

Proactive Displays & the Experience UbiComp Project

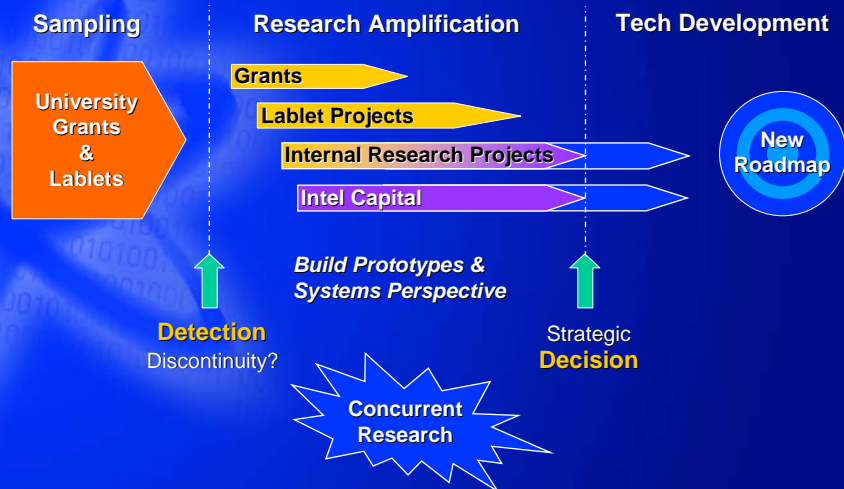
Joe McCarthy
Intel Research Seattle



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Exploratory Research The model of Intel Research

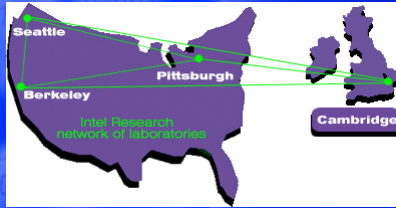


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Intel Research Lablets

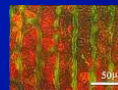


LAB FOCUS:

- **Berkeley:**
Extremely networked systems - the very large, the very small, and the very numerous
- **Cambridge:**
Networking, platform and development technologies to enable innovation in distributed applications
- **Pittsburgh:**
Software for widely distributed storage systems
- **Seattle:**
New technologies and usage models for ubiquitous computing environments

Living Labs

- **Laboratory**
 - “a place equipped for experimental study in a science or for testing and analysis” (Merriam-Webster)
 - Often carefully instrumented and controlled
- **Living Laboratory: variations on a theme**
 - Version 1: “Walk the talk”
 - Experimenters as participant-observers within the lab
 - Version 2: “Bring the mountain to Mohammed”
 - Deploy for use by others in real-world settings outside the lab
 - Version 3:
 - The laboratory is a living organism
- **Living Labs @ UCSD:**



Living Labs @ Intel Research

- **PlanetLab:** An open platform for developing, deploying and accessing planetary-scale services
 - 150 sites, 20 countries, 450 research projects
 - www.planet-lab.org



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Living Labs @ Intel Research

- **Wireless Sensor Nets (Motes):** embedded chips and sensing devices integrated into objects and locations that are part of our daily lives
 - Great Duck Island
 - www.greatduckisland.net
 - Wireless Vineyards
 - <http://www.intel.com/labs/features/rs01031.htm>



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Living Labs @ Intel Research

- **Place Lab:** An open platform for making privacy-observant, location-enhanced web services available in a wide variety of daily, real-world, situations



- www.placelab.org



- Extending **ActiveCampus** to new areas and communities
 - Bill Griswold (CSE), *et al.*
 - activecampus.ucsd.edu



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Living Labs @ a Conference

Proactive Displays & The Experience UbiComp Project

AutoSpeakerID



Ticket2Talk



Neighborhood Window



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Displays in Context(s)



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Proactive Displays

- Displays + sensors (+ algorithms + policies + ...)
 - *sense & respond appropriately* to the **people & activities** taking place nearby
- Issues:
 - Context(s)
 - Where should they go?
 - Content
 - What should they show?
 - Interaction models
 - How will they know?

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Proactive Displays in the Large



An interactive project by SCLC (04/11/97) "Sunset" Margaret Cygan-Tate, MacDonald Spott, Memorandum West, Xerox PARC, Article in Residence Program (07/00)

Sunset @ 200MHz (PARC)



Love Board (Hachiko Crossing)

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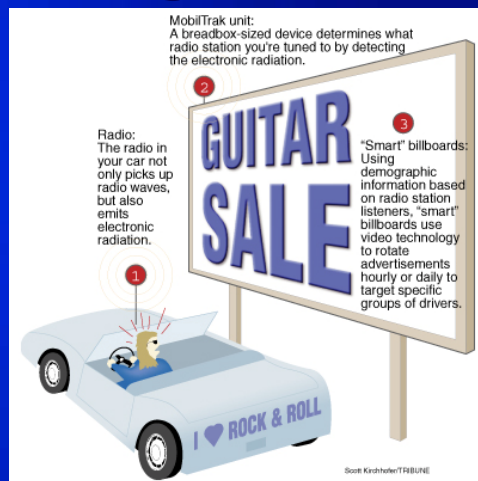
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Proactive Displays in the Large



Alaris E-boards
(www.alaris.net)



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Proactive Displays in the Small

- Convergence of Motes & Displays
 - Mote processor + radio + LCD
 - Ultra low power
 - Future: bi-stable, color, reflective displays



Proactive Displays Research

- Goals
 - Technology-mediated Interactions:
 - Explore how proactive displays can create, maintain or enhance relationships among people that are nearby
 - Living Lab(s):
 - Design, build, deploy, & evaluate a suite of applications for public, real-world settings
 - Calm Technology:
 - Minimally intrusive, leverage existing practices (& devices, ...)

