

## CONTINUING THE DEVELOPMENT OF SCIENCE COMMUNICATION SKILLS IN EARLY CAREER SCIENTISTS

### Challenges and Rewards During COVID-19

Hayley Schiebel , Rebecca Stone, Tullio Rossi, and Michelle Smisek

#### OVERVIEW

Academics must have strong communication skills to explain their work effectively. There is a need for accurate and engaging scientific information delivery to any audience, inclusive of both discipline-specific colleagues and the general public. For early career scientists (undergraduate students, graduate students, and those within two years of graduation from a graduate degree program), this type of training is rarely provided in curricula, creating a significant skill gap for early career professionals (Coil et al. 2010; Brownell et al. 2013; Mercer-Mapstone and Kuchel 2015; Cirino et al. 2017). In an effort to provide early career scientists with professional development related to science communication, we developed a full-day workshop funded by the National Science Foundation entitled *Developing the Science of Science Communication*. This workshop was held at the Association for the Sciences of Limnology and Oceanography (ASLO) 2019 Aquatic Sciences Meeting and the 2020 Ocean Sciences Meeting co-sponsored by ASLO, the American Geophysical Union, and The Oceanography

Society (Schiebel et al. 2021). After gathering information from approximately 100 participants in these two pilot in-person workshops, a virtual workshop (due to COVID-19) was held in conjunction with the 2021 Aquatic Sciences Meeting with different materials. Specifically, participants in previous years had indicated that they were interested in more information about developing and presenting conference posters, so the sessions were reformatted from prior years to incorporate these requests.

The 2021 workshop attendees voluntarily participated in a full-day virtual workshop (previous years were in-person) comprised of verbal and visual communication skill sessions. The workshop was advertised with preregistration and was free for attendees, with 50 available slots. The only requirement was that participants attend the entire day. The online format of the workshop allowed for more participants than typically possible in an in-person setting and, as a result, 53 participants attended including: 37 doctoral students, 7 postdoctoral researchers, 5 masters students, 2 participants listed as “other” types of degree stages, 1 nontenure track faculty member, and 1 tenure-track faculty member. Sixty-six percent of participants identified as female, 32% as male, and 2% as nonbinary or agender. Participants attended across multiple time zones as the workshop was held in local time for Palma de Mallorca, Spain, to be consistent with the rest of the conference.

The all-day workshop included two presentation skills-focused sessions facilitated by professional actor and voice coach Michelle Smisek. The first session, “Science Communication 101,” provided an overview of skills needed in an oral presentation such as in a conference or lab group setting. Skills included in this session were speaking characteristics such as pace, tone, inflection, and so on. The second vocal session, “Thinking on Your Feet,” was

tailored to skills needed in a poster presentation setting at an academic conference. Participants were placed into breakout groups and focused on improvisation skills for communicating with a range of audiences. To accomplish this, Michelle created a variety of prompts and scenarios with discussion and feedback between scenarios. Two poster design sessions were run by Dr Tullio Rossi, Director of *Animate Your Science* (<https://www.animateyour.science/>). Tullio focused on many elements of poster design, from graphics to font size and choices. The first session was an overview of poster basics such as text size and fonts. The second session focused on graphics (both photos and table/graphs) on a poster, with an overview of good and bad poster designs to strive for or avoid.

All study protocols and supplemental materials were approved by the Suffolk University Institutional Review Board prior to implementation at the workshops. Online preworkshop and postworkshop survey data were collected via Qualtrics. All questions were presented on a Likert-type scale from 1 (strongly disagree) to 4 (strongly agree). Data from completed evaluation forms were entered into SPSS, went through quality control, and were analyzed in SPSS. Paired-samples *t*-tests were used to compare change from preworkshop to postworkshop responses to Likert items (de Winter and Dodou 2010). Based on the evaluation results, as well as the research team’s reflections, we have compiled a list of recommendations and next steps for this workshop as well as for science communication training more broadly.

#### RESULTS AND NEXT STEPS

Generally, participants felt that the workshop was helpful and would recommend this workshop to colleagues (Table 1).

