



A Glimpse of Human-Computer Interaction

Jim Hollan
Co-Director Design Lab
Professor Cognitive Science
Professor Computer Science and Engineering

Email: hollan@ucsd.edu
Lab: Design Lab at UC San Diego
Web: hci.ucsd.edu/hollan & designlab.ucsd.edu

Jim Hollan, hci.ucsd.edu/hollan

Jim Hollan

Distinguished Professor of Cognitive Science & Professor of Computer Science and Engineering
Founding Co-Director, UC San Diego Design Lab, Atkinson Hall 1601C

UC San Diego, La Jolla, CA 92093
EMAIL: hollan@ucsd.edu PHONE: +1.858.534.8156

My research explores the cognitive consequences of computational media. It is motivated by a belief that we are at the beginning of a paradigm shift in thinking about representational media, one that is starting to appreciate the importance of representations that are not only dynamic and interactive but also adapt to the structure of tasks, the history and context of activities, and our relationships with others. My goal is to better understand the cognitive, computational, and social ecology of dynamic interactive adaptive systems.

My interests span across cognitive design, distributed and embodied cognition, human-computer interaction, multiscale information visualization, multimodal interaction, cognitive ethnography, and software tools for design and visualization. My work involves four intertwined activities: developing theory and methods, designing representations, implementing prototypes, and evaluating their effectiveness to better understand the broader design space in which they are situated.

Current research is funded by the National Science Foundation (NSF). Recently completed research has been funded by California's Digital Media Innovation Program, Chancellor's Interdisciplinary Collaboratories Program, Darpa, Intel, Microsoft, Nissan, NSF, Sony, Toyota, and the UC MICRO Program.

Honored to have received the ACM SIGCHI Lifetime Research Award in 2015.

COURSES CURRENT ACADEMIC YEAR

FALL 2018

COGNITIVE SCIENCE 220: Information Visualization Seminar

Wed 9-11:50 Cognitive Science Building 003

DESIGN 119, COGNITIVE SCIENCE 229, and COMPUTER SCIENCE 219: Design@Large

Wed 4-5 Computer Science 1202

WINTER 2019

COGNITIVE SCIENCE 126: Human Computer Interaction

Tues & Thur 9:30 - 10:50 Cognitive Science 003

SPRING 2019

COGNITIVE SCIENCE 10: Cognitive Consequences of Technology

RECENT RESEARCH PUBLICATIONS

Exploration and Explanation in Computational Notebook.

Adam Rule, Aurelien Tabard, and James D. Hollan, *Proceedings of CHI 2018, ACM Conference on Human Factors in Computing Systems, 2018.*

Stories We Tell Ourselves: Using Visual Histories to Make Sense of Interrupted Activities.

Adam Rule, Aurelien Tabard, and James D. Hollan, *Human Computer Interaction, 511-558, 2017.*

Sharing, Human Values, and Computer Activity Tracking.

Karen Boyd, Adam Rule, Aurelien Tabard, and James D. Hollan, *Proceeding os ACM Computer Supported Cooperative Work and Social Comoutina . 233-236. 2016.*

RECENT GRADUATE STUDENTS AND OTHER COLLABORATORS

COGNITIVE SCIENCE

Amaya Becvar Weddle (PhD, 2008; Now at Cisco), Gaston Cangiano (Ph.D. 2011), Monal Chokshi (M.S. 2005; Now at Lyft), Brynn Evans (M.S. 2009; Now at Google), Whitney Friedman, Adam Fouse (Ph.D. 2013), Amy Rae Fox, Daniel Frysingier, Tim Marks (Ph.D. 2006; Now at MERL), Anne Marie Piper (Ph.D 2011; Now at Northwestern University), Erik Pukinskis, Nan Renner (Ph.D. 201; Now at UCSD), Adam Rule, Amy Rae Fox.

