

Lighting pathways to success in STEM: A virtual Lab Meeting Program (LaMP) mutually benefits mentees and host labs

Website: <https://www.bco-dmo.org/dataset/928537>

Data Type: Other Field Results

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Project

» [RCN: Evolution in Changing Seas](#) (RCN ECS)

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Abstract

Developing robust professional networks can help shape the trajectories of early career scientists. Yet, historical inequities in STEM fields makes access to these networks highly variable across academic programs, and senior academics often have little time for mentoring. Here, we illustrate the success of a Virtual Lab Meeting Program (LaMP). In this program, we matched students (“Mentees”) with a more experienced researcher (“Mentors”) from a research group. The Mentees then attended the Mentors’ lab meetings during the academic year with two lab meetings specifically dedicated to the Mentee’s professional development. Survey results indicate that Mentees expanded their knowledge of the hidden curriculum as well as their professional network, while only requiring a few extra hours of their Mentor’s time over eight months. In addition, host labs benefitted from Mentees sharing new perspectives and knowledge in lab meetings. Diversity of the Mentees was significantly higher than the Mentors, suggesting that the program increased participation of traditionally underrepresented groups. Finally, we found that providing a stipend was very important to many mentees. We conclude that Virtual Lab Meeting Programs can be an inclusive and cost-effective way to foster trainee development and increase diversity within STEM fields with little additional time commitment. These data are available in Dryad at <https://datadryad.org/stash/dataset/doi:10.5061/dryad.p2ngf1vzp>

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Dataset Description

The data accompanying these metadata reside at the Dryad repository. Dryad has provided the dataset DOI and is linked on this dataset metadata landing page.

Raw survey data is not provided to protect the anonymity of participants. Survey responses were summarized for each study question and those summaries are provided in the following data tables.

Description of the data files:

mentee-collaborate.txt: This table summarizes Mentee responses to the question of whether they expect to collaborate with host labs in the future.

Columns:

- * Collaborate Category of response
- * Mentees: Number of participants that selected that category.

mentee-futureinteract.txt: This table summarizes Mentee responses to the question of whether they expect to interact with host labs in the future.

Columns:

- * Future_Interactions: Category of response
- * Mentees: Number of participants that selected that category.

Mentee-Knowledge.txt: This table summarizes Mentee responses to the question of what kind of knowledge they gained through the program. Mentees were instructed to select any that applied.

Columns:

- * Gained: Category of response
- * Mentees: Number of participants that selected that category.

Mentee-ProfDevelop.txt: This table summarizes Mentee responses to the question of what areas of professional development were covered in lab meetings. Mentees were instructed to select any that applied.

Columns:

- * AreasProfDevel: Category of response
- * Mentees: Number of participants that selected that category.

mentee-recommend.txt: This table summarizes Mentee responses to the question of whether they would recommend the program to a friend.

Columns:

- * Recommendtofriend: Category of response
- * Mentees: Number of participants that selected that category.

mentee-stipend.txt: This table summarizes Mentee responses to the question of how important the stipend was to Mentee's completion in the program.

Columns:

- * Category: Category of response
- * Participants: Number of participants that selected that category.

MenteeDiversity.csv: This table summarizes Mentee responses to demographic questions.

Columns:

- * Q4_genderID: Gender categories
- * Q5_racialID: Racial and ethnic group categories
- * Q6_sexOrient: Sexual orientation categories
- * Q7_disability: Disability categories

MenteeMentorsQs.xlsx: This spreadsheet has a list of questions that was used in the survey. There are two tabs: "Mentee" and "Mentor".

Columns:

- * ColumnNameForR: The name of the object used in R
- * Question: The question from the survey corresponding to that R object.

Mentor-future-interact.txt: This table summarizes Mentor degree of response to the statement of whether they plan to interact with the Mentee in the next year.

Columns:

- * Future_interaction: Category of response
- * Mentors: Number of participants that selected that category.

Mentor-lab-benefited.txt: This table summarizes Mentor degree of response to the statement of whether their lab benefitted from the program.

Columns:

- * Laboratory Benefited: Category of response
- * Mentors: Number of participants that selected that category.

Mentor-labwillbereource-mentee.txt: This table summarizes Mentor degree of response to the statement of whether their lab will be a resource in the future for the Mentee.

