

ECOLOGICAL DISSERTATIONS IN THE AQUATIC SCIENCES

An Effective Platform for Developing Professional Collaborations Among Early Career Aquatic Scientists

Anwesha Ghosh , Andrew L. Robison ,
Ariana M. Chiapella , Brittni L. Bertolet ,
Corday Selden , Danielle Perry , Hannah G. Reich ,
Isabella Oleksy , Jana Isanta-Navarro ,
Kelly S. Aho , Laura Ganley , Laura M.V. Soares ,
Liam Heffernan , Matthew Sasaki , Nicholas E Ray ,
Ohad Peleg , Patricia Thibodeau , Paula C.J. Reis ,
Pfananani A. Ramulifho , Rebecca L. Maher ,
Richard LaBrie , and Shannon L. Speir 

WHAT IS ECOLOGICAL DISSERTATIONS IN THE AQUATIC SCIENCES?

The Ecological Dissertations in the Aquatic Sciences (Eco-DAS, pronounced “eco-days”) symposium connects freshly minted Ph.D.s in the aquatic sciences with the aims of facilitating networking, collaboration, and interdisciplinary cross-talk. This exercise is intertwined with training discussions on team leadership, career paths, proposal writing and submissions, and funding strategies and opportunities.

HOW DID IT ALL START?

The symposium started as the Dissertations Initiative for the Advancement of Limnology and Oceanography in 1993, under the direction of Susan Weiler with funding from the National Science Foundation, and contributions from other U.S. federal agencies. In 2008, the program was reinvented and renamed Eco-DAS, under the direction of Paul Kemp with support from the NSF Biological Oceanography Program. Additional funding support was, and continues to be, extended from the Association for the Sciences of Limnology and Oceanography (ASLO). The symposium gained momentum, and success was reflected through numerous publications of collaborative pieces including data-centered research articles, reviews, and book chapters in peer-reviewed journals, such as *Environmental Evidence*, *Limnology and Oceanography*, *Limnology and Oceanography Bulletin*,

Limnology and Oceanography: Fluids and Environments, *Limnology and Oceanography Letters*, *Oecologia*, and *F1000Research* (Daigle et al. 2015; Asch et al. 2016; Coble et al. 2016; Hundey et al. 2016; Kremer et al. 2016; Toscano et al. 2016; Durden et al. 2017; Guy-Haim et al. 2017; Hayes et al. 2017; Kelly et al. 2017; Millette et al. 2018; Farrell et al. 2019).

The outcomes of Eco-DAS have been broader than just scientific publications. In 2018, the participants formulated the concept of WikiProject Limnology and Oceanography. This project aims to improve the accuracy of Wikipedia pages on topics related to inland waters and marine ecosystems. Details about the WikiProject can be accessed from: https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Limnology_and_Oceanography (Kincaid et al. 2021).

PERSPECTIVES FROM Eco-DAS XIV

Symposium format: A virtual meet-up

Eco-DAS XIV was held over 5 days in October 2021 and attended by 22 participants currently affiliated with institutions from countries including Brazil, Canada, Germany, India, New Zealand, South Africa, Sweden, and the United States of America (Fig. 1). In line with safety precautions mandated under the ongoing COVID-19 pandemic, Eco-DAS XIV was held virtually. Most participants of Eco-DAS XIV were new postdocs, meaning that they had few pre-existing connections. Compared to maintaining established connections in the virtual setting, developing new relationships was particularly challenging. The Eco-DAS XIV virtual portal allowed systematic interactions among the participants by facilitating dialogues with adequate time allotments.

Symposium proceedings

Eco-DAS aims to foster long-term, interdisciplinary collaborations among early career researchers. To help identify topics for collaboration, at the application stage potential participants were required to formulate a project idea which was inspired by the individual's own background. Once at the Eco-DAS event, each participant was allotted a “breakout” room where they got an opportunity to discuss their manuscript idea with every other participant of the symposium. This format allowed cross-talk among participants, fostering the development of working groups over the first 2 days of the symposium. Each working group consisted of

researchers with synergistic ideas and unique, complementary skill sets. The focus then remained on the working groups throughout the rest of the symposium (i.e., 3 days), where each day the groups met to discuss and sketch out a collaborative manuscript. Attendees were often involved with more than one working group, which widened the network to allow more knowledge sharing and conceptualization of innovative ideas. Ample opportunities were provided for the working groups to meet and structure their manuscripts. The participants mutually decided the meeting time of the working group. To avoid overlap, each working group met on different days over three sessions such that no member would miss out on discussions should they be involved in multiple groups. The final day of the symposium was dedicated to idea presentation by the working groups. By this time, all working groups had successfully summarized important points of their ideas and shaped them into a working draft to be transformed into a manuscript following the meeting.

