

# If Computer Science Is our Friend, Can STEM be our Enemy?

In his recent blog post, "[The Afterlife of the Humanities](#)," David Theo Goldberg thanks diverse colleagues for helping him understand current "challenges and changes facing the humanities, and the academy more generally." Those challenges are both familiar and daunting. They include: "expanding managerialism and administrology, creeping professionalization and instrumentalization in career development, the public emphasis on STEM and the social disenchantment with the humanities."

If STEM appears here as part of the increasingly hostile environment the humanities have to confront, this does not prevent Goldberg from singling out computer scientists as necessary for a humanities "afterlife." Approving of the role computer scientists played in developing MOOC applications beyond "talking head videos," Goldberg presents such applications as part of the larger project of innovation known as "the digital." In the wake of this sea change, "our ways of relating, of critical commentary, our temporalities and modes of relation, the contrast between the 'real' and the 'virtual' have all been profoundly affected." Collaborations among humanists and computer scientists represent an academic vanguard riding (if not producing) this wave, generating all the while "new objects of analysis such as software studies, platform studies, screen studies, and gaming studies, cultural analytics, or production of and reflection on electronic literatures and poetry." Thus the question: if computer science is our friend, can STEM be our enemy? (The answer is: no.)

Goldberg is obviously not alone in thinking of computer

science as an ally for humanists. The University of California, Santa Cruz institutionalized that alliance with its [B.S. in Computer Game Design](#), which “provides a rigorous education in computer science, in concert with a broad introduction to those aspects of art, music, narrative, digital media, and computer engineering most relevant to games.” [Stanford](#), meanwhile, plans to offer new joint majors in Computer Science and, alternatively, Music or English. Through such means, proclaims Stanford English professor Nicholas Jenkins, “The worlds of the humanities and computer science are coming closer together.” Undergraduates in the University of Arizona’s [School of Information Sciences, Technology, and Arts](#), may choose from either a B.S. in Information Science and Technology or a B.A. in Information Science and Arts, the later promoting itself as extending the idea of a “liberal arts education” because “In the Information Age, a well-educated citizen must understand the interrelatedness of information science, technology and arts.” Georgia Tech’s [School of Literature, Media, and Communication](#) offers an array of programs including a B.S. in Computational Media that requires students to choose both a humanities and a computer science “thread.” Southern Methodist University offers a [B.A. in Creative Computing](#) which it describes as “a new, highly interdisciplinary major combining theory and methodology from computer science and engineering with aesthetic principles and creative practice from the arts.” And so on.

## **Again with the Science Wars?**

Since all this activity flies in the face of the narrative that presents “STEM” as adversary of the “humanities,” it is worth wondering just how committed various parties are to continuing that fight. The narrative paradigm was probably set by C. P. Snow’s 1959 “[Two Cultures](#)” lecture, although we would do well also to remember Laurence Veysey’s important contribution in his 1965 *Emergence of the American University*. Veysey characterized the university, from its late nineteenth

century origins, as divided between arguments on behalf of useful research made by scientists and engineers and arguments on behalf of “culture” made by an unruly mob of humanist complainers.

In the 1990s, the two sides famously went to “war” over their differences. Developing a media relations strategy funded by the conservative Olin foundation and popularized by literary traditionalists in the “Culture Wars,” Paul Gross and Norman Levitt’s *Higher Superstition: The Academic Left and Its Quarrels with Science* (1994) threw down a gauntlet happily picked up by the “academic left.” The editors of *Social Text* obligingly published the notorious [Sokal hoax](#).

With an obstinance satisfying to only the dimwitted and/or bellicose, mainstream journalism of the day delighted in setting naively realist scientific epistemologies against caricatures of “postmodernist” ones. Thus was it proven that the two cultures remained irreconcilable.

Scholarship at the time and since has established that the supposed sides in this argument largely talked past one another. Explaining that there was really nothing to be learned about science and its study from the Sokal hoax, Andrew Ross hoped nonetheless “that the mutual embarrassment—for scientist and nonscientist commentators alike—will generate new and unforeseen kinds of dialog” (“Reflections on the Sokal Affair,” *Social Text* [1997] 50: 152). Mathematician [Gabriel Stolzenberg](#) began publishing detailed chronicles of the intellectual laziness and sloppy argumentation that fueled the “Science Wars.” Meanwhile, Ullica Segerstråle’s edited collection *Beyond the Science Wars: The Missing Discourse About Science and Society* (2000) provided an explanatory context for the often astonishing misrepresentations involved.

In retrospect, it is easy to see that the general-public-facing literature of the “Science Wars” is just about the last

place one should look for insight concerning how “scientists” and “humanists” really think about their prospects for working together.

It may be more surprising to learn, however, that these two sides and their respective cultures do not in fact exist as such.

### **Identities Only Public Relations Can Love**

Science and Technology Studies (STS) veteran Steve Fuller usefully estranges the “two cultures” hypothesis in his contribution to the Segerstråle collection. “If we are indeed witnessing a clash of disciplinary worldviews,” he asks, “why have so few humanists and social scientists rushed to the side of their colleges who make the natural sciences and technology their objects of study?” (186). His answer is that STS in fact descends not from the efforts of social scientists but from those of natural scientists, like C.P. Snow, who felt that scientists should better engage humanist approaches.

