ferrara, Italy
Poster: The genetic architecture of adaptive pigmentation traits in swordtail (*Xiphophorus*) fishes.

2022 **HHMI Science Meeting**, Chevy Chase, M.D., United States
Poster: The genetic architecture of adaptive pigmentation traits in swordtail (*Xiphophorus*) fishes.

Bay Area Population Genomics (BAPGXX), Berkeley, C.A., United States
Oral presentation: The genetic architecture of sexual mimicry in swordtail (*Xiphophorus*) fishes.

Australian Society of Herpetologists, Adelaide, Australia
Oral presentation: Genomes of endangered reptiles provide insights into evolution and conservation.

SOLES Research Showcase, Sydney, Australia
Oral presentation: Crossing the Pacific to develop insights into genomes, evolution, and conservation.
Received honorable mention for best talk.

2021 **Society for Molecular Biology and Evolution (SMBEv2021)**, Online conference
Poster: The genetic architecture of adaptive pigmentation traits in swordtail (*Xiphophorus*) fishes. (Presented virtually)

Evolution, Online conference
Oral presentation: The genetic architecture of a female mimicry trait in male swordtail fish. (Presented virtually)

2019 **Midwest Ecology and Evolution Conference**, Terre Haute, I.N., United States
Poster: Little cost of reproduction in the long-lived perennial, *Echinacea angustifolia*.

Research Experience

2021 – **Graduate Student Researcher & NSF GRFP Fellow**, Stanford University
Supervisor: Molly Schumer, Ph.D.
- Investigate genetic architecture of pigmentation traits and the evolutionary forces maintaining their variation over long timescales.
- Study how structurally complex regions (e.g., sex chromosomes, ampliconic arrays) evolve and underpin phenotypic variation using long-read sequencing.

2022 **Fulbright Future Scholar**, University of Sydney
Supervisors: Carolyn Hogg, Ph.D. & Katherine Belov, Ph.D.
- Assembled reference genomes and inferred population history for two extinct-in-the-wild reptile species to inform conservation practices.

2019 **Staff Research Associate II**, University of California, Berkeley
Supervisor: Benjamin Blackman, Ph.D.
- Identified genetic and environmental controls on floral development timing by phenotyping domesticated sunflower association mapping panel.
- Explored the molecular basis of local adaptation to harsh serpentine soils by quantifying expression of candidate genes in different monkeyflower lines.

2019 **Undergraduate Research Assistant**, Carleton College
Supervisor: Jennifer Wolff, Ph.D.
- Investigated structure of nematode communities in restored tallgrass prairie with metabarcoding data.

2018 **Summer Research Assistant**, Rocky Mountain Biological Laboratory
Supervisors: Lauren Carley, Ph.D. & Thomas Mitchell-Olds, Ph.D.
- Collected phenotypic data for GWAS dissecting the genetic basis of fitness-related traits (e.g., survival, growth, chemical defense) in a montane plant.

2017 **Summer Research Assistant**, Carleton College
Supervisors: Daniel Hernández, Ph.D. & Mark McKone, Ph.D.
- Collected phenological and demographic data to understand how herbivore exclusion reshapes plant community dynamics in restored tallgrass prairies.

Teaching Experience

Stanford University

Long-read Sequencing and Structural Variation (BIOS 424) — Instructor
- Designed and taught 3-week minicourse for graduate students, including lecture and laboratory components. Taught for 3 years.

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

Genetics (BIO 82) — TA for Profs. 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) — Grader for Prof. Mark McKone
- Designed review problem sets, hosted review sessions for students, and graded assignments.

Service & Outreach

Reviews provided: Molecular Biology & Evolution (2026, 2025), Genome Biology & Evolution (2026), Journal of Heredity (2025), Ecology & Evolution (2025), Current Biology (2024)

2026 –	Mentorship and Research Individualized Training (MERIT) program mentor. Supervise student on computational biology research project, in collaboration with Tanzania Human Genetics Organization.
2025 –	Admissions Committee student member. Review and evaluate applications for Stanford Biology Ph.D. program.
2023 –	Stanford Biology Preview Program (BPP) organizing team member. Design and implement programming demystifying the Ph.D. application process for students lacking access to mentors.
2023, 2025	Stanford Biology Summer Undergraduate Research Program (BSURP) mentor. Supervised first- and second-year students in full-time research.
2022 –	Building Up Developing Scientists in Biology (BioBUDS) mentor. Design and teach class on the biology of pigmentation. Supervise first- and second-year students from Stanford in evolutionary biology research.
2022	Taught primary school lesson called "spot the differences" on detecting phenotypic variation in nature, in collaboration with non-profit organization Deadly Science (New South Wales, Australia).
2021 –	Stanford Biology Preview Program (BPP) mentor. Provide advice on graduate school application process and feedback on personal statements and CVs.
2021	Taught two AP Biology classes about current research and what daily life looks like for a scientist (Leland High School, San Jose).
2020	Taught three middle school classes called "Hybrids, hybrids everywhere!" about hybridization in nature (Friendship Academy of the Arts, Minneapolis).