Columns:

- * Labwillbearesource: Category of response
- * Mentors: Number of participants that selected that category.

mentor-participate-again.txt: This table summarizes Mentor degree of response to the statement of whether they would participate as a Mentor in the program again.

Columns:

- * ParticipateAgain: Category of response
- * Mentor: Number of participants that selected that category.

mentor-time.txt: This table summarizes Mentor responses to the question of how much time they spent over the course of an academic year, in addition to lab meetings, on participation in the program.

Columns:

- * Time: Category of response
- * Mentors: Number of participants that selected that category.

MentorDiversity.csv: This table summarizes Mentor responses to demographic questions.

Columns:

- * Q4_genderID: Gender categories
- * Q5_racialID: Racial and ethnic group categories
- * Q6_sexOrient: Sexual orientation categories
- * Q7_disability: Disability categories

Mentors-mentee-contrib.txt: This table summarizes Mentor responses to the question of how the Mentee contributed to lab meetings. Mentors were instructed to select any that applied.

Columns:

- * Mentee_contributions: Category of response

* Mentors: Number of participants that chose that category

Methods & Sampling

Running the Virtual Lab Meeting Training Program

The first three months of the program requires dedicated time for recruiting and matching Mentees and Mentors (for summary of program timelines, see **publication**). One month prior to the start of the academic year, we began to advertise the program by sharing a link to our webpage with potential mentors and mentees (<https://rcn-ecs.github.io/VMTP/>). Then, we recruited mentors through a list of personal invitations, listservs, and members of the Evolution in Changing Seas RCN. We completed the process of recruiting 30-40 mentors approximately two weeks after the academic year started.

After mentors were recruited, we began the process of recruiting student Mentees. We advertised on the listserv to the RCN and asked Mentees in the network to share with their peers. To reach students from traditionally marginalized groups, we also shared an advertisement to the program with a number of groups and programs created to support students from marginalized groups, including Black Women in Ecology, Evolution, and Marine Science (BWEEMS), Black in Marine Science (BIMS), the HBCU Biology and Natural Resource Program, CERF, AGU Bridge, SACNAS, ASLO Multicultural program, ESA-SEEDS, Asian Americans & Pacific Islanders in Geosciences (AAPIIG), and the Inclusive Ecology section in ESA. In addition, we shared the advertisement with a list of faculty in the biological sciences at HBCUs.

To apply, Mentees submitted a 300 word statement that described their current research interests and/or experiences related to the themes under the Evolution in Changing Seas RCN, future career interests, how interactions with a host lab would help to advance their careers and/or support their professional development, and a description of how their participation in this program would help to increase diversity (broadly defined) within the network. They also (i) answered questions about their time zone, (ii) listed their top three choices for mentors, (iii) selected two keywords that described their research interests from a list, (iv) submitted a CV or resume, and (v) optionally answered demographic questions.

Approximately six weeks into the academic year, we closed applications for mentees and started pairing them with mentors. Matching was made by two members of the RCN diversity committee based on the Mentee's academic interests, who they listed as their top three choices for a Mentor, and time zone alignment, taking into account how many Mentees could be assigned to a single Mentor (i.e. usually 1-2 Mentees per lab group). Due to high request rates for well-known Mentors, sometimes we were unable to match a Mentee with one of their top three choices. In the few cases where Mentees did not get their top choices, pairings were made based on affinity between Mentors' and Mentees' research interests. By the second month of the academic year, we had completed the process of pairing mentees with Mentors. Pairs were introduced to each other by email and reminded of the program guidelines and expectations (Supp Doc: Example Email).

Over the course of the academic year, Mentees attended lab meetings on an independent basis. At the end of the academic year, we distributed stipends to students for their participation in the program. To obtain a stipend, students had to provide a letter from their Mentor that stated the student had completed the program requirements.

Mentee and Mentor Surveys

At the end of the academic year in 2022, we distributed surveys to Mentees and another survey to Mentors that had participated in the program. Both surveys included optional questions on demographic information, year(s) of participation, activities that were part of lab meetings, potential for future collaborations, a likert scale on how they ranked the program from 1 to 10, and open-ended feedback. We also had an open-ended question where participants were encouraged to leave constructive feedback.