Fuller provides an illuminating genealogy of the “Science Wars” from this perspective, and his argument receives unacknowledged confirmation in John Guillory’s 2002 *Critical Inquiry* article on the Sokal affair. Guillory demonstrates that literary critics have a stake in the “two cultures” debate, but only if they can construe it as being all about them. The Sokal hoax “has less to tell us about the politics of science, or science studies,” he asserts, “than about the history of criticism” (471). Specifically, “because the antirealist position had achieved something close to the status of consensus in the literary academy, it did not have to be backed up by fully elaborated philosophical arguments, it could simply be *stated*” (475). Tidily sweeping several decades of relatively autonomous work in STS under the rug of the “literary academy’s” consensus, Guillory goes on to explain why a rigorous literary theory, purged of troubling influences from the social sciences, would not have left

itself open to attacks on “cultural construction.” Construing the Sokal affair as the reproduction of “two cultures” requires stern reduction of “the humanities” to a disciplinarily limited problem set. Just so, Guillory lectures his audience, the only difference that really matters is between the “methodology of the sciences (observation, experiment, quantification) and the methodology of criticism (interpretation)” (498).

For Fuller, in contrast, the lesson to be learned from the “Science Wars” is that the sides have been drawn all wrong: “a more productive debate would realign the parties so that scientists and STSers who wish to protect the academy from the rest of society could stand on one side, while those who wish to use the academy as a vehicle for reforming society could stand on the other” (209). We agree: that debate would be more productive.

It is important to note that Fuller’s argument (published in 2000) precedes the moment when “STEM” leapt easily to academic lips (hard to date exactly, but sometime around the 2007 publication of the Congressionally commissioned report *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, which uses the term, but not promiscuously). Although the rise of STEM clearly structures any number of arguments in the present, its very assemblage invites skepticism about “two cultures” thinking.

STEM betrays its essentially bureaucratic origins in grouping as “science, technology, engineering, and mathematics” disciplines that otherwise think of themselves as distinct and often internally split between “basic” and “applied” orientations. No doubt, the rubric has recently served an important function for funders and policymakers—something of the scope of activity can be grasped via the [STEMConnector](#)—but it has done so precisely by bundling into one nation, as it were, what might otherwise seem a diverse archipelago.

(It is worth noting that the success of this effort has a precedent in the organization as “the humanities” of all those disciplines left out of the developing “natural” and “social” science areas of the 1930s.)

The internal diversity of STEM could hardly escape scientists. Computer scientists provide the case in point. Although undoubtedly part of the triumphant nation of STEM, computer scientists apparently still feel the need to establish that their science is one. In “The Science in Computer Science: The Computing Sciences in STEM Education” (*Ubiquity* March 2014 DOI: 10.1145/2590528.2590530), Paul Rosenbloom argues that “It is time to go beyond the straightforward conclusion that computer science is a respectable scientific discipline—such as physics or psychology—to the bolder conclusion that computing actually constitutes an entire domain of science. . . . The computing sciences are the equal of the physical, life and social sciences.” Rosenbloom locates this science’s distinction in its ability to understand “information and its transformation.” (Thanks to [Duncan Buell](#) for this reference.) Similar arguments were made in the 1970s, relatively early in the computer science enterprise (see, e.g., Wegner, Peter. “A View of Computer Science Education.” *The American Mathematical Monthly* 79.2 (1972): 168-179.)

With the complexity revealed by STEM in mind, we cannot entirely agree with James Clifford’s admirable effort in “[The Greater Humanities](#)” to recognize “an already-existing reality—overlapping assumptions, epistemologies, and methods” adding up to a “sprawling configuration of knowledge practices” uncontainable “by more narrowly defined disciplinary traditions” (2).

It is clear that underacknowledged affiliations exist among literature, history, linguistics, “all the ‘studies and interdisciplines,’” sociocultural anthropology, “embattled sectors of politics, economics, and psychology,” and “what we might call the ‘theoretical arts’—including theater arts,

performance studies, film, and digital media.” But we do not share Clifford’s desire to construe this assemblage as STEM’s “other half.” Much better, we think, to acknowledge that “STEM” is no more a monolith than “The Greater Humanities” would be.

We ask you, fellow humanist: do you really want to approach potential collaborators in CS as an ambassador from the proud empire of “Greater Humanities” in hopes of striking a grand bargain with the mighty people of STEM? Or, might you be better off trying to figure out whether you can have a shared conversation with various scientists, social scientists, and fellow humanists concerned with “information” and the ends to which it can be “transformed”? The organizing rubric of the “two cultures,” useful and probably essential for national policy debates and media campaigns, are—“Science Wars” style—more likely to thwart than encourage any decent conversation about what the university might do. Unlike the popular press, with its deeply ingrained habit of point-counter-point narration, academics really should be able to count past two.