COMPUTER SCIENCE

Dan Amelang, Lisa Cowan (Ph.D. 2011), Jonathan Lee, Kevin Li (Ph.D. 2009; Now at AT&T Labs), Roshni Malani (Ph.D. 2009; Now at Google), Kevin Ponto; (Ph.D. 2010; Now at University of Wisconsin), Macneil Shonle (Ph.D. 2009; Now at Google), Arvind Satyanarayan (Honors Undergrad; Ph.D. Stanford 2017; Now at Google; Starting MIT Fall 2018), Tim Sohn (Ph.D. 2008; Now at Google), So Yamaoka (Ph.D. 2011)

SOCIOLOGY

Tricia Wang (Ph.D. 2014)

POSTDOCS

Pierre Fastrez, David Fox, Jean-Baptiste Haue, Ron Hightower, Terry Jones, Derek Lomas, Melanie McComsey, Lars Mueller, Saeko Nomura, Malte Risto, Carsten Roeker, Nadir Weibel

FAQ

Brief Bio

Academic Vitae

Requests to Meet

Undergrads & Research

Undergrad Honors Projects

Letters of Recommendation

Graduate Applicants to UCSD

Advice to Students Slides (PDF)

WEEKLY MEETINGS

Design Lab Huddle

Design Lab Research:

Department: Wed 12:00-2:00

Office Hour: Send email

TRAVEL

3 - 7 November 2018

CSCW 2018: Computer-Supported Cooperative Work and Social Computing
New York, New York

11 December 2018

MIT-CSAIL Talk
Cambridge, MA

21 - 26 April 2018

CHI 2019: Conference on Human Factors in Computing Systems
Glasgow, UK

TBD 2019

HCIC 2018: Human Computer Interaction Consortium
Pajaro Dunes Resort, CA

Today a Glimpse of HCI but first, one slide of advice

Why do so few people make significant contributions?

What is the difference between those who do and those who don't?

One factor is expectations: If you think you can't almost certainly you won't

To do significant things you have to neglect other things

Take time to think important thoughts

Be thoughtful about who you spend time with

Refuse to let the urgent always drive out the important

Do your best in a course to learn what that feels like

HCI and Design at UC San Diego

UC San Diego is a special place with a long history in Cognitive Science and Human-Computer Interaction (HCI)

Early Days: Institute for Cognitive Science

Focus on User-Centered System Design (UCSD) and Parallel Distributed Processing

Today: New Design Lab Focus: Complex Socio-Technical Systems

HCI/Design Faculty: Steven Dow, Philip Guo, Jim Hollan, Lilly Irani, David Kirsh, Scott Klemmer, Michael Meyer, Don Norman, Taylor Scott

Cognitive Science Majors (2145)

90% Specialize in areas

HCI & Design Specialization is largest (789 40%)

Design Minor (177)

HCI/Design Courses

Fall 2019-2020

COGSCI 3: Introduction to Computing

COGSCI 9 Introduction to Data Science

COGSCI 10 Cognitive Consequences of Technology

COGSCI 13 Field Methods

COGSCI 18 Introduction to Python

COGSCI 100 Cyborgs Now and in the Future

COGSCI 102A Distributed Cognition

COGSCI 108: Data Science in Practice

COGSCI 118B: Introduction to Machine Learning II

COGSCI 120 Human Computer Interaction

COGSCI 123: Social Computing

COGSCI 126 HCI: Thinking with Computers

COGSCI 144: Social Cognition

COGSCI 187A Usability and Information Architecture

COGSCI 189 Brain Computer Interfaces

Fall 2019-2020

DSGN 1 Design of Everyday Things

DSGN 90: Undergraduate Seminar

DSGN 119: Design@Large

DSGN 1: Design of Everyday Things

DSGN 1 is a studio-based course about the principles and process of design. It focuses on developing skills. Design is as much about identifying problems as finding solutions. It is fundamental to making the world a productive, enjoyable, and wonderful place to live.

You will learn to observe, analyze, and understand the role design plays in our lives. Look around. Virtually everything you see was designed: the layout of keys on your laptop, even the font used for the letters, the shape and placement of your front door knob, the ways you control your car, how you swipe to interact with your smartphone. All were designed. But how well were they designed? Could they be designed better?

