

LETTERS

Edited by **Jennifer Sills**

Editor's note

In her Working Life piece “Instagram won’t solve inequality” (16 March, p. 1294), Meghan Wright examined why she feels conflicted reading #scicomm Instagram posts by fellow women scientists. She explained that she recognizes the good they can do, yet it seems unfair that such scientists must devote time to social media outreach to combat systemic inequities. So, she has decided that she prefers to separate her social media use from her scientific activities. Wright named a social media role model at her university—the Science Sam Instagram account run by Samantha Yammine—before detailing why she did not want to participate in this kind of outreach. Although she intended to use Science Sam as an example of social media success, Wright’s critical comments about such outreach were interpreted by some as a sexist and mean-spirited personal attack on Samantha Yammine in particular and women science communicators in general. In this section, Samantha Yammine and colleagues describe the power of social media, the 500 Women Scientists organization responds to the Working Life article, and two scientists recognized by AAAS (the publisher of *Science*) for public engagement discuss how outreach and institutional reform can go hand in hand. In the Online Buzz box, we provide several excerpts from the online eletters we received.

Jeremy Berg

Editor-in-Chief

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Social media for social change in science

Although we agree with M. Wright (“Instagram won’t solve inequality,” Working Life, 16 March, p. 1294) that there are many systemic structures perpetuating the marginalization of women in science, we view social media as a powerful tool in a larger strategy to dismantle such structures. In addition, scientists have been using social media productively to address several other concerns in academia, including engaging with the public about science, increasing science literacy, promoting trust, exploring career options, networking internationally, and influencing policy.

Strong public trust in science contributes to a democratic, civil society. Scientists have a responsibility to engage effectively with society, especially when trust is lacking (1, 2) and scientific knowledge is not equitably accessible (3). Within academic science, much of this outreach is done by women (4) and underrepresented groups (5). Thus, not surprisingly, outreach has been grossly undervalued and sometimes demeaned. Instead of urging academia to stop celebrating this essential service, we should ensure sufficient compensation and recognition for public engagement. Evidence of outreach is increasingly a

component of publicly funded research grants, and public engagement activities should have weight in merit, tenure, and promotion assessments. Whether scientists do outreach themselves or work with communication and media experts, public engagement with science is a responsibility requiring important skills that should be valued accordingly.

Given the other barriers women and

other marginalized scientists must overcome as minorities in science, technology, engineering, and mathematics (STEM) (6), they should not be expected to bear the full responsibility for outreach—nor should they be penalized for choosing to do this work. Diversity among communicators should be encouraged because multiple styles and approaches of science communication can make science more accessible and relatable to more people, including those who may not otherwise seek STEM education. Selfies on Instagram are optional, but they receive 38% more engagement than pictures without a face (7), enabling open dialogue with broad audiences in an effectively personal manner. Further research can determine whether sharing selfies from a research setting helps confer more trust without sacrificing credibility, and these data will inform strategies for improving the public’s lack of trust in scientists (1, 2).

Social media serve an important role in the movement toward increased equity, diversity, and inclusion within STEM because it provides a widely available, readily accessible platform for many to use easily. Social media allow high-throughput networking and exploration of careers, which benefits trainees who may otherwise lack access to professional development (8). Although not free from the bias and prejudice inherent in society, social media can connect diverse groups, enable rapid information exchange, and mobilize like-minded communities.

This connectivity can allow those same groups to challenge traditional structures, identify and call out systemic barriers, and question hierarchies of power. Instagram, for example, allows for visible representation of individuals who are often unseen, and can amplify voices that may go unheard in traditional settings. Furthermore, increased representation of those who break stereotypes and are underrepresented creates a more inviting perception of STEM careers, and these efforts can improve diversity and inclusion in academia (9–11). For a diverse academic community to thrive, inclusion and acceptance of every scientist, regardless of



appearance (whether conventional or not) is necessary.

No single post or person on social media should be expected to change the world, but social media have been instrumental in mobilizing grassroots political movements, including those related to safety in education, research, and equity, such as the March for Our Lives, the March for Science, Black Lives Matter, #MeToo, and the Women's March. Thus, we challenge the false dichotomy that use of social media for public engagement with science and working to change policy and remove systemic barriers to inclusion are mutually exclusive. Rather, they are intrinsically linked, and we need to harness the potential power of social media to create social change. As scientists, we must look to data and evidence to inform our understanding of the benefits and pitfalls of the use of social media for public outreach and policy change, and uphold the same rigor and analysis in determining what has value and what should be celebrated.

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REFERENCES

1. 3M, "State of Science Index 2018 Global Report" (2018); <https://multimedia.3m.com/mws/media/15152950/presentation-3m-state-of-science-index-2018-global-report-pdf.pdf>.
2. S. T. Fiske, C. Dupree, *Proc. Natl. Acad. Sci.* **111**, 4 (2014).
3. M. Anderson, "The race gap in science knowledge," *Pew Research Centre* (2015); www.pewresearch.org/fact-tank/2015/09/15/the-race-gap-in-science-knowledge/.
4. E. H. Ecklund, S. A. James, A. E. Lincoln, *PLOS ONE* **7**, e36240 (2012).
5. M. Ong, "The mini-symposium on women of color in science, technology, engineering, and mathematics (STEM): A summary of events, findings, and suggestions" (TERC, Cambridge, MA, 2010).
6. N. Gupta, C. Kemelgor, S. Fuchs, H. Etkowitz, *Curr. Sci.* **89**, 1382 (2005).
7. S. Bakhshi, D. Shamma, E. Gilbert, "Proceedings of the 32nd Annual ACM Conference on Human Factors in Computing Systems" (2014), pp. 965–974; <http://comp.social.gatech.edu/papers/chi14.faces.bakhshi.pdf>.
8. A. L. Gonzales, *Commun. Res.* **44**, 467 (2015).
9. B. J. Drury, J. O. Siy, S. Cheryan, *Psychol. Inquiry* **22**, 265 (2011).
10. S. D. Hermann *et al.*, *Basic Appl. Soc. Psychol.* **38**, 258 (2016).
11. S. Cheryan, J. O. Siy, M. Vichayapai, B. J. Drury, S. Kim, *Soc. Psychol. Person. Sci.* **2**, 656 (2011).