The Mentee survey included unique likert scale questions on whether the program helped them extend their professional network, advance their expertise of subject matter, and how important the stipend was to completing the program. We also asked Mentees what kind of interactions most helped to advance their professional development, what knowledge they gained during the program, and whether they planned to continue interactions with the host lab.

The Mentor survey included questions on the number of Mentees hosted, professional development activities discussed in lab meetings, Mentee contributions to lab meetings, how much time mentors invested in the program, whether Mentees attended lab meetings beyond the program requirements, how many people

attended their lab meetings, whether Mentees had 1:1 interactions with other lab members, and likert questions on whether they agreed with statements regarding continued interactions and benefits of having the Mentee join lab meetings.

IRB Review

Our surveys were reviewed by the Institutional Review Board at Northeastern University (IRB #: 22-03-33) and were considered exempt (DHHS Review Category: EXEMPT, CATEGORY #2 Revised Common Rule 45CFR46.104(d)(2)(iii)).

Data Processing Description

Statistical Analysis

To determine if the diversity of Mentees was significantly different from Mentors, we tested the null hypothesis of independence between Mentor/Mentee status and (i) gender, (ii) race, or (iii) sexual orientation with Fisher Exact Tests. Other survey questions were summarized by the number or percent of respondents in each response.

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Parameters

Parameters for this dataset have not yet been identified

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Project Information

RCN: Evolution in Changing Seas (RCN ECS)

Website: <https://rcn-ecs.github.io/>

Coverage: United States

NSF abstract:

How marine species will react to changing environment and climate is not well understood. While the interaction between oceanographic and ecological processes has yielded considerable insight into the ecology of marine species, the evolutionary responses of marine species are not well integrated into this framework. This project research coordinated network on "Evolution in Changing Seas" (ECSRCN), will bring marine scientists together with evolutionary biologists having expertise in population genetics, eco-evolutionary dynamics, and phylogenetics to better understand and predict the evolutionary responses of marine species to climate stressors. ECS-RCN will increase the impact of evolutionary studies in marine systems through increased collaboration among scientists from diverse fields. Furthermore, the empirical robustness of these studies will also be improved through the development of standards for experimental design and statistical analysis, especially for genomics data analysis. ECS-RCN will build a diverse network through a dedicated workshop for early-career participants, by advertising with diversity groups, and by dedicating funds to increase diversity. This project will support one postdoctoral researcher who will play a key role in coordinating scientific activities of the network as well as receive interdisciplinary training through network activities, strongly positioning them to become a leader in the field. ECS-RCN will also build the foundation for a lasting network through establishment of a listserv, open access to publications, development of a website, and development of teaching modules for undergraduate and graduate curriculum.

Specifically, ECS-RCN will consider how coupling between oceanographic and evolutionary processes shape adaptive and plastic responses to climate change, from the fundamental level of genomes scaled up to entire populations. Under this theme, the objectives of ECS-RCN are to synthesize the current state of knowledge, to prioritize lines of inquiry that will advance knowledge in marine and evolutionary biology, to determine the appropriate experimental designs and statistical approaches for robustly testing these lines of inquiry (including genomics approaches), and to build a foundation for a diverse and lasting network. These goals will be realized over the course of 3 years, starting with a Synthesis Workshop in Year 1 where working groups will be established, followed by working group meetings and formation of a Genomics Subcommittee in Year 2, and ending with an Integration and Training Workshop aimed at early career scientists in Year 3. To promote synthesis and self-organization at workshops, the workshops will employ the Open Space format. ECS-RCN will promote evolutionary thinking in biological oceanography and integrate unique aspects of marine life-histories into evolutionary principles. ECS-RCN will also advance knowledge in both marine and evolutionary biology through synthesis and the development of frameworks for merging genomics and ecology. The activities will provide novel insights into pressing questions in both marine and evolutionary ecology, such as: what drives geographic patterns of local (mal)adaptation and plasticity?; what are the mechanisms that generate adaptive vs. nonadaptive plasticity?; what is the role of genotype dependent dispersal in adaptation?; what are the genetic constraints on adaptation of function-valued traits to climate change?; and how do epigenetic modifications act as a mediator between adaptation and plasticity? Ultimately, the RCN aims to develop a quantitative understanding of the relative importance of ecological versus evolutionary responses to climate change.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1764316

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