We examine not only the visible features of designed objects but also the less visible features of process and interaction (e.g., how we queue to obtain service at an ATM, why we decide to grasp an object in a certain way, or sit in that specific seat in the classroom), the implicit and explicit ways design influences our interaction with the world and with each other.

Tool Stolen From N.S.A. Is Being Used to Hijack Cities Across Country

From Page 1

expert at Johns Hopkins University, called the Shadow Brokers episode “the most destructive and costly N.S.A. breach in history,” more damaging than the better-known leak in 2013 from Edward Snowden, the former N.S.A. contractor.

“The government has refused to take responsibility, or even to answer the most basic questions,” Mr. Rid said. “Congressional oversight appears to be failing. The American people deserve an answer.”

The N.S.A. and F.B.I. declined to comment.

Since that leak, foreign intelligence agencies and rogue actors have used EternalBlue to spread malware that has paralyzed hospitals, airports, rail and shipping operators, A.T.M.s and factories that produce critical vaccines. Now the tool is hitting the United States where it is most vulnerable, in local governments with aging digital infrastructure and fewer resources to defend themselves.

Before it leaked, EternalBlue was one of the most useful exploits in the N.S.A.’s cyberarsenal. According to three former N.S.A. operators who spoke on the condition of anonymity, analysts spent almost a year finding a flaw in Microsoft’s software and writing the code to target it. Initially, they referred to it as EternalBlue-screen because it often crashed



JIM LO SCALZO/EPA, VIA REX, VIA SHUTTERSTOCK

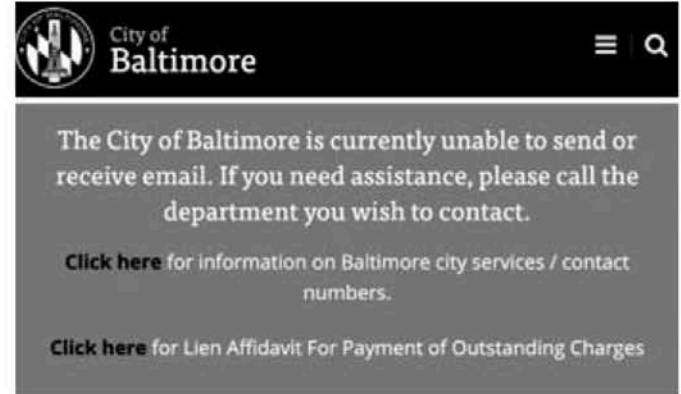
The National Security Agency headquarters in Maryland. The agency lost control of its EternalBlue tool in 2017; it spread around the world and has caused billions of dollars in damage.

exploits a vulnerability in unpatched software that allows hackers to spread their malware faster and farther than they otherwise could.

North Korea was the first nation to co-opt the tool, for an attack in 2017 — called WannaCry — that

Brokers began dumping the agency’s tools online in 2017, the N.S.A. — aware of the breach — reached out to Microsoft and other tech companies to inform them of their software flaws. Microsoft released a patch, but hundreds of

the cities and towns affected, citing customer privacy. But other experts briefed on the attacks in Baltimore, Allentown and San Antonio confirmed the hackers used EternalBlue. Security responders said they were seeing Eternal-



On May 7, city workers in Baltimore had their computers frozen by hackers. Officials have refused to pay the \$100,000 ransom.



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will be used almost forever, he compared to silver, timber



The Washington Post



CNN EXCLUSIVE

FACEBOOK DOUBLES DOWN ON NOT REMOVING FAKE PELOSI VIDEO

CNN

8:14 PM ET

AC360°

Cogsci 10: Cognitive Consequences of Technology

A project-based course. This quarter three projects:

Project I: Digital Media Fast

Project II: Visualization Critique

Project III: A choice among three alternatives

Search or Trust on the Web Goal is to better understand how people search the web and determine trust about search results.