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Journal editors should not divide scientists

We're writing to express our disappointment at the poor judgment that led to the publication of "Instagram won't solve inequality" (M. Wright, Working Life, 16 March, p. 1294), which singled out and criticized a successful woman science communicator for her Instagram presence promoting and celebrating science. The editor of this piece should have ensured that the message focused on the issues: Women and underrepresented minorities take on a great deal of science communication, mentorship, and outreach work without recognition or professional reward from their institutions. Despite increasing institutional pressure to communicate about science—whether to increase a university's public profile or meet the National Science Foundation's Broader Impact requirements—many institutions expect the work to be done on personal time without compensation or additional resources. Although the piece hinted at these systemic issues, those arguments were undermined when the editors allowed the author to criticize the work of another woman with an

ONLINE BUZZ

SciComm speaks

The Working Life "Instagram won't solve inequality" (M. Wright, 16 March, p. 1294) sparked a wide-ranging discussion about the value and purpose of social media in science. Excerpts from readers' reactions to the article are below. Read the full eletters and add your own at <http://science.sciencemag.org/content/359/6381/1294/tab-e-letters>.

A selection of your thoughts:

Not every tweet, post, or YouTube video that happens to feature a woman science communicator is uploaded with the express intent of challenging the status quo or systemic and institutionalized bias.... To assume this...fails to understand the many reasons why women choose to communicate science to the public. There are indeed activists who constantly challenge the institutionalized bias favoring men, people who sporadically participate in collective

events such as Women in Science day, and also science communicators who just happen to be women. We should applaud all of their efforts....

Victoria J. Forster

...Like the author, I strongly believe that women and other underrepresented minorities in science should feel no obligation to take on additional emotional labor for the sake of educating others. I also agree that systemic issues of inequality will likely require systemic solutions to enact lasting change.... It is evident that the author views #scicomm on Instagram as a chore, but for some of us it is a labor of love. If building model satellites out of cake...or posing my dog in front of Apollo 14 moon trees...weren't incredibly fun, I wouldn't be doing it.... Instagram has significant and largely untapped potential as a vehicle for science communication. The visual nature of the platform, in conjunction with the large and diverse userbase,...provides tremendous opportunity to reach nontraditional audiences. I agree with the author that science communication must be performed in a manner authentic to each individual, but my

hope is that we can continue to encourage each other to promote science in a variety of ways. Right now, we need #scicomm more than ever.

Beth R. Gordon

...As an early-career researcher, the first in my family to go to university, social media has provided me with both community and opportunities that would have been unimaginable without it. Having a window into the lives of other academics and scientists from a range of backgrounds has helped me feel I belong and reassured me that there is a place in the academy for people like me.... At the same time, I was recently invited to publish a comment piece... after an editor noticed my tweets. I have also found coauthors on Twitter and used it to keep up with recent publications and research.... I have nonetheless begun to limit time spent on social media, realizing that it...distracts me from important work. But the benefits far outweigh the limitations....

Glen Wright

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unabashed tone of condescension and did not give the target of the comments an opportunity to respond.

Rather than address the roadblocks facing women and underrepresented groups in science, technology, engineering, and mathematics (STEM) or grapple with the author's personal misgivings around science communication, the piece was framed as an attack. The tone implied that anything beyond basic research is a frivolous waste of time, belittling meaningful approaches to science communication and public engagement. It offered a false choice between an authentic and relatable social media presence and effective advocacy for institutional change. The choice to run this inflammatory article demonstrates a lack of thoughtfulness on the editors' part.

Pitting one woman scientist against another is destructive and irresponsible, and it perpetuates unreasonable standards for women and underrepresented groups in STEM. It is antithetical to the open, accessible, and inclusive future that we at 500 Women Scientists envision for science.

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Efforts large and small speed science reform

The Working Life article "Instagram won't solve inequality" (M. Wright, 16 March, p. 1294) asserts that science outreach efforts by individual women cannot counteract structural inequities and that women are doing outreach at a cost to their own careers. We concur that collective action and structural change are needed to diversify science and improve meaningful science engagement with the public. However, when such reform is absent or too slow, individual efforts fill the vacuum and should not be condemned.

Along with hundreds of other scientists, we devote time and energy to individual public engagement initiatives, while pushing for institutional reforms to support more scientists who wish to engage effectively. These reforms would provide support and incentives through professional recognition,

financial and logistical resources, networks of support, and an inclusive culture and capacity for public engagement. With support, more scientists could develop collaborative and innovative engagement practices to broaden participation in science. While changing the culture of public engagement, we must similarly push to dismantle other structural barriers to women and minorities in the sciences. To accelerate these changes,

"...when [structural change] is absent or too slow, individual efforts fill the vacuum..."

data collection and learning networks would enable us to improve the effectiveness of our efforts to create a diverse workforce and tackle science-societal challenges. Individual action versus structural change is not an "either/or" question; it is a "yes, and."

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