Computing technology is changing us. We are creating a computational environment that is shaping our society.

But are these the changes we want?

Do we just stand back and watch, as commercial interests and governments build technologies around us?

The faculty and students in the Societal Computing PhD program in the School of Computer Science answer decisively that waiting passively is not an option. Building on a decade of world-leading research, we are shaping a new scientific discipline that is changing the world.

We are asking the right questions. We are finding answers.

Societal Computing is the branch of computer science that designs computational technology to shape tomorrow’s digital world and uses computational methods to understand the societal challenges a digital world poses.

Our field is defined by the fundamental question it seeks to answer:

How can we design computing technologies to address societal needs and concerns, and how can we assess and guide the design, implementation and deployment of new computing technologies as they appear?

This fundamental question takes many forms, across the full range of interests of Societal Computing faculty and students. For example,

• How do we address the privacy challenges we face with the coming Internet of Things?
• How do we use sensing and machine learning to enhance sustainability?
• How do we build the hardware/software infrastructure for the Smart Cities of the future?
• How do we design analytics to show the impact of social media and mobile technology?
• How do we design technology that ensures compliance with legal requirements?
• How do we support collaboration and coordination in ultra-large scale, data-rich, open production environments?
• How do we design big data analytics and simulations to model large-scale networks to help policy makers evaluate how their decisions impact our computer mediated world?
Our research can be broadly grouped into five cross-disciplinary thrusts:

- **APPLIED SYSTEMS & INFRASTRUCTURE**
- **NETWORK SCIENCE & SOCIAL NETWORKS**
- **COMPLEX SOCIO-TECHNICAL SYSTEMS**
- **COMPUTING TECHNOLOGY & POLICY**
- **PRIVACY & SECURITY**

### Societal Computing Faculty

- **Yuvraj Agarwal**
  - Building hardware and software systems with security and privacy in mind. Particularly for Mobile Computing, Smart Infrastructure and IoT domains.

- **Lujo Bauer**
  - Computer security, usable security; studying users and building usable systems with sound theoretical underpinnings.

- **Travis Breaux**
  - Requirements engineering, software design assumptions, privacy and security, and policy and legal compliance.

- **Kathleen Carley**
  - Dynamic network analysis, computational social and organization theory, and the impact of telecommunication technologies and policy.

- **Nicolas Christin**
  - Cybersecurity and online crime modeling, security economics, and usable and secure authentication.

- **Lorrie Cranor**
  - Usable and user-controllable privacy and security, privacy decision making, usable cyber trust indicators, and usable and secure passwords.

- **Fei Fang**
  - AI, computational game-theory, security and sustainability, large-scale and robust optimization, spatio-temporal analysis, machine learning

- **Mayank Goel**
  - Building and deploying new sensing systems for applications in high-impact areas: health sensing, technologies for global development, and accessibility.

- **Matt Fredrikson**
  - Formal methods for ensuring privacy and security, particularly in applications that use personal data and statistical learning.

- **Jim Herbsleb (program director)**
  - Complex socio-technical systems, software teams and organizations, collaboration, coordination, and open source.

- **Zico Kolter**
  - Machine learning, optimization, and computational approaches to sustainable energy and smart grids.

- **Douglas Sicker**
  - Data spectrum access, security and privacy, broadband networking, network policy.

- **Bogdan Vasilescu**
  - Software analytics, social aspects, teams, collaboration, open source ecologies, and “big code”

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