Privacy Goal is to better understand the personal data that is being collected about you and the issues that are raised.

Activity, Interruptions, or Breakdowns Goal is to better understand how time is spent in technology-mediated activities or the frequency and types of interruptions and breakdowns that happen.

To-Yeh Jonathan Chang



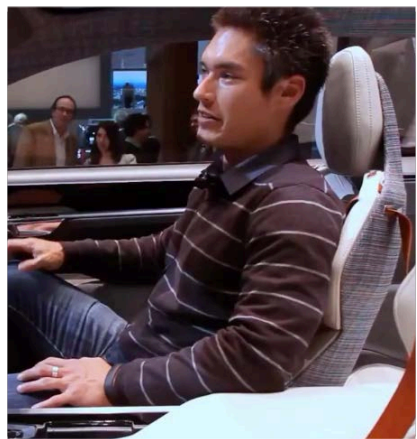
To-Yeh Jonathan Chang



Cogsci 10: Cognitive Consequences of Technology



Nate Bolt, UCSD undergrad, Bolt Peters sold to Facebook, design research manager at Facebook and Instagram. Co-wrote *Remote Research*, *Ethnio* is his current company, [droned the NYPL](#), BookOps, ...



Ed Langstroth, UCSD undergrad, surfer, advance planning Nissan, platform coordinator VW research lab, Teach for America, automotive product manager Apple, CarPlay at Geneva Auto Show in Volvo concept car...

Thinking with Computers

For far too long we have conceived of thinking as something that happens exclusively in the head.

Thinking happens in the world as well as in the head.

We think with things, with our bodies, with marks on paper, and with other people.

Thinking is a situated social activity that exploits the extraordinary facilities of language, representational media, and embodied interaction with the world and other people.

Today we increasingly think with computers.

Amazing amount of computation available. Already today there have been a billion Google searches.

Computers Are Special

Computers are special in that they provide a new kind of stuff, a new medium, out of which to fashion dynamic interactive systems to assist thought, communication, collaboration, and social interaction.



“The computer is the first meta-medium, and as such it has degrees of freedom for representation and expression never before encountered and as yet barely investigated.”

— Alan Kay

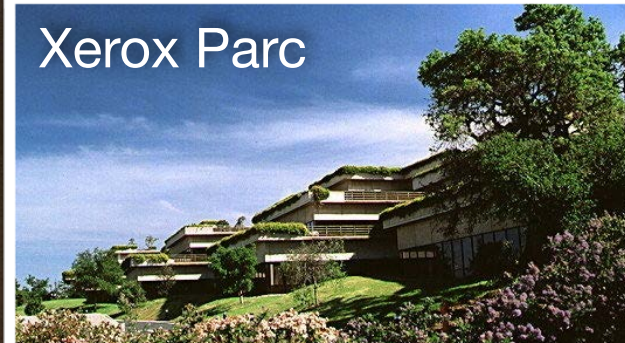
Xerox Parc and the Alto

Xerox CEO decides Xerox should become “the architect of information.”

Parc becomes the place to be. Create the future by living in it. Alan Kay, “The best way to predict the future is to invent it.”

Parc Legacy: personal computer, ethernet, laser printing, object-oriented programming, icons and desktop metaphor, ethnography of technology, ...

Xerox Parc



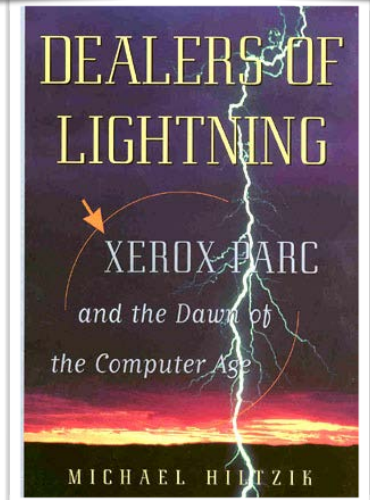
Stanford AI Lab



DEALERS OF LIGHTNING

XEROX PARC
and the Dawn of
the Computer Age

MICHAEL HILTZIK



Computers Are Special



Computation provides the most plastic medium for representation, interaction, and communication we have ever known

