

Hannah Weller

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Present Position

Postdoctoral researcher, [Integrative Evolutionary Biology Group](#)

Project: Developmental and environmental robustness of color pattern formation in cichlids.
University of Helsinki, Helsinki, Finland

Education

- 2019–2023 **Ph.D.** **Brown University**, Dept. of Ecology, Evolution, and Organismal Biology
Advisor: Elizabeth Brainerd
- 2017–2019 **M.Sc.** **Brown University**, Dept. of Ecology, Evolution, and Organismal Biology
Advisor: Elizabeth Brainerd
- 2012–2016 **B.Sc.** **University of Chicago**, Biology (Honors)
Undergraduate advisors: Mark Westneat & Caleb McMahan

Publications

- 2024 Crowell, H.L.*¹, Curlis, J.D.¹, **Weller, H.I.**¹, Davis Rabosky, A.R.¹ (2024). Predators drive the evolution of ultraviolet colouration in snakes. *Nature Communications*. doi.org/10.1038/s41467-024-49506-4.
- ¹All authors contributed equally to this work.
- 2024 **Weller, H.I.**, Hiller, A.E., Lord, N.P., and Van Belleghem, S.M. (2024). Recolorize: flexible color segmentation of biological images. *Ecology Letters*. doi.org/10.1111/ele.14378.
- 2023 Paquette, S.E., Martin, N., Rodd, A., Manz, K.E., Camarillo, M., Allen, E., **Weller, H.I.**, Pennell, K., and Plavicki, J. (2023). Neural dysregulation and aberrant microglial responses to brain injury following perfluorooctane sulfonate exposure in larval zebrafish. *Environmental Health Perspectives*. doi.org/10.1016/j.cub.2023.11.032.
- 2023 Tumulty, J.P., Miller, S.E., Van Belleghem, S.M., **Weller, H.I.**, Jernigan, C.M., Vincent, S., Staudenraus, R.J., Legan, A.W., Polnaszek, T.J., Uy, F.M.K, Walton, A., and Sheehan, M.J. (2023). Evidence for a selective link between cooperation and individual recognition. *Current Biology*. doi.org/10.1016/j.cub.2023.11.032.
- 2022 **Weller, H.I.**, López-Fernández, H., McMahan, C.D., and Brainerd, E.L. (2022). Relaxed feeding constraints facilitate the evolution of mouthbrooding in Neotropical cichlids. *The American Naturalist*. doi.org/10.1086/719235
- 2022 Capano, J.G., Boback, S.M., **Weller, H.I.**, Cieri, R.L., Zemer, C.F., and Brainerd, E.L. (2022). Modular lung ventilation in *Boa constrictor*. *Journal of Experimental Biology*. doi.org/10.1242/jeb.243119.
- 2020 **Weller, H.I.**, Olsen, A., Camp, A.L., Hernandez, L.P., Manafzadeh, A.R., and Brainerd, E.L. (2020). An XROMM study of intra-oral transport and swallowing in catfish. *Integrative Organismal Biology*. doi.org/10.1093/iob/obaa018.
- 2020 Cohen, K.E., **Weller, H.I.**, Westneat, M.W., and Summers, A.P. (2020). The Evolutionary Continuum of Functional Homodonty to Heterodonty in the Dentition of *Halichoeres* Wrasses. *Integrative and Comparative Biology*. doi.org/10.1093/icb/icaa137.
- 2020 **Weller, H.I.**¹, Hooper, S.E.¹, and Amelon, S.K.¹ (2020). Countcolors, an R package for quantification of the fluorescence emitted by *Pseudogymnoascus destructans* lesions on the wing membranes of hibernating bats. *Journal of Wildlife Diseases*. doi.org/10.7589/2019-09-231.

¹All authors contributed equally to this work.

