



# The Intel Science and Technology Center for Social Computing

## Abstract

Social Computing is the study of information technologies and digital media as social and cultural phenomena. Rather than using computing to understand the social, we use social science to understand the contemporary phenomena of computing – from social networks to e-government. The Intel Science and Technology Center for Social Computing will establish a new paradigm for computing, moving from the personal to the social. Bringing together researchers from informatics, anthropology, communication, digital humanities, cultural studies, science and technology studies, media studies, philosophy, computer science and design, the center will facilitate research and collaboration at the vanguard of the emerging era of massively networked, mobile, and cloud computing, while providing tools to understand and build on the history of earlier systems of social and technological interaction. Our goal is to bridge gaps between technical and social disciplines and understandings, and create new ways for social scientists, designers, and technologists to inform, challenge, and advance each others' work.

## White Paper

Intel Labs

ISTC for Social Computing

## Background

Our everyday lives have become profoundly entwined with information technology and digital media. It is easy to picture in this in terms of the white-collar worker sitting at her desk using a PC, or the college student wedded to their smartphone as the conduit for their social life. But this observation runs deeper than that, and human lives across the globe are entangled with digital media and IT beyond simply the pervasive use of technological gadgets. Consider three examples.



Figure 1 From the bridge of an Icelandic fishing boat. Photograph by Hrönn Brynjarsdóttir.

Example 1. When Icelandic fishing boats head out into the North Atlantic, their catches are located via GPS, quantified, and sold -- perhaps many times over -- before they have even been landed, in a global electronic marketplace. The fish become data, the data become money, the economic lives of the fishery workers depend as much on electronic finance and risk management as they do on muscle and perseverance.



Figure 2 Rural South Australia. Photograph by Genevieve Bell.

Example 2. In the 20th century, how close a place was to shipping routes, railroad lines, and

superhighways could mean the difference between prosperity and destitution. In this century, South Pacific nations compete to have undersea cables run close to their islands and rural areas in North America similarly compete over broadband stimulus grants because both know that proximity to broadband networks is as important now as proximity to transportation was then. Economic prosperity, education, and investment flows along those wires along with the bits.



Figure 3 OWS computer center, 9/25/2011. Photograph by David Shankbone.<sup>1</sup>

Example 3. In the summer of 2011, members of the Occupy Wall Street movement worried that they might be being censored because #ows never became a trending topic on Twitter, which rivals newspaper headlines and the nightly news as an arbiter of what's happening in the world. But instead of intentional censorship, it is more likely that algorithm design at Twitter, in the context of the business and engineering issues that constrained it, impacted public perceptions of the movement.

<sup>1</sup> <http://www.flickr.com/photos/shankbone/6183443813/>

## Computing is Social

What these examples teach us is that, however profoundly technology changes, driven by Moore's Law and the huge investments of technology industry money into research and development, social and cultural responses to digital innovation is every bit as profound. If industrial and academic research efforts are intended to help us understand the futures that arise around information technology, then we need to frame that as a social program as much as a technical program.

The goal of the new Intel Science and Technology Center (ISTC) for Social Computing is bring the engagement of social science and technology practice to a whole new level: to generate new models and theories that explain information technology and digital media as sociocultural phenomena in and of themselves, and that inspire new approaches to technology design, policy, and strategy.

## Connecting Social and Technical

Intel has long been a leader in human-centered product innovation, and is well known for incorporating social science into its research program, employing anthropologists to study technology and technology use and collaborating with leading academics to bring theory and outside perspectives to bear. Indeed, though it is an autonomous research group pursuing its own intellectual agenda, the center is hosted by Interaction and Experience Research (IXR), Intel Labs, a group founded and lead by cultural anthropologist and Intel Fellow Genevieve Bell.

### Models of Engagement

The technology industry as a whole has a long history of employing different models to engage with social and behavioral science expertise. Human-Computer Interaction (HCI) arose in the 1970s as time-sharing systems allowed non-

technicians direct access to computing, and the "user interface" became a critical bottleneck. With the rise of the PC as a pervasive in workplaces and homes, HCI developed into the thriving area of professional research and practice it is today, still focused on bridging the gap between technology and its users, and creating elegant devices and tools for this purpose.

A complementary model, experience-based computing, developed in the 1990s with the rise of the Internet and world wide web as infrastructures for consumer devices and services. Rather than starting with a question of interface, computing design started to rely on different disciplines within basic and applied social science (for example, ethnographic and consumer researchers) to inspire and shape engineering efforts to create compelling (and profitable) technology-enabled consumer experiences. Today, experience design is central to mainstream technology development, further shifting attention from technology, to interface, to full product/service experience.