This would seem especially to be urged by the fact that a great many of the “Greater Humanities” fields in Clifford’s list did not exist when C.P. Snow first lamented the “two cultures.” Indeed a comparable disciplinary explosion in the sciences arguably made it necessary to provide a slogan uniting “science, technology, engineering, and math.” The disciplinary proliferation that produced STS alongside computer science, the “theoretical arts,” and, say, biomechanical engineering, points, again, to an institutional problem set all constituents of the contemporary research university share.

### **It’s All about Work**

If there is any lingering truth to the two cultures model, it resides at the level of work practice. Where humanists largely

insist on a single author (with all that entails for the fetishizing of genius that resides within a unique brain and body), research in the sciences and some wings of the social sciences involves far more various actors. These run the gamut from strictly hierarchical labs with a (more or less) charismatic leader as PI to crowdsourced experiments and fieldwork collaborations (replete with the possibility of native informants). Although humanists working in areas including STS or the history of anthropology are notable analysts and critics of these scholarly modes, they engage in them less often.

Humanists' imaginations of what research looks like situates us in narrow disciplinary ways, as [Mario Biagioli](#) memorably argued in *Critical Inquiry* in 2009. The sciences are moving towards "organizing their practitioners around problems, not disciplines, in clusters that may be too short-lived to be institutionalized into departments or programs or to be given lasting disciplinary labels" (819).

For all that collaboration has become usual in certain corners of the humanities, it is still atypical for a humanist approaching a new project to begin by imagining what kind of cluster or team will be required. Instead, if the project demands skills the humanist does not possess, she will seek to learn them herself. This was certainly John's approach when he decided to write a little bit about "[failed states](#)" and to do so read nothing but political science articles for the better part of a year. Mark notes that interdisciplinarity meant something very different when he was working in the University Libraries on a [digital video repository](#). That project involved teamwork among variously equipped experts brought together to engage a particular problem.

Precisely because it comes from science and the corporate sector, the project-based team is liable to provoke fears of contamination among humanists rigorously trained to believe their methods uniquely capable of "critique." Yet



collaboration can also provide an invigorating interruption to humanist business as usual. This is how English Professor [Eduardo Cadava](#) described it in an interview (with [John's Fall 2013 working group](#)) about, among other things, his experience teaming up with [photographers and museum curators](#). "If I can put it this way," Cadava suggested, "collaboration should always also be about interrupting yourself. That's part of what can happen with a collaboration is that you can be interrupted, and I think things can happen when you're interrupted." Teamwork has the virtue of shaking the solitary scholar out of habitual practice.

Collaborative programs that link computer science and humanist work ought to make both appear more various. They ought to remind us that STEM is no monolith, as we argue above, and they also ought to loosen the grip of the solitary humanist researcher. We would not mandate teamwork in place of the solitary labors of humanists or scientists. Our hope, rather, is that a broader range of practices might fall within the norm for humanist research. Nearly a century ago, John Dewey identified "knowledge cooped up in private consciousness" as myth. The humanities remain too much in its thrall.

Which is not to say that humanists' commitments to single-author publication are "merely" ideological. "The science model," Biagioli argues, "is hardly applicable to the humanities because we usually decouple our research from the training of graduate students. Instead, some scientists' teaching takes the form of running labs where they train graduate students while conducting their own research. Therefore, not only do they have more time to engage in collaborations but they can also mobilize more resources (such as their labs and graduate students) for such projects" (821n16).

Humanists do not need labs (although some enjoy them). And they may refer to the labs they do need as "libraries." But

the way labs “couple” graduate training with faculty research might spur us to imagine alternatives to our current arrangements, allowing us to steer more deftly between the Scylla of defensive ghettoization and the Charybdis of overloaded service commitment to interdisciplinary programs and centers.

We have had many occasions to flag the confusion of department with discipline on this work-in-progress blog. Persistent (and sometimes unconscious) efforts to make the one form fit the other produce a recurring stumbling block for humanist experimenters. For this reason, we enjoy Biagioli’s evocation of a research model that does not need a department-like structure in order to educate students. This proposition appeals particularly to those of us (like Mark) who find themselves in institutional situations where strongly departmentalized humanities disciplines (like English and History) limit the contributions that locally non-departmentalized disciplines (like Film and Media Studies) can make to graduate training (and thus the reproduction of “the humanities”). There is, to be sure, no shortage of support for “interdisciplinary” work among professors in established humanities departments, but the habits of disciplinary reproduction often leave little room in curricula for the development of alternative competencies.

Money in the humanities and social sciences has historically flowed more through tuition dollars than grants, which is part of why pedagogical experiments like those involving the construction of new joint majors between computer science and humanities departments is so appealing. But for these experiments to actually succeed in the longer term, they need to break down or radically supplement a departmental structure that tends to be inflexible in its relation to discipline. Once upon a time, humanities scholars sought to designate the seriousness of their enterprise by arguing that it rivaled the stringency of science. We suggest another kind of

relationship, one less burdened by *ressentiment*. The lesson of the "Science Wars" should be that two cultures arguments do not serve us well at all, and that there is more to learn from the working friendships humanists are in the process of institutionalizing with computer scientists.