

## RELATE: Researchers Expanding Lay-Audience Teaching and Engagement

One major challenge facing contemporary scientists—both trainees and professional researchers—is an underdeveloped ability to communicate scientific discovery to the public. With ever-increasing forums for lay-audience communication through the internet, radio, television, and public speaking opportunities, it is surprising that many scientists do not tap these resources to increase public awareness about the fascinating and critical issues we face every day. In light of shrinking federal budgets for agencies overseeing research, this issue is quickly reaching critical mass. If the greater public felt as invested in current scientific research as it did during the 1960s Space Race, would the recent 7.8% federal scientific budget cuts have gone through the way they did, without enormous public outcry?

We believe that the relative lack of public engagement with science occurs because contemporary scientists are not trained to adequately convey the excitement we feel about our research, making it difficult for the general public to relate to our work. However, there is no lack of public interest in scientific topics: Ira Flatow's "Science Friday" on National Public Radio has been a top-rated program since 1991, David Eagleman's *Incognito: The Secret Lives of the Brain* was a recent Best Book on Amazon.com, and *New York Times* articles on science and health are consistently among the most popular. Yet misperceptions about research abound, facilitating unrealistic expectations about the pace of scientific discovery and sometimes leading to frustration and suspicion about where federal research dollars are being spent. The challenge then rests on our shoulders as researchers to become better communicators and meaningfully engage the public about the incredible power and possibility of scientific endeavor. Quality lay-audience communication carries a unique set of challenges, including the use of precise, clear, and jargon-free language, creative metaphors, and intuitive visual displays. Although current graduate education curricula have begun to implement formal training to improve communication among scientists, few programs include similar training to address these challenges for communicating to the public, especially in the biological sciences.

Effective training in lay-audience communication and engagement should become a core goal of graduate education. Focusing on this type of professional development early in scientific careers promotes several beneficial outcomes, both immediate and long-term. Immediately, graduate students can more actively participate in local outreach initiatives as they practice and improve their public communication skills. Longer-term, it will generate a network of scientists, progressively growing larger with each generation of trainees, who are able to meaningfully translate scientific methods, results, and broad implications to the public. Integration of public engagement directly into training at the graduate education level will also encourage future scientists to view lay-audience communication as a core aspect of their profession, further encouraging the development of a national initiative to keep the public abreast of scientific discovery. Widespread training in lay-audience communication will also promote the efforts of NSF and NIH to encourage outreach, increasing the vigor and depth of outreach ideas proposed in grant applications and lowering the entry barrier to actively carry out those initiatives.

*We propose to implement RELATE: a unique program designed to address graduate preparation for public communication by partnering specific training in lay-audience engagement with community outreach.* The seminar series will highlight and address challenges crucial to effective lay-audience communication for graduate students. After some formal instruction, seminar trainees will prepare short talks centered on scientific themes of interest. At the end of the series, seminar trainees will present their talks at a series of public events, and an active discussion with the audience, or "science café," on the presented topic will follow. We believe that uniting training to improve skills critical to lay-audience communication with a

service-oriented opportunity to practice and develop those skills will benefit both the seminar trainees and the community with which they are connecting: this approach will foster mutual respect and a relaxed, informal environment for inquiry and learning.

The RELATE Ph.D. candidate-level training seminar will draw together a variety of resources and communications specialists to provide targeted instruction and feedback as participants develop their outreach talks. At the University of Michigan, we are privileged to have developed partnerships with the UM Natural History Museum, the Public Relations Office, the Center for Research on Learning and Teaching, individuals in the School of Education, and faculty members who are particularly skilled at lay-audience engagement. These experts will address the challenges of both written and oral lay-audience communication, then provide targeted strategies for its improvement. Some important topics include: avoiding scientific jargon and using clear, precise language; developing effective analogies and metaphors to explain complex concepts; and creating intuitive visual aids and uncluttered slides. Our experts will also emphasize strategies for facilitating discussions about scientific topics and the value in explicitly stating the limits in personal and scientific knowledge. Additionally, as scientific topics can sometimes spark controversy and heated debate, trainees will be instructed on dealing with tricky questions and contentious issues. Seminar trainees will practice written forms of lay-audience communication by generating pieces that are clear, concise, and engaging: participants will write a mock press release about their work to practice formal publication, and the material in this piece will be reworked for an informal dialogue such as a blog or popular science article. As a final project, each seminar trainee will be responsible for developing a 30-minute, scientifically-themed talk for a public audience. The last several weeks of the seminar series will be selectively devoted to providing both peer- and faculty-based feedback on these talks using a model of constructive criticism and active revision in preparation for the community lecture and engagement series.

The RELATE community lecture and engagement series will center around scientific themes of interest and relevance to the public, such as learning and memory, pollution and climate change, genetics, and disease. Each themed session will be comprised of two components: a short, 30-minute lay-audience lecture given by the seminar trainee and a “science café” immediately following the talk, consisting of on-the-fly conversations about the interests and concerns of audience members. The presenter will facilitate the discussion, assisted by university faculty or other experts in the field. This type of spontaneous interaction will accomplish several things: it will provide a service-oriented opportunity for the seminar participant to directly apply the training (s)he received, it will directly engage the audience in a dialogue on the issues surrounding the material from the presenter’s talk, and it will address the public’s thirst for knowledge. It will also provide an opportunity for students to practice spontaneous communication strategies with the support of professionals. These presentations will be partnered with special events at community venues such as local bars and restaurants, to increase attendance and facilitate unpretentious, spontaneous conversation. As most outreach efforts are currently geared towards educating children, this form of public communication will address the needs of an adult population currently under-targeted for such engagement efforts. The focus on adult participation and conversation will promote positive interactions between scientists and local community members. These interactions will ultimately improve the relationship between scientists and those who currently fund their research and build community pride in local science.

RELATE will benefit graduate students beyond providing professional development in lay-audience communication. As the seminar series lessons will generalize to other types of communication, participants will be better equipped to improve their professional scientific or technical communication skills, making the academic scientist trainees better able to present research-related findings, apply for funding, and teach effectively. Additionally, the NIH 2012 Biomedical Research Workforce Working Group Report estimates that at least 42% of the students currently pursuing PhDs in biomedical science will pursue non-academic scientific careers. Lay-audience communication training will directly improve skills that can be applied to many scientific careers intersecting with the public sphere, including public policy, science writing, pharmaceuticals, entrepreneurship, patent law, and consulting, among others. Because of its broad applicability, RELATE will provide direct training and support for scientists with career aspirations both within and beyond the academy.

RELATE is easily portable and adaptable to different audiences. If it proves successful, we will present it in forums committed to public communication, including the “Neuroscience and Society” and “Brain Awareness” series at the annual Society for Neuroscience meeting and symposia and workshops in the education section of the American Association for the Advancement of Science meeting. The course materials, which can be easily packaged and distributed, will be made freely available. Although we have developed specific relationships with experts in communication and education at the University of Michigan, we will provide guidance for finding similar resources in other communities. RELATE can also be easily adapted for undergraduate courses, continuing education programs geared toward retirees, and other potential audiences. Ultimately, we hope that by creating a sample infrastructure and making our resources widely available, we can inspire scientists everywhere to begin a local agenda of meaningful discussion with their communities and launch a grassroots scientific communication initiative.