Terry R. Dial
Curriculum Vitae

Utah State University Moab
1850 S Aggie Blvd
Moab, UT 84532

terry.dial@usu.edu
+1 310-702-6796
trdial.wixsite.com/ontogeny

Education

Ph.D. 2016, Ecology and Evolutionary Biology, Brown University

M.S. 2010, Biology, University of Utah

B.S. 2007, Biology, Loyola Marymount University

Academic Appointments

2022 – present: Professional Practice Assistant Professor, Utah State University
2019 – present: Affiliate, University of Montana
2020 – 2023: Research Associate, Harvard University
2020 – 2022: Instructor, Utah State University
2019 – 2020: Laboratory Specialist, Utah State University
2017 – 2020: Postdoctoral Fellow, Harvard University
2016 – 2019: Course Instructor: Ecology, Evolution and Conservation of East Africa, Brown University and University of Montana
2016 – 2017: Postdoctoral Research Associate, Brown University
2013 – 2016: Teaching Assistant, Human Anatomy, Alpert Medical School, Brown University
2012 – 2013: Teaching Assistant, Evolution Lecture, Ecology and Evolutionary Biology, Brown University
2011 – 2012: Research Assistant, for Dr. Elizabeth Brainerd, EEB, Brown University
2008 – 2010: Teaching Assistant, Comparative Anatomy Lab, Department of Biology, University of Utah
2007 – 2008: Teaching Assistant, Animal Design and Evolution Lab, Division of Biological Sciences, University of Montana
2006 – 2007 Research Fellow, Dr. David Poulsen Neurobiology laboratory, University of Montana
2005 – 2007: Teaching Assistant, General Biology Lab, Department of Biology, Loyola Marymount University

Publications

Peer-reviewed publications

Avery, T.M., Matthews, D.G. and **Dial, T.R.** *in prep.* Intramandibular joint disrupts morphological integration of guppy oral jaws. In preparation for the journal Functional Ecology.

Sims, D.B., Monk, J.R., Woldetsadik, D., **Dial, T.R.** *et al.* 2024. Per- and polyfluoroalkyl substances (PFAS) in the rivers of the Western United States. *Int. J. Environ. Sci. Technol.* https://doi.org/10.1007/s13762-024-06269-1

Dial, T.R., Collins, L.A., Liao, J.C. and Tobalske, B.W. 2024. Body length determines flow refuging for rainbow trout (Oncorhynchus mykiss) behind wing dams. *Journal of Experimental Biology*, *227*(15). https://doi.org/10.1242/jeb.247829

Matthews, D.G., Reznick, D.N. and **Dial, T.R.** 2024. Trophic niche drives the evolution of craniofacial shape in Trinidadian guppies. *Evolution*: qpae020. DOI: https://doi.org/10.1093/evolut/qpae020

Mayerl, C.J.*, **Dial, T.R.***, Mainwaring, M.C., Heers, A.M. and German, R.Z. 2023. Birth and the pathway to adulthood: integration across development, environment, and evolution. *Integrative and Comparative Biology,* 63(3): 548-556. DOI: 10.1093/icb/icad101 *Co-first author

Matthews, D.G., **Dial, T.R**. and Lauder, G.V. 2023. Genes, morphology, performance, and fitness: quantifying organismal performance to understand adaptive evolution. *Integrative and Comparative Biology,* 63(3): 843-859. DOI: 10.1093/icb/icad096

Dial, T.R. and Lauder, G.V. 2020. Longer development provides first-feeding fish time to escape hydrodynamic constraints. *Journal of Morphology* 281(8): 956-969. DOI: 10.1002/jmor.21224

Dial, T.R., Reznick, D.N. and Brainerd, E.L. 2017. Heterochrony in the evolution of offspring size: maturation along a uniform ontogenetic trajectory. *Proceedings of the Royal Society B* 20171319.

Dial, T.R., Hernandez, L.P. and Brainerd, E.L. 2017. Morphological and functional maturity of the oral jaw covaries with offspring size in Trinidadian guppies. *Scientific Reports* 7:5771 1-10 (DIO:10.1038/s41598-017-06414-6).

Dial, T.R., Reznick, D.N. and Brainerd, E.L. 2016. Effects of neonatal size on maturity and escape performance in the Trinidadian guppy. *Functional Ecology* 30:943–952 (DOI:10.1111/1365-2435.12565).