- 2020 Cohen, K.E., **Weller, H.I.**, and Summers, A.P. (2020). Not your father's homodonty-stress, tooth shape, and the functional homodont. *Journal of Anatomy*. doi.org/10.1111/joa.13248.
- 2019 van Meer, N.M., **Weller, H.I.**, Manafzadeh, A.R., Kaczmarek, E.B., Scott, B., Gussekloo, S.W.S., Wilga, C.D., Camp, A.L., and Brainerd, E.L. (2019). Intra-oropharyngeal food transport and swallowing in white-spotted bamboo sharks. *Journal of Experimental Biology*. doi.org/10.1242/jeb.201426.
- 2019 **Weller, H.I.**, and Westneat, M.W. (2019). Quantitative color profiling of digital images with earth mover's distance using the R package colordistance. *PeerJ*. doi.org/10.7717/peerj.6398.
- 2017 **Weller, H.I.**, McMahan, C.D., and Westneat, M.W. (2017). Dirt-sifting Devilfish: Winnowing in the geophagine cichlid *Satanoperca daemon* and evolutionary implications. *Zoomorphology*. doi.org/10.1007/s00435-016-0335-6.

Grants and Awards

- Jan. 2022 **Doctoral Dissertation Enhancement Grant**
\$10,000 USD, Bushnell Fund at Brown University (Providence, RI, USA)
- May 2021 **Dean's Excellence in Teaching Award**
For human anatomy teaching at Brown University Alpert Medical School
- Apr. 2019 **Graduate Research Fellowship**
\$138,000 USD, National Science Foundation (Alexandria, VA, USA)
- Dec. 2018 **Field Museum Visiting Scientist Scholarship**
\$1,500 USD, Field Museum of Natural History (Chicago, IL, USA)
- May 2017 **Presidential Fellowship**
\$108,000 USD, Brown University (Providence, RI, USA)
- June 2015 **Jeff Metcalf Undergraduate Research Fellowship**
\$5,000, Marine Biological Laboratory (Woods Hole, MA, USA)
- Mar. 2015 **Elected to Phi Beta Kappa Society**
- Sep. 2014 **Best Presentation, Undergraduate Research Symposium**
\$150 USD, University of Chicago (Chicago, IL, USA)
- June 2014 **Elliott and Eileen Hinkes Research Fellowship**
\$4,000 USD, University of Chicago (Chicago, IL, USA)

Software

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| recolorize: Simplify and Remap Image Colors
(>300 downloads / month) | CRAN (stable)
GitHub (development) |
| colordistance: Distance Metrics for Image Color Similarity
(>400 downloads / month) | CRAN (stable)
GitHub (development) |
| countcolors: Locates and Counts Pixels Within Color Range(s)
(>300 downloads / month) | CRAN (stable)
GitHub (development) |

