

# WHY SOCIAL SCIENCE ?

## Because It Makes Computing Work for People

*By Andrew Bernat, Ph.D., Executive Director, Computing Research Association*

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Two years ago, the leadership of the House Science, Space and Technology Committee looked to our organization, the Computing Research Association, to endorse an approach to reauthorize funding at a number of key Federal science agencies. The proposed legislation would provide increases for computing research funding at the National Science Foundation while keeping the overall agency budget essentially flat by bolstering computing — along with mathematics, physics, biology, and engineering — at the expense of the social, behavioral, and economic sciences (and the geosciences). The committee Chair hoped that CRA, which represents nearly 200 academic computing departments and industrial research labs — including computing research labs at IBM, Google, Facebook, and Microsoft — would support the approach, given the direct and indirect benefits increased investment in computing research at NSF would have to our member institutions.

The science advocacy community in Washington, DC, is comprised of many organizations like CRA, each representing some typically discipline-specific slice of the academic and research community, but bound by the shared goal of ensuring that policymakers understand the importance of the Federal investment in research and the value of peer and merit review in setting priorities. As such, we are typically averse to efforts that pit the disciplines against each other, like the one proposed. But that wasn't the only important reason for us to oppose the proposal. What primarily motivated our opposition was our strong belief that cutting social, behavioral, and economic science investments would also do great damage to computing research.

In our original response to the committee, we noted several key areas of computing research — including cyber-security and human-computer interaction (HCI) — that were significantly informed by work emanating from the Social, Behavioral and Economic Sciences (SBE) directorate at NSF. We argued that the insight into human behaviors provided by SBE-funded work is critical to understanding how best to design and implement hardware and software systems that are more secure and easier to use. In cyber-security work, where the human is often the weakest link in the chain, it is especially crucial to understand the varying motivations and usage patterns that dictate how people interact with their machines, and the expertise in studying those issues in large part resides in the social, behavioral and economic sciences. In HCI work, expertise in social, behavioral and economic sciences is critically valuable in creating workplace systems that foster collaboration and creativity, creating disaster response systems that influence people to effectively find shelter and assistance and creating systems that motivate medical adherence and compliance with medical treatment.

In the two years since this legislation was proposed, our members have highlighted further connections to social science research and their own work, including:

- ◇ Social network principles rooted in sociology that have helped inform link and content recommendation systems on social media platforms like Facebook and Twitter.
- ◇ Auction principles rooted in economics that have been crucial to the creation of online markets, including the market for Internet advertising.
- ◇ Psychology that helps us understand the low-level perceptual effects that guide the design of the resolution and dynamic range of displays, or high-level effects that guide interface design, and understandings that guide computer vision research.
- ◇ Behavioral and economic sciences that guide the design of “anticipatory analytics” tools for decision making, which must address salience, credibility, and legitimacy to be effective.
- ◇ Quantitative techniques like risk theory, utility theory, and decision theory that are being applied to software development problems, or game theory to model the interactions between hackers and those attempting to defend a system.

Social science is also instrumental to computing not just to help answer the question of “what can we do?”, but also “what *should* we do?” As algorithms and autonomous agents become increasingly part of daily life, the issue of algorithm bias, for example, requires much input from both social sciences and humanities. And as the world becomes ever more awash in digital data and as our technology becomes ever more adept at wading through it, social scientists are helping us understand the implications for privacy and offering ways to preserve it.

As Holly Rushmeier, a computer scientist at Yale, put it — perhaps most succinctly — “since the whole purpose of computing is to accomplish things for people, the social sciences are critical to everything we do.”

That’s a message we will continue to carry to policymakers in Congress and the Administration.



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