Dial, T.R. and Carrier, D.R. 2012. Precocial hindlimbs and altricial forelimbs: the partitioning of ontogenetic strategies in mallards (*Anas platyrhynchos*). *Journal of Experimental Biology* 215: 3703-3710 (doi:10.1242/jeb.057380).

Dial, T.R., Heers, A.M. and Tobalske, B.W. 2012. Ontogeny of aerodynamics in mallards: comparative performance and developmental implications. *Journal of Experimental Biology* 215: 3693-3702 (doi:10.1242/jeb.062018).

Dial, K.P., Randall R.J. and **Dial, T.R.** 2006. What use is half a wing in the ecology and evolution of birds? BioScience 56: 437-445.

Book chapters

Dial, K.P., Heers, A.M. and **Dial, T.R.** 2015. Ontogenetic and evolutionary transformations in avian locomotion: the ecological significance of incipient structures. In: K.P. Dial, N.H. Shubin, E.L. Brainerd (eds.), *Great Transformations in Vertebrate Evolution*. University of Chicago Press, Chicago.

Grants

Funded

- Pathways to Adulthood: Environmental, developmental and evolutionary influences on the ontogeny of form and function. Company of Biologists. $5126, 2023
- Collecting Trinidadian guppy fish to study environmental plasticity in craniofacial adaptation, Putnam Exploration Grant, $5304, 2021
- Experimental miniaturization of guppy offspring. Doctoral Dissertation Improvement Grant, National Science Foundation, $17,197, 2016
- Experimental miniaturization of guppy offspring. Dissertation Development Grant, Brown University, $5000, 2015

Unfunded

- On the edge of function: immaturity and hydrodynamics of suction feeding in larval fishes. NSF Postdoctoral Research Fellowship in Biology, $138,000, 2018
- Hibbitt Early Fellows Program, Marine Biological Laboratories, 2017
- Darwin Fellowship, University of Massachusetts, Amherst, 2017
- On the edge of function: immaturity and hydrodynamics of suction feeding in larval fishes. NSF Postdoctoral Research Fellowship in Biology, $138,000, 2017
- Experimental miniaturization of guppy offspring. Doctoral Dissertation Improvement Grant, National Science Foundation, $20,954, 2015

Awards/Distinctions

- Student Representative, Ecology Search Committee, Department of Biology, Loyola Marymount University, 2006
- President-Selected Student Representative, "Right time, right place" Campaign, Loyola Marymount University, 2006
- Summer Undergraduate Research Fellow, University of Montana, 3-month stipend amounting $4000, 2006
- McLaughlin Family Foundation Scholarship, Loyola Marymount University, awarded $10,000, 2005-2006

Courses taught (instructor of record)

- BIOL 2320 Human Anatomy, Fall 2024, Utah State University Moab
- ENVS 4950 Colorado River Science, Fall 2024, Utah State University Moab
- BIOL 2420 Human Physiology, Spring 2024, Utah State University Moab
- BIOL 2320 Human Anatomy, Fall 2023, Utah State University Moab
- ENVS 4950 Colorado River Science, Fall 2023, Utah State University Moab
- BIOL 2420 Human Physiology, Spring 2023, Utah State University Moab
- NR 6580 Data Analysis and Programming for Natural Resource Management, Spring 2023, MNR Program, Utah State University
- BIOL 2320 Human Anatomy, Fall 2022, Utah State University Moab
- BIOL 2420 Human Physiology, Spring 2022, Utah State University Moab
- BIOL 2320 Human Anatomy, Fall 2021, Utah State University Moab
- BIOL 2420 Human Physiology laboratory, Spring 2021, Utah State University Moab
- BIOL 2320 Human Anatomy, Fall 2020, Utah State University Moab
- BIOL 2420 Human Physiology laboratory, Spring 2020, Utah State University Moab
- BIOL 2320 Human Anatomy laboratory, Fall 2019, Utah State University Moab
- Ecology, Evolution and Conservation of East Africa, Fall 2018, Brown University and University of Montana
- Ecology, Evolution and Conservation of East Africa, Fall 2016, Brown University and University of Montana

Mentoring (Directed Student Learning)

- Lauren Houstoun, USU MS Biology Department, Committee member Fall 2023 – Slug-eating snake craniofacial morphology
- Valerie Gil, USU MNR Capstone Chair, Spring 2023 – Salmonid ecology and conservation
- Jeremiah Cabrera, Honors Research Thesis Committee California State University Los Angeles – Feathers vs. Flight
- Leila Hatier, Honors Research Thesis Committee California State University Los Angeles - The Ontogeny of Wings and Feathers in Flightless Indian Runner Ducks