Participants overwhelmingly agreed that they: (1) would recommend the workshop to others,

TABLE 1. Postworkshop survey results

	Strongly agree	Agree	Disagree	Strongly disagree
I would recommend a workshop like this to my colleagues, mentees, and/or students.	83.87%	16.13%	0	0
I would recommend that other scientific conferences offer workshops like this.	80.65%	19.35%	0	0
This workshop material will be useful for advancing my career or professional goals.	80%	20%	0	0
This workshop provided me with new information and skills to improve my science communication.	83.33%	16.67%	0	0

and (2) felt the workshop content would be useful in their careers. As previously mentioned, pilot workshop participants (i.e., those involved in 2019/2020; Schiebel et al. 2021) mentioned an overwhelming interest in training on other types of communication skills beyond the scope of the pilot. Although the pilot workshops were focused on building oral presentation slides, many participants requested more practice with designing a conference poster. The focus of the 2021 workshop was poster design and presentation, which was very well received based on a 30-min informal discussion at the end of the workshop. Early career scientists may be more likely to present posters rather than talks at large conferences, so shifting gears to provide this content has been well received. Moving forward, this same content will be featured in the workshop.

The original proposal was for the workshop to be fully in-person, but due to COVID-19 this in-person mode was not possible. While this move to a virtual workshop was not ideal, it was not a major setback. The biggest difficulty was accommodating the verbal sessions as these are intended to be interactive and “on your feet.” Michelle was able to pivot and create sessions that still enabled participants to interact in smaller breakout rooms and then share thoughts in the main room space. There were a few outcomes of the fully virtual space that were beneficial. First, because everyone was able to be online, multiple time zones were reached at one time. It appeared people were more comfortable asking questions using the chat feature on Zoom, presumably because most participants had already had experience with Zoom and the chat feature during the pandemic. Finally, more participants were engaged than in the pilot workshops. In previous years, approximately 40 of 50 slots were filled onsite, vs. 53 participants in the 2021 virtual session. We still feel that an in-person workshop is the best environment for the delivery of this material, but the alternate fully remote option was highly successful. For future workshops we are exploring the option of a two-day workshop with virtual poster creation sessions on the first day a few weeks before the conference, and then a second day focused on in-person poster presentation. This would allow for participants to: (1) not be overwhelmed by receiving all the content in one day, and (2) harness the potential of both virtual and in-person professional development.

The workshop team feels strongly that the shift in content from slide to poster design along with the move to a virtual environment in light of COVID-19 created a successful workshop based on survey and informal participant feedback. We have plans to continue with virtual engagement in some form for coming workshops.

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**Hayley Schiebel**, Center for Urban Ecology and Sustainability, Suffolk University, Boston, MA, USA

**Rebecca Stone**, Sociology Department, Suffolk University, Boston, MA, USA

**Tullio Rossi**, Animate Your Science, Adelaide, SA, Australia

**Michelle Smisek**, Boynton Beach, FL, USA

## THE MARINE BIODIVERSITY OBSERVATION NETWORK PLANKTON WORKSHOPS Plankton Ecosystem Function, Biodiversity, and Forecasting—Research Requirements and Applications

**Maria Grigoratou** , **Enrique Montes** ,  
**Anthony J. Richardson** , **Jason D. Everett** ,  
**Esteban Acevedo-Trejos** , **Clarissa Anderson**,  
**Bingzhang Chen** , **Tamar Guy-Haim** , **Jana Hinners** ,  
**Christian Lindemann** , **Tatiane Martins Garcia** ,  
**Klas O. Möller** , **Fanny M. Monteiro** ,  
**Aimee R. Neeley** , **Todd D. O'Brien**, **Artur P. Palacz** ,  
**Alex J. Poulton** , **A. E. Friederike Prowe** ,  
**Áurea E. Rodríguez-Santiago** , **Cécile S. Rousseaux** ,  
**Jeffrey Runge**, **Juan F. Saad** , **Ioulia Santi** ,  
**Rowena Stern**, **Alice Soccodato**, **Selina Våge** ,  
**Meike Vogt** , **Soultana Zervoudaki** , and  
**Frank E. Muller-Karger** 

#### INTRODUCTION

Plankton is a massive and phylogenetically diverse group of thousands of prokaryotes, protists (unicellular eukaryotic organisms), and metazoans (multicellular eukaryotic organisms; Fig. 1). Plankton functional diversity is at the core of various ecological processes, including productivity, carbon cycling and sequestration, nutrient cycling (Falkowski 2012), interspecies interactions, and food web dynamics and structure (D'Alelio et al. 2016). Through these functions, plankton play a critical role in the health of the coastal and open ocean and provide essential ecosystem services. Yet, at present, our understanding of plankton dynamics is insufficient to project how climate change and other human-driven impacts affect the functional diversity of plankton. That limits our ability to predict how critical ecosystem services will change in the future and develop strategies to adapt to these changes.

The Marine Biodiversity Observation Network (MBON; <https://geobon.org/bons/thematic-bon/mbon/>, last accessed date: 22 Dec 2021), with the support of the Modelling Different