### Needed: A New Paradigm

Now well into the beginning of the 21st century, the time is right for a new model for the engagement of technologists and social scientists. We are calling this new model Social Computing, and it will complement both HCI and experience-based approaches, as it brings in yet new types of social science disciplinary expertise to bear on contemporary technology design issues, issues characterized by "entanglement" as noted above. Indeed, whereas the interface is the central concern for HCI, as is consumer experience for experience-centered computing, entanglement -- of individuals, groups, and cultures on one hand, and technological products, services, infrastructures, and regulations on the other -- is the central concern of Social Computing.

Elegant computational tools for tasks will always be needed. Computing in the service of consumer needs and delights will remain a powerful economic force. However, people don't just engage with computers to accomplish tasks, nor is "consumer"

the only or even the dominant role people play in their relationships with technology. The fresh approach of Social Computing is needed now, to cover new intellectual territory and discover new resources for IT design and analysis. It both treats technology as more than something to be used, and people as more than an market for selling experiences.

### Crossing Disciplines and Universities

Employing leading academic researchers from disciplines including informatics, anthropology, communication, digital humanities, cultural studies, science and technology studies, media studies, philosophy, computer science and design, the new center will work to establish a new paradigm for productive engagement between technologists and social scientists. The Social Computing center functions as a single distributed research group, across disciplines and across universities. It is based at UC Irvine, a leader in cross-disciplinary activity as well as a world-class center of excellence both in Informatics and Anthropology. But the center also draws together faculty, postdoctoral, and graduate student scholars at Cornell University, Indiana University, Georgia Institute of Technology, and New York University.

The center is co-lead by principal investigators Paul Dourish (Professor of Informatics, UC Irvine) and Scott Mainwaring (Senior Research Scientist, Interaction and Experience Research, Intel Labs). Bill Maurer (Professor of Anthropology and Associate Dean of the School of Social Sciences, UC Irvine) serves as academic co-PI.

### Open Collaboration

Like the other Intel Science and Technology Centers, the Social Computing center uses an open, collaborative model of industrial-academic partnership. Intel is funding the center's activities, but all research results will be published and software developed will be open-source, to encourage widespread sharing of information and

results and to avoid IP issues that have hindered other models.

## Opportunities for Impact

We have identified five research areas with significant opportunity for impact.

<b>Materialities of Information</b>	▪ Re-thinking information as grounded in materials and physical objects
<b>Subjectivities of Information</b>	▪ Moving beyond "the user" as center of user experience and user-centered design
<b>Information Ecosystems</b>	▪ How we relate to each other in, around, and through data
<b>Creativity and Collectivity</b>	▪ Group-embedded technical creativity and how it can change the world
<b>Algorithmic Living</b>	▪ Digital representations and algorithms that change how we understand ourselves

Figure 4 Social Computing Research Themes

### Materialities of Information

First, we want to ask what happens if we re-evaluate the decades-old idea that information is independent of the physical world. Anyone who believes that information can be entirely virtual as never tried to rent premises in a technology hot spot like South of Market in San Francisco. And yet the theory of information on which we proceed is one that makes it hard to account for the realities of where information is, what shapes it takes on, and how that affects what we can do with it. Our research program takes seriously the idea that information is about matter, and that the matter matters.

Rather than assuming information is intrinsically abstract, we proceed instead from a concern with material configurations and their properties (flexibility, density, durability, portability, visibility, and the like) of IT, and its geographical embeddedness in actual places. Our research can then examine where and how "material" and "informational" conceptions diverge, and what material practices of design can unite them. We expect this work to produce new design methods that better integrate product design, experience

design, and information design. In addition, materiality-centric analyses could yield productive re-framings of a number of ongoing research domains such as Ubiquitous Computing, Cloud Computing, and ICT for Development.

### Subjectivities of Information

Our second research area will explore the different ways that people can be affected – sometimes profoundly -- by digital material. Technology design has become user-centered, and rightly so, but sitting down and using a device isn't the only way that it affects our world. Facebook shapes your world even if you don't have an account there. We are asking, what comes after "user-centered," and how do we begin the process of designing for a world of much more diverse engagement?

Work in the subjectivities theme will look at how people become, as the name suggests, subjects of technological systems, policies, and norms. Instead of assuming that systemic structure simply emerges from individuals autonomously and rationally acting, analyses will consider how the reverse also holds, with "autonomy" and "rationality" being as much products as causes of social structures. From this perspective, structural positions we see in traditional product development like "researcher", "designer", "developer", "consumer", etc. need not be accepted as givens, and innovative new configurations can be explored, and more productive dialog between brand managers, technologists, regulators, and consumers fostered.