- Mimic existing media (e.g., books, newspapers, magazines, photographs, audio recordings, and films)
- Create new media and modify the form of existing media,
- Create models that represent, with ever increasing fidelity, the physical world
- Provide virtual worlds that range from the simple metaphorical desktop of the graphical user interface to the amazing digital effects and virtual characters of current games and films
- Combine the real and the virtual, as with computer-augmented surgery in which images of internal structure are projected onto a patient's body to guide surgery and robotic-assisted controls remove the tremors from the surgeon's hands



Abe Davis

Stanford

Wednesday, February 27
11:00am - 12:00pm
CSE 1242, EBU-3B

Augmenting Imagination: Capturing, Modeling, and Exploring the World Through Video

Cameras offer a ubiquitous, high-bandwidth source of data about the world around us, providing many opportunities for computational approaches to real-world problems. In this talk, I will show how insights from art, science, and engineering can help us connect progress in visual computing with typically non-visual problems in other domains, allowing us to leverage the convenience and power of video to solve new problems.

The first section of the talk will focus on visual vibration analysis: I will show how insights from physics can help us extract sound from silent video, reason about structural and material properties that are perceptually invisible to humans, and even build interactive physical simulations of visible objects.

The second section of the talk will give an overview of how similar methodologies can be applied to artistic domains, using insights from music, dance, and cinematography to design computational tools that offer creative control over large amounts of media.

Abe Davis is a postdoctoral researcher at Stanford University working at the intersections of computer graphics, vision, HCI, and civil engineering. He earned his Ph.D. in Electrical Engineering and Computer Science from MIT in 2016 and is the recipient of the MIT Sprowls Award for Outstanding Dissertation in Computer Science and the ACM SIGGRAPH Outstanding Doctoral Dissertation Honorable Mention Award. Abe was awarded NSF and Mathworks graduate fellowships, named one of Forbes Magazine's "30 under 30", Business Insider's "50 Scientists Who are Changing the World" and "8 Innovative Scientists in Tech and Engineering." As a postdoc, he won the "Most Practical SHM Solution for Civil Infrastructures" Award at IWSHM 2017, and has been the recipient of two Magic Grants from the Brown Institute for Media Innovation.

A man with dark hair, wearing a grey button-down shirt and dark pants, stands on a red carpeted stage. He is gesturing with his hands as if speaking. The background consists of dark blue curtains. The name 'ABEDAVIS' is overlaid in white text at the bottom of the image.

ABEDAVIS



Computers are also changing form

Monolithic computer is coming apart and being reassembled in myriad new forms

New device ecologies and ways of interacting

Already today a billion google searches; each using the equivalent of all the computing of the Apollo Project that landed the first human on the moon