Eco-DAS XIV saw the formation of nine working groups on interdisciplinary topics including: time series variations of water chemistry, extreme events, climate feedbacks, response of reservoirs to climate change, microbial biogeochemistry, extracellular enzyme activities, dissolved organic matter reactivity, biogeochemical sustainability, and “poop” (or, scientifically put, the importance of fecal nutrients in food webs). Each group includes participants from varied backgrounds including terrestrial, freshwater, and marine or estuarine systems with unique skill sets such as microbial community analyses, modeling, and nutrient chemistry dynamics.

In addition to meetings of working groups, participants also attended talks and discussions guided by relevant mentors. The first day of Eco-DAS XIV concluded with a session led by Laura Falkenberg about the importance of developing an academic identity. Other mentor sessions included alumni discussions about previous successful Eco-DAS projects such as the WikiProject, which was led by Jacob Zwart, Kelly Hondula, Erin Larson, and Jessica Brandt; and advice about writing successful NSF proposals was provided by Program Officers Cynthia Suchman and Michael Sieracki. Both Cynthia and Michael explained the format of grant submission to the NSF along with the NSF Merit Review process and provided helpful insights into crucial aspects of successful grants. A



FIG. 1. Attendees of Eco-DAS XIV posing cheerfully for the group photo on the final day to conclude 5 days of brainstorming during the virtual symposium. Image credit: Paul Kemp.

separate session was scheduled where the participants could ask specific queries to the NSF Program Officers on funding opportunities.

All of these discussions were organized on the “Network Lounge” of the official Eco-DAS website to emulate past symposium informal dinner talks, and participants were also free to use other communication platforms following the symposium. The participants formed working groups quickly because the symposium format was focused on fostering attendees’ collaborations, as opposed to scientific talks. In a recent publication, the alumni of Eco-DAS have shown how these networks led to successful connections even 1-year post-symposium (Kelly et al. 2017). Furthermore, previous Eco-DAS working groups have published manuscripts in leading journals and had successful collaborative grant proposals (Kavanaugh et al. 2013; Asch et al. 2016; Hundey et al. 2016).

Beyond the professional connections

As the scientific ideas identified continue to develop and take shape, formation of professional networks and publications are not the only outcomes of Eco-DAS XIV. The symposium has provided an opportunity for like-minded researchers to connect with others who are at

similar career stages. Our cohort provides a safety net to express uneasiness and concerns about uncertainties associated with job opportunities, shifting to new institutions, and handling family responsibilities amidst professional growth, particularly during the COVID-19 pandemic. Furthermore, Eco-DAS XIV provided early career participants an opportunity to lead projects together as peers, without direct involvement (or under the supervision) of their scientific advisors. This was a chance to test our individual capacities before we step into the scientific world to manage our own teams and become principal investigators. And again, the feature that sets Eco-DAS apart from many other symposiums is the design and format that focuses only on scientists at the same career stage. This approach fosters a nonhierarchical atmosphere that is distinct from the standard norm of formal principal investigator-led scientific collaborations. Eco-DAS allowed for stress-free brainstorming sessions and development of scientific ideas, while giving us a once-in-a-lifetime experience of being a part of the symposium and enriching our professional networks with early career scientists from diverse backgrounds. Through these experiences, Eco-DAS bolstered our confidence in embracing leadership roles in the aquatic sciences.

Although we look forward to completion and publication of the collaborative ideas, other successes—such as Brittni Bertolet giving the Amplifying Voices talk or Matthew Sasaki co-chairing the 2022 Ocean Global Change Biology Gordon Research Seminar—continue to make us proud as everyone paves their way toward a successful career.

Eco-DAS XIV will serve as a key foundation step to our careers as aquatic scientists and this symposium would not have been possible without Paul Kemp, the lead organizer of Eco-DAS, and Kristina Remple, both of whom worked tirelessly to run every aspect smoothly. We would like to acknowledge and thank Paul and Kristina for their time and effort in giving us this once-in-a-lifetime experience.

References

- Asch, R. G., D. J. Pilcher, S. Rivero-Calle, and J. M. Holding. 2016. Demystifying models: Answers to ten common questions that ecologists have about earth system models. *L&O Bull.* **25**: 65–70.
- Coble, A. A., R. G. Asch, S. Rivero-Calle, S. M. Heerhartz, J. M. Holding, C. T. Kremer, M. Finiguerra, and K. E. Strock. 2016. Climate is variable, but is our science? *L&O Bull.* **25**: 71–76.
- Daigle, R. M., C. J. Monaco, and A. K. Baldridge. 2015. An adaptable toolkit to assess commercial fishery costs and benefits related to marine protected area network design. *F1000Research* **4**: 1234.
- Durden, J. M., J. Y. Luo, H. Alexander, A. M. Flanagan, and L. Grossman. 2017. Integrating big data into aquatic ecology: Challenges and opportunities. *L&O Bull.* **26**: 101–108.
- Farrell, K. J., A. N. Cramer, K. L. Hondula, S. K. Thompson, and J. A. Zwart. 2019. Support of early-career researchers supports the future of ASLO. *L&O Bull.* **28**: 34.
- Guy-Haim, T., and others. 2017. What are the type, direction, and strength of species, community, and ecosystem responses to warming in aquatic mesocosm studies and their dependency on experimental characteristics? A systematic review protocol. *Environ. Evid.* **6**(1): 6.
- Hayes, N. M., B. R. Deemer, J. R. Corman, N. R. Razavi, and K. E. Strock. 2017. Key differences between lakes and reservoirs modify climate signals: A case for a new conceptual model. *L&O Lett.* **2**: 47–62.
- Hundey, E. J., and others. 2016. A shifting tide: Recommendations for incorporating science communication into graduate training. *L&O Bull.* **25**: 109–116. doi:10.1002/lob.10151.