### Information Ecosystems

Third, we are setting up a program that examines the way that we relate to each other in, around, and through data. We want to take a fresh look at the problems of privacy and security, by thinking of the ways that data mediates social relationships. Again, it might not be the information we have; we might be bound together by our mutual knowledge of the things that we don't know. Information mediates relationships in many more ways than simply knowledge and disclosure, and we believe that

taking a wider view can give us new insight into the problems of data security, personal privacy, and collective information access that we all face every day.

An important topic within this area is scale. For example, sole authorship or individual invention may be the easiest cases to analyze in terms of access rights and conflict resolution, but are exceedingly difficult to find examples of in the world, which is ecosystem and recombination rich. There is a pressing need for systems that can deal with aggregated data, aggregated agency, and the potential instabilities these imply. Beyond aggregation, work on information ecosystems will also look at scale in terms of level of analysis. For example, how is it that trust at one level (e.g., in devices) becomes fear at another (e.g., of intrusive services insinuating themselves through this trust)? The goal here would be the production of practical new frameworks for crafting and understanding data rights and human values, when data sets and human engagement span multiple levels of scale and analysis.

### Creativity and Collectivity

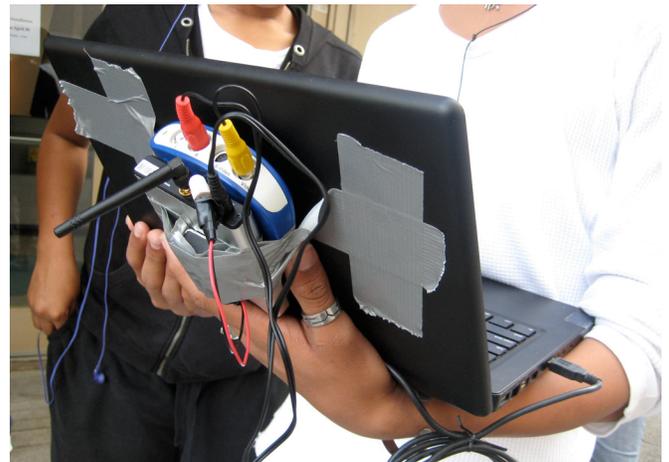


Figure 5 Hacked laptop. Photograph by Carl Di Salvo.

Fourth, we are looking at the way that technological creativity is embedded in many different kinds of communities. This means everything from the scientific communities that form around advanced problems, to the open source communities that harness the creativity of programmers around the

world, to the people whose viral video mashups change the outcomes of political campaigns. These are very different areas, but they share a common focus – on using digital tools to engage with others to make change in the world. If we can understand how technologies connect people together, and how creative practice emerges across these different domains, we can help people to do amazing things.

As in the previous two themes, the paradigm shift we are pursuing here involves moving from the individual to the social. The focus is on innovation, production, and creativity at the group or collective level, and the results of this research may be not just new theories of innovation or proposed policies around intellectual property, but actual group spaces – real or virtual – in which group production can take place and be fostered. For example, researchers will explore how to scale-up and re-target “hacker spaces” and DIY practices.

### **Algorithmic Living**

In the fifth area, the Center is setting out to examine how algorithms provide new ways for understanding ourselves and each other. Numbers and data sets paint new kinds of pictures of who we are, and they give us new ways to reflect on ourselves as individuals, as members of families, as citizens, as workers, and as human beings. We hinted earlier at the way that Twitter gives us new tools for knowing ourselves and our affiliations, but social media today is barely scraping the surface of the ways that digital representations and computational algorithms shape our experience of

each other. Algorithms are moving into social systems and daily life, invited or not.

Research in this area will look at data and at the algorithms that propel, aggregate, visualize, and otherwise process it. How is “big data” collection, representation, and use creating new practices and subcultures (as movements like the “Quantified Self” suggest)? Conversely, what is the social life of algorithms? How are they produced in practice?

Results from this work will range from new models of how personal, commercial, and governmental concerns interact to new way of interacting with and experiencing data that allow communities and individuals to participate and act.

## **Catalyzing Future Connections**

Our world is social and technological; our infrastructures are material, informatic, and human. The Intel Science and Technology Center for Social Computing will establish paradigms beyond experience-based computing to account for the fact that our devices have experiences now, too, and profoundly shape our own. Technology is no longer something we use; it is something we inhabit, and technology inhabits and remakes our social world and our innermost senses of self. The center will advance our understanding of the complex interconnections between society and technology, the emerging socio-technical infrastructures and pathways that are determining the direction of social change and laying the groundwork for the next generation of information technology and digital media.

### **For more information:**

Web: [socialcomputing.uci.edu](http://socialcomputing.uci.edu)

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