Teaching and Pedagogical Training

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| Sep. 2024 – Present
Helsinki, Finland | UP1 Learning in higher education / YP1 Oppiminen yliopistossa
Pedagogy seminar on student-oriented teaching. |
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July 2022 Providence, RI, USA	Instructor, Brown University Summer@Brown Program Revised from prior year (22 students). <i>Course title: Anatomy, Behavior, and Evolution: Fishy Solutions to Life Underwater</i> <i>Course evaluations: 4.7 / 5 (19 responses; session avg: 4.6 / 5)</i> <i>Instructor evaluations: 5 / 5 (19 responses; session avg: 4.7 / 5)</i>
June 2021 Providence, RI, USA	Instructor, Brown University Summer@Brown Program Proposed & designed intensive high school course including labs, assignments, and final projects (12 students). <i>Course title: Anatomy, Behavior, and Evolution: Fishy Solutions to Life Underwater</i> <i>Course evaluations: 4.2 / 5 (7 responses; session avg.: 4.6 / 5)</i> <i>Instructor evaluations: 4.9 / 5 (7 responses; session avg.: 4.7 / 5)</i>
Jan. 2021 – May 2021	Course Design Seminar (Sheridan Center for Teaching and Learning) Seminar on syllabus/course design. Basis for Summer@Brown course.
Aug. 2020 – Apr. 2021 Providence, RI, USA	Teaching assistant, Brown University Alpert Medical School <i>Course: Human Anatomy I & II (lecture & lab). Restructured curriculum for COVID compliance, including running small group sessions (139 students). Received Excellence in Teaching Award.</i> <i>Evaluations: 4.6 / 5 (135 responses; course avg: 4.4 / 5)</i>
Aug. 2019 – Apr. 2020 Providence, RI, USA	Teaching assistant, Brown University Alpert Medical School <i>Course: Human Anatomy I & II (lecture & lab). Guided medical students through cadaver-based human anatomy labs; delivered lectures on development and innervation (142 students).</i> <i>Evaluations: 4.4 / 5 (128 responses; course avg: 4.3 / 5)</i>
Sep. 2018 – Dec. 2018	Teaching Seminar (Sheridan Center for Teaching and Learning) Introductory pedagogy seminar.
Sep. 2017 – Dec. 2017 Providence, RI, USA	Teaching assistant, Brown University Dept. of Ecology and Evol. Biol. Ran discussion sections, wrote/graded assignments and exams.
Jan. 2015 – Apr. 2017 Chicago, IL, USA	Teaching assistant, University of Chicago Dept. of Biological Sciences Supervised labs; wrote/graded assignments; delivered lectures; lead paper discussions/review sessions. <i>Courses:</i> <ol style="list-style-type: none"> 1) Genetic and Developmental Biology (80 students) 2) Multiscale Modeling of Biological Systems (60 students) 3) Molecular Biology of the Cell (x2) (60 students) 4) Comparative Vertebrate Anatomy (10 students) 5) Bioinformatics (20 students)

Outreach

Sep. 2023 – Present Helsinki, Finland	Postdoctoral representative, Univ. of Helsinki Wellbeing Committee Organizing events around wellbeing resources (e.g. mental health, mentorship) for Helsinki Institute of Life Sciences research community.
Sep. 2023 – June 2024 Helsinki, Finland	Local organizer, Meeting of the European Society of Evolutionary and Developmental Biology (EuroEvoDevo) 2024 Organized outreach events and coordinated conference activities.
Sep. 2019 – June 2023 Providence, RI, USA	R User Group, Brown University Dept. of Ecology and Evol. Biol. Organized and ran monthly R workshops for students in my department.

Sep. 2018 – June 2022 Providence, RI, USA	Marine Science Club, Paul Cuffee High School Collaborated with high school teachers for weekly science activities with high school students.
June 2013 – Sep. 2013 Boston, MA, USA	Animal care intern, New England Aquarium Daily animal care and maintenance; visitor outreach; collection trips.

Mentorship

June 2024 – Present University of Helsinki	Mehrnaz Asadnejad Co-supervising master's thesis: The effect of increased temperature on phenotypic robustness in a cichlid fish.
Sep. 2023 – July 2024 University of Helsinki	João Lopes Co-supervised master's thesis: Heritability of fluctuating asymmetry in the color pattern of <i>Chindongo demasoni</i> .
Sep. 2021 – June 2023 Brown University	Angelina Cho Supervised undergraduate research project: An automatic pipeline for landmarking fish feeding videos in the lab using DeepLabCut. Included paid summer Undergraduate Research Opportunity (UROP).
June 2021 – July 2021 Brown University	Micah Selengut Supervised undergraduate research project: Mercury levels in different species of fish commonly caught in ponds on Narragansett land. Paid summer Undergraduate Research Opportunity (UROP).

