Becoming "Forces of Change"

Making a Case for Engaged Rhetoric of Science, Technology, Engineering, and Medicine

Lauren E. Cagle
University of Kentucky, Lexington

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In *Poroi*'s 2013 special issue "Inventing the Future: The Rhetorics of Science, Technology, and Medicine," Lisa Keränen reflected on the variety of purposes contributing authors ascribe to the scholarship and practice of rhetoric of science, technology, and medicine (RSTM).[1] Keränen especially noted the distinction Randy Harris, Lynda Walsh, and Carolyn Miller draw between studying persuasion and making persuasion happen. As Harris puts it, it's the difference between "the impulse to *understand* persuasion and the impulse to *achieve* persuasion" (Keränen, 2013, para. 7; emphasis in original). The latter is the active choice, which Keränen refers as "engagement," a term she equates to "public intellectualism." As a lens through which to imagine possibilities for our work, however, "engagement" can be much more than merely doing scholarship in public. I don't intend to wax pedantic here about precise interpretations of engagement. However, as Kenneth Walker and Sara Beth Parks show, without some definitional work "engagement" risks being reduced to only one of its many facets, which include not only public engagement (Berube, 2013; Ceccarelli, 2013; Keränen, 2013), but also classroom teaching (Ceccarelli, 2013) and transdisciplinary research with—rather than focused on—STEM practitioners and related stakeholders (Walker, this issue; Parks, this issue; Druschke, 2014).

[1]RSTM is the acronym used by the 2013 special issue. Like the other authors in this symposium, my later usage in this paper expands the acronym to RSTEM, adding the 'E' to account for the role engineering disciplines do and might play in the kind of engaged work we're discussing.

In this intervention I focus mostly on transdisciplinary research, although the arguments below can also partially apply to the former two versions of engagement, public engagement and pedagogy. I find inspiration in Leah Ceccarelli's call for us to become "forces of change" by finding ways to expand our audiences such that our critical work can affect the science and policy we analyze (Ceccarelli, 2013, para. 2). As Caroline Druschke has already pointed out, we can have that effect not only by expanding the scope of the audience for our finished work, whether in the classroom, other fields, or the public at large, but also by expanding the scope of those *with whom* we *do* work (Druschke, 2014). The rhetoric of science, technology, engineering, and medicine (RSTEM) stands to gain in numerous ways from taking up the charge to think deeply about "*how* we do this work" in order to engage in ways that make change (Ceccarelli, 2013, para. 10).

It's worth noting again, though, the reservations offered by some in response to engagement of this sort. In response to Carl Herndl's vision of an applied rhetoric of science, Miller has raised the important question of what happens in the aftermath of engaging beyond our disciplinary boundaries and traditional methodologies (Miller 2013). She challenges us to consider, if we follow Herndl's call to "*do* science," an important question (Herndl, 2013; Miller, 2013): "Do we give up the critical stance altogether? Does rhetoric lose its identity as a distinct discipline?" (Miller, 2013, para. 14). Walsh has also called attention to the challenge of maintaining disciplinarity and a critical stance, asking, "How do we achieve greater disciplinary rigor without losing our civic edge, and how do we make ourselves a public resource without becoming a tool of hegemony?" (Walsh, 2013, para. 5). As the discussions in the 2013 *Poroi* special issue have highlighted, engagement is hardly easy, let alone an immediate panacea for problems we think the field might face.

In answer to this acknowledgment of engagement's potential challenges and limitations, I will offer three broad arguments that support a move towards the kind of engaged transdisciplinary research that Druschke and others have already been doing and writing about: projects that bring together rhetoricians, scientists, community members, and policymakers in various configurations to address specific wicked research problems (Druschke, 2014; see *e.g.,* Lindenfeld *et al.*, 2012; McGreavy *et al.*, 2014). In addition to making the case for why engagement is worth the risk of diffusing disciplinarity and blunting the edge of critique (assuming we keep those risks in mind and work to combat them), I also briefly discuss institutional constraints that impose additional challenges on those

trying to do this work. Making engagement not just an attractive, but a *viable* option for many researchers, especially early-career ones, will require institutional and structural shifts.

So why is this effort to engage worth our time? I see three primary answers to the question: a strategic one, an ethical one, and an epistemological one. Together, they provide grounds on which to begin addressing how to refashion and build institutional infrastructure that supports engagement in teaching, public engagement, and especially in engaged transdisciplinary research.