Kavanaugh, M. T., G. W. Holtgrieve, H. Baulch, J. R. Brum, M. L. Cuvelier, C. T. Filstrup, K. J. Nickols, and G. E. Small. 2013. A salty divide within ASLO. *L&O Bull.* **22**: 34–37.

Kelly, P. T., and others. 2017. Ecological dissertations in the aquatic sciences: An effective networking and professional development opportunity for early career aquatic scientists. *L&O Bull.* **26**: 25–30.

Kincaid, D. W., W. S. Beck, J. E. Brandt, M. M. Brisbin, K. J. Farrell, K. L. Hondula, E. I. Larson, and A. J. Shogren. 2021. Wikipedia can help resolve information inequality in the aquatic sciences. *L&O Lett.* **6**: 18–23.

Kremer, C. T., A. K. Williams, M. Finiguerra, A. A. Fong, A. Kellerman, S. F. Paver, B. B. Tolar, and B. J. Toscano. 2016. Realizing the potential of trait-based aquatic ecology: New tools and collaborative approaches. *Limnol. Oceanogr.* **62**: 253–271. doi:10.1002/lo.10392.

Millette, N. C., J. Grosse, W. M. Johnson, M. J. Jungbluth, and E. A. Suter. 2018. Hidden in plain sight: The importance of cryptic interactions in marine plankton. *L&O Lett.* **3**: 341–356.

Toscano, B. J., N. J. Gownaris, S. M. Heerhartz, and C. J. Monaco. 2016. Personality, foraging behavior and specialization: Integrating behavioral and food web ecology at the individual level. *Oecologia* **182**: 55–69. doi:10.1007/s00442-016-3648-8.

Anwesha Ghosh, Centre for Climate and Environmental Studies, Indian Institute of Science Education and Research Kolkata, Mohanpur, Nadia, West Bengal, India; drghoshanwesha@gmail.com

Andrew L. Robison, Stream Biofilm and Ecosystem Research Laboratory, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland

Ariana M. Chiapella, Rubenstein Ecosystem Science Laboratory, University of Vermont, Burlington, Vermont, USA

Brittni L. Bertolet, Department of Ecology and Evolutionary Biology, University of California Irvine, Irvine, California, USA

Corday Selden, Department of Marine and Coastal Sciences, Rutgers University, The State University of New Jersey, Rutgers, New Jersey, USA

Danielle Perry, Conservation Science Department, Mass Audubon, Lincoln, Massachusetts, USA

Hannah G. Reich, Department of Biological Sciences, University of Rhode Island, Kingston, Rhode Island, USA

Isabella Oleksy, Department of Zoology and Physiology, University of Wyoming, Laramie, Wyoming, USA

Jana Isanta-Navarro, Flathead Lake Biological Station, University of Montana, Missoula, Montana, USA

Kelly S. Aho, Battelle, National Ecological Observatory Network (NEON), Boulder, Colorado, USA

Laura Ganley, Anderson Cabot Center for Ocean Life, New England Aquarium, Boston, Massachusetts, USA

Laura M.V. Soares, Department of Hydraulic Engineering and Water Resources, Federal University of Minas Gerais, Belo Horizonte, Minas Gerais, Brazil

Liam Heffernan, Department of Ecology and Genetics, Limnology, Uppsala University, Uppsala, Sweden

Matthew Sasaki, Department of Marine Sciences, University of Connecticut, Groton, Connecticut, USA

Nicholas E Ray, Department of Ecology and Evolutionary Biology, Cornell University, Ithaca, New York, USA

Ohad Peleg, Institute of Marine Science, University of Auckland, Leigh, New Zealand

Patricia Thibodeau, University of Rhode Island, Graduate School of Oceanography, Narragansett, Rhode Island, USA

Paula C.J. Reis, INRS Eau Terre Environnement, Quebec City, Quebec, Canada

Pfananani A. Ramulifho, Department of Biological Sciences, University of Venda, Thohoyandou, Limpopo Province, South Africa

Rebecca L. Maher, Institute of Ecology and Evolution, University of Oregon, Eugene, Oregon, USA

Richard LaBrie, Interdisciplinary Environmental Research Centre, University of Freiberg, Freiberg, Germany

Shannon L. Speir, Department of Biological Sciences, University of Alabama, Tuscaloosa, Alabama, USA