Invited and Contributed Talks

Apr. 2024	Weller, H.I. , Van Belleghem, S. Talk: recolorize: An R package for flexible colour segmentation of biological images. <i>Finnish Molecular Ecology Symposium</i> , Joensuu, Finland.
July 2023	Weller, H.I. , Van Belleghem, S. Invited symposium talk : One way to measure color pattern variation in coral reef fishes. <i>International Conference for Vertebrate Morphology</i> , Cairns, Australia.
Jan. 2023	Weller, H.I. , Weissman, M., and López-Fernández, H. Talk: Bet-hedging theory helps explain life history differences among mouthbrooding cichlids. <i>Society for Integrative and Comparative Biology</i> , Austin, TX, USA.
Sep. 2022	Weller, H.I. and López-Fernández, H. Invited symposium talk : How (and how much) does feeding influence the evolution of mouthbrooding in Neotropical cichlids? <i>Encontra Brasileiro de Ictiologia</i> , Gramado, Brazil.
Jan. 2022	Weller, H.I. , Brainerd, E.L., and López-Fernández, H. Talk: Does feeding mediate life history tradeoffs in mouthbrooding cichlids? <i>Society for Integrative and Comparative Biology</i> , virtual conference.
Aug. 2021	Weller, H.I. , Wham, D., Ezray-Wham, B., and Lord, N.P. Talk: Greater than the sum of their parts? Unpacking the "black box" of perceptual similarity using classical color pattern metrics. <i>Living Light Early Career Researchers</i> , virtual conference.
Jan. 2021	Weller, H.I. , Schwartz, S.T., Karan, E., and Lord, N.P. Talk: Recolorize: a flexible R package for color classification. <i>Society for Integrative and Comparative Biology</i> , virtual conference.
Jan. 2020	Weller, H.I. , López-Fernández, H., McMahan, C.D., and Brainerd, E.L. Talk: The spandrels of Satan's perches: evidence for the co-optation of feeding traits in the convergent evolution of mouthbrooding in Neotropical cichlids. <i>Society for Integrative and Comparative Biology</i> , Austin, TX.

- Oct. 2019 **Weller, H.I.**, López-Fernández, H., McMahan, C.D., and Brainerd, E.L. Talk: Does mouthbrooding constrain or complement feeding morphology? *Regional Division of Vertebrate Morphology (Northeast)*, Newton, MA.
- June 2019 **Weller, H.I.**, Olsen, A., Camp, A.L., Hernandez, L.P., Manafzadeh, A.R., and Brainerd, E.L. Talk: 3D-intraoral prey trajectories indicate distinct phases in how channel catfish swallow food. *International Congress of Vertebrate Morphology*, Prague, CZ.
- Jan. 2019 **Weller, H.I.**, Olsen, A., Camp, A.L., Hernandez, L.P., Manafzadeh, A.R., and Brainerd, E.L. Talk: An XROMM study of intra-oral transport and swallowing in catfish. *Society for Integrative and Comparative Biology*, Tampa, FL.
- Oct. 2017 **Weller, H.I.** and Brainerd, E.L. Talk: How do fish swallow food? *Regional Division of Vertebrate Morphology (Northeast)*, Lowell, MA.

Invited Lectures and Workshops

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| June 2022 | Univ. of Washington, Friday Harbor Laboratories (WA, USA) | 1. Workshop: Practical Statistics for Biologists
2. Workshop: Phylogenetic Methods in R
R workshops for graduate-level biomechanics course. |
| May 2022 | American Society of Naturalists | Podcast: Naturalist Selections
Podcast interview about Weller et al. 2022 on the co-evolution of feeding and parental care. |
| July 2020 | Univ. of Washington, Friday Harbor Laboratories (WA, USA) | Lecture: A field guide to statistics in organismal biology
Guest lecture on how to approach novel statistical methods for those without a statistical background. |
| July 2020 | Univ. of California-Davis, Dept. of Ecol. and Evol. (CA, USA) | Virtual seminar: Mouthbrooding morphologies in Neotropical cichlids
Host: Peter Wainwright. |
| Apr. 2020 | Louisiana State Univ., Dept. of Biol. (LA, USA) | Special Topics: Light, Color, and Vision in Biology (BIOL 7901/ENTM 7008)
Guest lecturer (3 classes). Instructors: Nathan Lord (ENTM) and Brant Faircloth (BIOL). |
| Dec. 2019 | Louisiana State Univ., Dept. of Entomology (LA, USA) | Workshop: R for Biologists
Organizer. Day-long workshop on data analysis, visualization, and troubleshooting in R. |