- Dave Matthews, Harvard graduate student – Trinidadian guppy craniofacial development and quantitative genetics, zebrafish developmental pathway expression experiment
- Tess Avery, Harvard undergraduate – fish craniofacial morphometrics
- Natividad Chen, Brown undergraduate –art and science of Trinidadian guppies
- Yvonne Fong, Brown undergraduate – fish craniofacial and axial muscle immunohistochemistry
- Trisha Jain, Brown undergraduate – guppy feeding performance and breeding experiment

Presentations

Conference presentations

Avery, T.M., Matthews, D.G. and **Dial, T.R.** 2025. Intramandibular joint disrupts morphological integration of guppy oral jaws. Integrative and Comparative Biology.

Dial, T.R., Avery, T.M and Matthews, D.G. 2025. Local adaptation of feeding morphology, kinematics and performance in Trinidadian guppies. Integrative and Comparative Biology.

Dial, T.R., Heers, A.M. and Mainwaring, M.C. 2023. The impact of early life conditions on performance during adulthood: past, present and future. Integrative and Comparative Biology: S5.

Matthews, D.G., **Dial, T.R.** and Lauder, G.V. 2023. Effects of altered Wnt expression on craniofacial morphology and feeding performance in zebrafish. Integrative and Comparative Biology: S5.

Matthews, D.G., Reznick, D.N. and **Dial, T.R.** 2022. Local adaptation of craniofacial shape in Trinidadian guppies. Integrative and Comparative Biology: 93.

Dial, T.R., Collins, L.A., Liao, J.C. and Tobalske, B.W. 2022. Ontogeny of flow refuging in rainbow trout. Integrative and Comparative Biology: 94.

Matthews, D.G., Reznick, D.N. and **Dial, T.R.** 2021. Relative effects of genetics and plasticity in benthic-limnetic morphological divergences of Trinidadian guppies. Evolution.

Dial, T.R. and Lauder, G.V. 2020. Longer development provides first-feeding fish with the jaw kinematics to escape hydrodynamic constraints. Integrative and Comparative Biology: 4-1.

Matthews, D.G., **Dial, T.R.** and Lauder, G.V. 2020. Suction feeding in zebrafish is improved by upregulated Wnt signaling. Integrative and Comparative Biology: 4-2.

Dial, T.R. and Lauder, G.V. 2019. Larval fish prey capture: comparing zebrafish and guppies. Integrative and Comparative Biology: p1-48.

Dial, T.R. and Brainerd, E.L. 2017. Effects of Feeding Performance on the Limits of Guppy Offspring Size. Integrative and Comparative Biology: 1925-610931.

Dial, T.R. Hernandez, L.P. and Brainerd, E.L. 2016. Size, not age, predicts feeding morphology and kinematics among guppy offspring and juveniles. International Congress of Vertebrate Morphology.

Dial, T.R., Brainerd, E. L. 2016. Guppy offspring are born at different stages of morphological and functional maturity among populations. Integrative and Comparative Biology: 56, E53-E53.

Dial, T.R., Brainerd, E.L. 2014. Perinatal escape performance and morphological scaling of Trinidadian guppies (*Poecilia reticulata*). Integrative and Comparative Biology: 54, E265-E265.

Dial, T.R., Summers, A.P. and Brainerd, E.L. 2013. Tradeoffs in anguilliform locomotion over complex substrates in Stichaeid fishes. Integrative and Comparative Biology: 53, E276-E276.

Tobalske, B.W., Warrick, D.R., Heers, A.M., **Dial, T.R.** and Crandell, K.R. 2011. Effects of Wing Morphology on Aerodynamics in Birds Revealed Using Revolving-Wing Models. Integrative and Comparative Biology: 51, E139-E139.

Dial, T.R. and Carrier, D.R. 2010. Precocial hindlimbs and altricial forelimbs of developing Mallard ducks: A study of locomotor performance and morphometrics. International Congress of Vertebrate Morphology.

Dial, T.R. and Carrier, D.R. 2010. Precocial hindlimbs and altricial forelimbs: the modulation of ontogenetic strategies in Mallard ducks. Integrative and Comparative Biology 50, E43-E43. **Honorable Mention**, D. Dwight Davis Competition.