For good and for ill, our activities are increasingly mediated by computers





REMOVED -
Eric Pickersgill www.removed.social







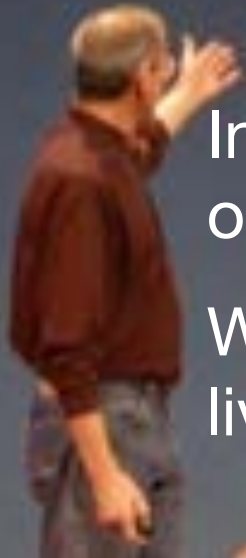
New types of computers: smartphones

Increasingly we have multiple and we don't think of many of them as computers

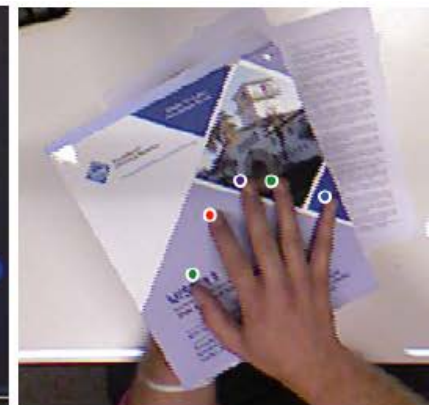
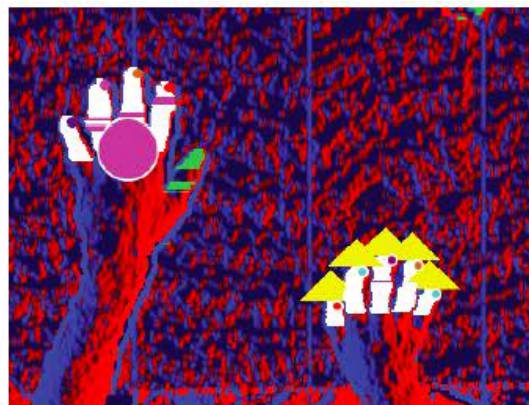
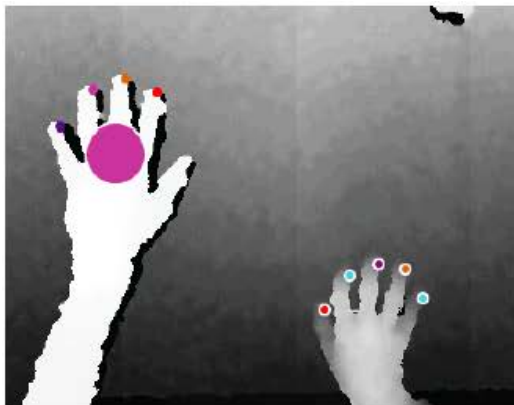
iPhone introduced in 2007

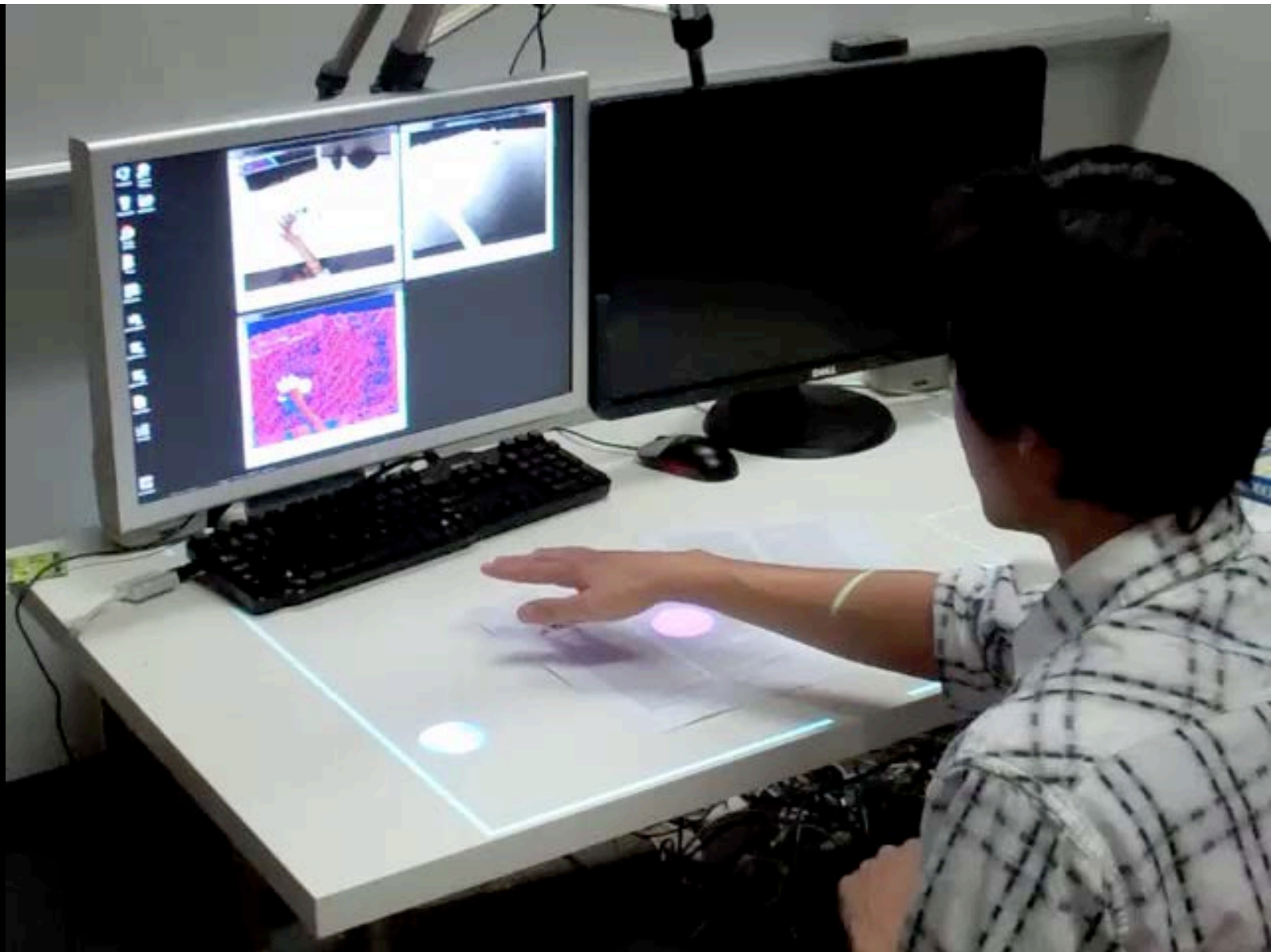
Internet: connected computers, sensors, and people all over the world