The Strategic Case

I start with the strategic case, which will be familiar to many. STEM fields are currently highly valued in the U.S., with higher education performance metrics, government initiatives, and think piece after think piece all ratifying the idea that STEM research and training provide the best paths towards reliable employment, a stable economy, and a competitive and secure nation. We see this ratification, for example, in the Department of Education's avowal that, "Ensuring that all students have access to high-quality learning opportunities in STEM subjects is a priority, demonstrated by the fact that dozens of federal programs have made teaching and learning in science, technology, engineering, and math a critical component of competitiveness for grant funding" (U.S. Department of Education, n.d.). Making STEM a priority is also an explicit call in any number of editorials. (For illustrative examples, see Engler, 2012; "Seminole Sets Standard," 2015; "Who Says Math Has to Be Boring?", 2013).

These examples are anecdotal, certainly, but they are of a piece with a broader strain of scientism that runs through U.S. culture. As we see in many discussions of climate change skepticism, even as some bemoan a sense of growing anti-science sentiment, U.S. support for science as creating a higher quality of life remains high, with 79% of U.S. adults agreeing that, "Science has made life easier for most people" (Funk and Rainie, 2015). The concomitant social and institutional support for it exists. This means that in an era of diminishing budgets and shifting commitments to higher education, as disciplines are pushed to demonstrate their value to extra-disciplinary stakeholders, STEM's value is often taken as more self-evident than that of, say, the humanities. Concomitantly, the humanities have faced increasing scrutiny from publics, government, and industry, with demands that they justify their use of student time, tuition dollars, and research support. This scrutiny

comes in a variety of forms, from op-eds calling for cuts to the humanities (Cohan, 2012) to elected public officials questioning the value of specific fields, as when Florida governor Rick Scott said in an interview, "Is it a vital interest of the state to have more anthropologists? I don't think so" (Anderson, 2011).

In lieu of over-rehearsing the most recent front in the culture wars, I will briefly point to the two most common tactics taken by defenders of the humanities: 1) making the case that the humanities offer comparable instrumental value to STEM education in terms of employability and economic value (for example, Matz, 2016); and 2) forwarding alternate metrics by which to assess the humanities' value, such as their role in teaching critical thinking skills and preparing citizens for democratic participation (for an elegant longform example, see Nussbaum, 2010). There are important reasons to make these kinds of arguments; humanities departments and programs, including rhetoric, must be strategic about asserting their value within and outside the university in order to elicit the public and institutional support necessary to sustenance and growth.

In addition to these two main approaches, there are many other strategic ways to establish our relevance and value. For example, naming is a powerful tool by which a field can signal its contributions and allegiances. Meredith Johnson, Michele Simmons, and Patricia Sullivan argue persuasively that, especially for technical communication programs, it is important to understand programmatic classifications as boundary objects and to strategically deploy them in service of "generat[ing] evidence of merit" (Johnson *et al.*, forthcoming). This move makes the work we do visible in ways that resonate with institutional values.

Engagement provides another mechanism by which to make merit visible without falling back on data-driven claims about our graduates' employment or claims about our relative cultural value. By doing research *with* STEM scholars, we can strategically make our value more self-apparent. It may seem uncouth to ride on their longer cultural coattails, but it can provide us levels of funding and support that humanities researchers typically don't enjoy if we can demonstrate our utility to their enterprise. By way of comparison, the much larger annual appropriations granted to and by the National Science Foundation (NSF) in comparison to the National Endowment for the Humanities are telling. In 2015, NSF appropriations were $7.344 billion while NEH appropriations were just over $146 million (National Science Foundation, 2015; National Endowment for the Humanities, 2015). Of course, there remains the danger Walsh points out of becoming yet another "tool

of hegemony" (Walsh, 2013). In taking up engagement strategically to establish our value and in this way access resources and institutional support, we must remain aware of this risk—especially if we subscribe to the argument that the humanities provide a particular critical and democratic service to society.