Invited lectures and Seminars

- What use is half a wing in the origin and evolution of avian flight? GEOL 3250 Natural History of Dinosaurs, Utah State University, 28 March 2024
- Avian Biomechanics and Evolution, Summer Program for Bioinspired Engineering, George Washington University, Summer 2021
- Functional and hydrodynamic constraints on offspring size in fishes, Utah State University Biology Department Seminar, Fall 2020
- Ecology and Evolution of East Africa Research Projects symposium report, Ecology and Evolutionary Biology Department, Brown University, Spring 2019
- Morphological and functional development among Trinidadian guppy offspring, Darwin Fellowship, Albertson Lab group interview, University of Massachusetts, Amherst, Spring 2017

- Ecology and Evolution of East Africa Research Projects symposium report, Ecology and Evolutionary Biology Department, Brown University, Spring 2017
- Morphological and functional development among Trinidadian guppy offspring, Hibbitt Early Careers Fellowship program interview, Roger Hanlon laboratory, Marine Biological Laboratories, Winter 2016
- Morphological and functional development among Trinidadian guppy offspring, Miller Fellowship interview, Berkeley University, Summer 2016
- Gut Embryology, Gross Anatomy, MED 2160, Alpert Medical School, 2015
- Pelvis, Gross Anatomy, MED 2160, Alpert Medical School, 2014
- The mechanics and origins of avian flight
  Comparative Vertebrate Morphology lecture, University of Utah, 2009
- What use is half a wing in the origin of flight?
  Comparative Vertebrate Morphology lecture, University of Utah, 2008

Societies

- American Association for the Advancement of Science 2018-present
- Atlantic Salmon Federation 2016 - present
- American Society of Naturalists, 2014 - present
- Society for the Study of Evolution, 2013 - present
- International Congress of Vertebrate Morphology, 2010 – present
- Society of Integrative and Comparative Biology, 2007 – present
- *Sigma Xi* Biology Honors Society, 2007
- *Alpha Sigma Nu* Jesuit Honors Society, 2006
- *Beta Beta Beta* Biology Honors Society, 2004

Synergistic Activities

- Member: Development Committee, Society of Integrative and Comparative Biology (SICB; 2017-2021; 2023-present); Chair starting in 2025
- Session Chair, Society of Integrative and Comparative Biology, 2023, Complementary to S5: Pathways to Adulthood: Environmental, Developmental, and Evolutionary Influences on the Ontogeny of Form and Function
- Moderator, Science Moab hosting Science on Screen with Dr. Sasha Reed, Movie: Don't Look Up (summer 2022)
- Co-creator, Arches GeoTour, collaboration with Chris Benson (USGS), Science Moab and Moab Festival of Science (2021) (https://sciencemoab.org/geotours/)
- Moderator, Science Moab hosting Science on Screen with Dr. Jayne Belnap, Movie: The Martian (summer 2021)
- Mentor, Utah State University Statewide Faculty-to-Student Mentoring Program (2020-present)
- Judge, Science Fair, Moab Charter School (March 2021)

- Co-creator, Moab Geology Podcast driving tour, collaboration with Chris Benson (USGS), Science Moab and Moab Festival of Science 2020 (https://sciencemoab.org/geotours/)
- Co-leader of field course 'Ecology, Evolution and Conservation of East Africa' through Brown University and the University of Montana (2016-2019)
- President, Graduate Student Association (2015), Department of Ecology and Evolutionary Biology, Brown University.
- Teaching assistant for field course 'Ecology and Evolution of East Africa' through the University of Montana (2009-2015)
- Vice president, Graduate Student Association (2014), Department of Ecology and Evolutionary Biology, Brown University.
- Graduate Teaching Assistant for Marine Science Club at Paul Cuffee High School, Providence, RI (2012-2016). Collaborating with high school teachers to teach a weekly science club focused on the biology of fishes.
- Assistant and interviewee, NOVA-PBS special on the evolution of flight (Summer 2014)
- Volunteer, tutoring science and math at Boys and Girls Club, Los Angeles CA (2004-2007)

Reviewer

- Hydrobiologia
- Journal of Experimental Biology
- Functional Ecology
- Ecology Letters
- PLOS One
- Genetics, Selection and Evolution
- Integrative and Comparative Biology
- Biological Journal of the Linnaean Society

Other interests

- Piloting (1350 hours total time)
    - Pilot in Command type rating (CE 525B)
    - Multiengine, Instrument ratings
- Non-profit, NGO work:
    - Member: Drollinger Family Charitable Foundation (2005-present)