Web: Changing our professional, personal, and social lives



Boundary between physical and digital worlds is becoming permeable





ObjecTop: Occlusion Awareness of Physical

M. Khalilbeigi (Darmstadt), J. Steimle (MIT), and
J. Hollan (UCSD)



ObjecTop

**Occlusion Awareness of Physical Objects on
Interactive Tabletops**

WritLarge: Ink Unleashed by Unified Scope, Action, & Zoom

Haijun Xia^{1,2}, Ken Hinckley¹,
Michel Pahud¹, Xiao Tu¹, Bill Buxton¹

¹Microsoft Research, ²University of Toronto

Data Revolution

We don't know nearly enough about what people really do

Inexpensive digital recording devices, sensors, and storage facilities are revolutionizing data collection in the behavioral sciences

Extending data collection into situations that have not typically been accessible

Enabling examination of the fine detail of action captured in meaningful settings

This makes real world activity an object of scientific scrutiny in ways never before possible and at a scale that until recently was unimaginable.

Interesting work of Chuck Goodwin

Three words: Yes, No, and And



Data Collection using Kinect

The screenshot displays a software interface for video annotation. At the top, two windows titled "Image Sequence" show a video of a doctor and a patient in a clinical setting, and a corresponding Kinect depth map with colored overlays. A "Categories" window on the left lists various action categories with color-coded boxes. Below the video, a complex timeline tracks multiple data streams: speech (green), patient actions (purple), doctor actions (green), translator actions (yellow), and platform interactions (blue). The timeline includes labels such as "Speech", "Patient", "Doctor", "Translator", "Platform", "Notepad", "Nodding", and "Shakes her head". A time axis at the bottom ranges from 00:10 to 05:00.

Category	Shortcut	Color
Translator		
Head		Orange
Body		Red
Speech		Green
Patient		
Head		Orange
Body		Red
Speech		Green
Doctor		
Head		Orange
Speech		Green
Doctor Body		Red
Start		Yellow
End		White
Doctor Head		
Platform		Blue
Translator		Yellow
Patient		Purple
Other		Red
Translator Head		

Spore Interface Study Outtakes

boltpeters.com blog

- home
- services
- ethnio
- clients
- about b|p
- ideas
- blog
- contact



bolt | peters is a creative research firm.

Fun example: Spore (the outtakes)





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