The Ethical Case

In addition to strong strategic reasons for engaging with STEM practitioners and stakeholders, there are ethical reasons prompting us to do so. The success of any ethical argument, of course, ultimately relies on an audience's response to its starting propositions about what matters and what doesn't. As ecological feminist Christine Cuomo reminds us, "Any ethic has value-laden starting points, and in the end an ethicist must simply either lay out or assume her own" (Cuomo, 1998, 45). In other words, ethical arguments rest on some claim to first principles that we forward as the foundation of the ensuing argument. In making arguments about my ethical responsibilities, then, at some point I must simply offer an opening claim, knowing that it brings with it baked-in values. Given that, I'll start by laying out my value-laden starting point, which is that rhetors, including academics, have a responsibility—not absolute, and not uncomplicated, but a responsibility nonetheless—for the consequences of the rhetorical moves we make, which include the knowledge we create and the scholarship we produce and make available to others. This claim points us back to a question raised throughout meta-reflections on RSTEM scholarship, particularly in the 2013 *Poroi* special issue: the purpose of RSTEM scholarship. If the purpose, as Michael Berube has suggested, is to "contribute to public understanding" or, as Ceccarelli suggests, to "make more of a difference in the world," then we are responsible for the consequences of pursuing these purposes (Berube, 2013; Ceccarelli, 2013).

This claim becomes especially important in light of Celeste Condit's charge that RSTEM scholarship often presumes an unreflectively anti-science stance (Condit, 2013). Rhetoricians of science are hardly alone in their skepticism about science's unvarnished goodness. Despite the poll cited above showing U.S. adults' faith in science's ability to "make life easier," examples abound of political, popular, and capitalist pushback against science in ways that threaten ecosystems, human health, and the global climate (Funk and Rainie, 2015). Vaccinations, climate change, and predator reintroduction are all sites where science

clashes with stakeholders, with science often painted as impersonal or dangerously overconfident.

Skepticism about science is not necessarily a bad thing. Despite her polemic against rhetoricians' unreflective critiques of science, Condit avows that she is "not suggesting that we should stop doing 'bad science' studies or contesting places where science exercises lop-sided influence" (Condit, 2013, para. 10). We should no more cede conclusive persuasive power to science as residing exclusively in the technical sphere than we should make the personal or public spheres exclusive locations of final authority. As Philip Wander has argued, overvaluing the technical sphere allows its standards for deliberation to overtake other spheres and exclude any number of stakeholders from deliberative participation (Wander, 1976). However, unrelenting critique of science and technology has considerable drawbacks as well.

Bruno Latour asserted that academia's emphasis on pure critique has so destabilized knowledge claims that we are increasingly less able to act in the face of monumental threats like climate change (Latour, 2004). Latour wrote about conspiracy theorists who doubt science and its attendant facts:

> Maybe I am taking conspiracy theories too seriously, but it worries me to *detect*, in those mad mixtures of knee-jerk disbelief, punctilious demands for proofs, and free use of powerful explanation from the social neverland *many of the weapons of social critique*. Of course conspiracy theories are an absurd deformation of our own arguments, but, like weapons smuggled through a fuzzy border to the wrong party, these are *our* weapons nonetheless (Latour, 2004, 230).

Latour highlights here how well honed the double-edged blade of critique truly is: it allows us to expose bad science, but also to undermine and reject valid and sound scientific findings. Taking this assertion seriously requires us to consider what our ethical obligations are when our critical lenses are being used for ends far beyond those for which we intended them. If we recognize both the ecological, public health, and other large-scale scientific crises that face us and the role that pure critique has played in exacerbating them, I believe we have an ethical obligation to use our stances, education, and critical sensibilities to push back against those who would use our critical tools as weapons in service of aims we don't support. Engagement is one way to do so.

The Onto-Epistemological Case

Finally, there is a strong epistemological case for doing rhetoric of science through engagement. This *case* has been made in Druschke's argument that there is deep value in the co-production of knowledge with colleagues outside of RSTEM (Druschke, this issue). I'll add briefly to that argument by turning to action research scholars, such as Jacques Chevalier, Daniel Buckles, Peter Reason, Hilary Bradbury-Huang, Davydd Greenwood, and Morten Levin, who argue that application and engagement enable more epistemologically and ontologically rich knowledge-making (Chevalier and Buckles, 2013; Reason and Bradbury-Huang, 2013; Greenwood and Levin, 2007). Greenwood and Levin, for example, reject establishing a divide between pure and applied research. They argue that, "Valid social knowledge can only be derived from practical reasoning engaged in thorough action. As action researchers, we believe that action is the only sensible way to generate and test new knowledge" (Greenwood and Levin, 2007, 6). Action researchers have a long, established tradition of recognizing and validating the external knowledge and expertise that participants bring to research. They provide a valuable map to the attitudes, methodologies, and epistemologies that we can bring to engagement in order to recognize how engagement is not just a way forward to increased external recognition, but also to more robust internal knowledge production within our field. In other words, while we have something to offer STEM in terms of understanding and leveraging the rhetorical nature of knowledge production and dissemination, they have something to offer us as well.

Condit echoes this view in an appeal for a broad and inclusive approach to our scholarly endeavors:

> To be an academic should not mean to find the narrowest possible community to credit or gain accreditation with. It should be to accept the mission of enhancing understanding, where understanding engages maximal possible breadth under the—necessarily and desirably vague—trajectory of improving the richness of life for human beings while protecting the natural world around us. Scientists cannot expand understanding in this way without the humanities, social scientists cannot do this without the humanities, and humanists (or post-humanists) like rhetoricians also can't do this without the natural and social scientists (Condit, 2013, para. 11).

While she makes a compelling case, Condit raises unanswered questions: *How* do we do this *with* natural and social scientists?

How do we persuade them to expand understanding *with* us in ways to which to which their training makes them resistant? Engagement offers one answer. Through co-production of knowledge, we can develop relationships with STEM scholars and stakeholders that demonstrate our expertise, our value, and our willingness to work with them in addition to providing critique and advice from the outside.

Structural Barriers to Engagement

However strong the case for engagement might be, it is important to note structural barriers within academia that pose challenges to RSTEM engagement across traditional field boundaries. To call for engagement without considering its feasibility is tantamount to issuing an unfunded mandate: most likely well meaning, but unlikely to happen. To some extent, challenges to engagement are well covered by broader discussions of interdisciplinary research. I want to highlight a few particular challenges that seem especially relevant to engaged rhetoric of science.

1) **Graduate Research Training.** While there do not seem to be comprehensive data on research training in graduate rhetoric programs, I'd wager that guided practice working on collaborative interdisciplinary teams and negotiating the various methodologies and paradigms that characterize both RSTEM and the STEM fields it studies is not a common experience across most graduate programs. Without such programmatic experience, those interested in doing engaged RSTEM may lack systematic understanding of how to develop and maintain transdisciplinary research projects. Of course, rhetorical training provides a rich skillset useful to this work, such as the careful attention to language and discussion dynamics that Parks argues could position us perfectly for managerial roles in transdisciplinary projects (Parks, this issue). Nonetheless, focused graduate research training that allows students to practice talking across disciplines, collaboratively constructing research questions and methodologies, and advocating for the value that rhetoric brings to the shared project could help us develop a stronger strain of engaged

scholarship in RSTEM. That's not to say that all rhetoric graduate programs should be tasked with providing such experience. Rather, acknowledging how research training can enable the growth of engaged RSTEM reveals a need that some programs might be interested in and capable of filling. Faculty at these programs might even emulate some aspects of STEM graduate training, such as inviting graduate students to participate in ongoing research projects, thereby exposing them to engaged trans-disciplinary work as a standard part of their preparation to launch their own research agendas. The Scientific and Medical Communications Laboratory at the University of Wisconsin-Milwaukee, directed by S. Scott Graham, could serve as one model for graduate research training that prepares engaged RSTEM scholars; the laboratory's commitment to mixed-methods research, effective forms of public outreach, and working with affiliate researchers in and outside of rhetoric suggests the kind of trans-disciplinary engagement I am advocating here (UW Milwaukee Scientific and Medical Communications Laboratory).

2) **Institutional Timelines.** A second challenge we should consider is the mismatch between institutional timelines and interdisciplinary research timelines. Research is always an uncertain business, with no guarantees of arriving at statistically significant findings, or turning up just the right item in the archive, or developing a fully explanatory theoretical frame, let alone any guarantees of accomplishing those things along an exact and predictable timeline. With engaged RSTEM, those risks may, or at least may seem to, multiply, given the uncertain timelines involved in building relationships and constructing research agendas with other people. Without strong support in the field and at the local institutional level for engaged work, these risks may seem too great to be worth taking for the graduate student whose funding

might run out or the assistant professor whose tenure case might be denied.

Acknowledging these challenges could help advocates of engaged RSTEM usefully address institutional and pedagogical barriers to engagement. When we advocate for engagement, it is critical that we also discuss the institutional structures that might undercut and that might support such engagement. In terms of support, perhaps we might prioritize grant writing in our curricula. We offer credit for STEM courses, so students can connect with STEM academics and practitioners. We fund students and junior faculty so that they have time to explore, make mistakes, and get the work done before having to leave grad school to pay loans or send their tenure portfolios out for review. Granted, these are idealistic recommendations that ignore broader institutional constraints, such as funding and accreditation. However, I believe the case for engagement is strong enough that they are worth taking seriously as concrete steps towards this vision of a more visible and robust RSTEM.

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