Experience UbiComp Project



- Desire for **mutual revelation**
 - show & tell about you & your work;
 - learn about others & their work
- Restricted **contexts**
 - Paper / panel sessions
 - Demo / poster sessions
 - Reception / breaks
- Available **content**
 - Explicit: registration info
 - Implicit: homepage data mining
- **Interaction**
 - Register, activate and wear tags during the conference
 - Opt out at any time (delete profile, discard tag)



Registration

E-mail Address:
(e.g., jane.doe@intel.com)

Full Name:
(e.g., Jane Doe)

Affiliation:
(e.g., University of Washington)

Photo:
Share a GIF/JPG photo of yourself.

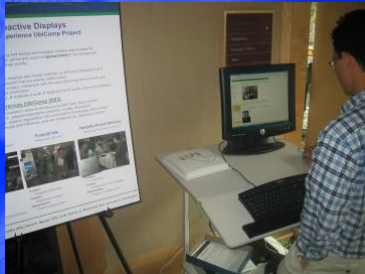
Ticket2Talk Image:
Share a GIF/JPG image of something you'd be happy to talk about with other UbiComp 2003 conference attendees.
Click [here](#) for more information on "tickets to talk".

Ticket2Talk Caption:

Homepage URL:

A few words about your interests:
Use a comma to delimit the concepts. [e.g. RFID, personal servers, kite boarding]

Activation



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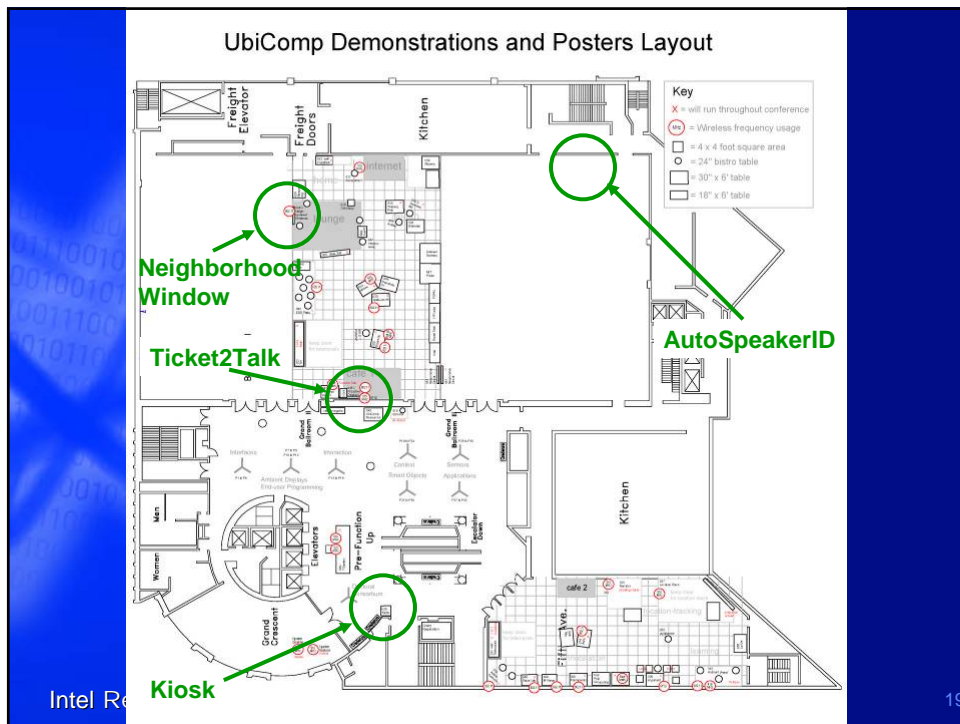
Experience!



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AutoSpeakerID

- Keynote/Paper/Panel Q&A “augmentation”
 - RFID: antenna (microphone), tag (badge)
 - Display photo, name, affiliation
 - Visual augmentation of common [oral] practice

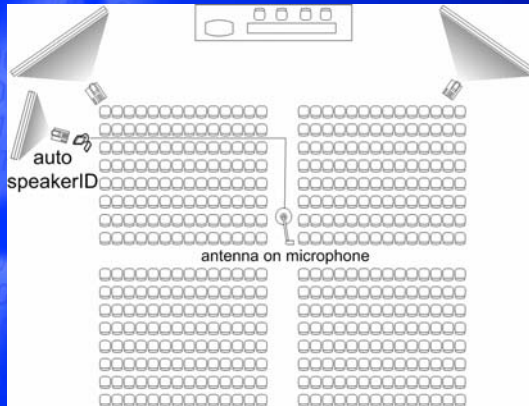



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AutoSpeakerID



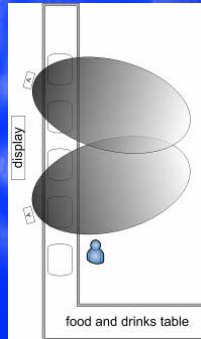
Ticket2Talk

- Coffee Break
 - *Explicitly* provided content
 - *Single* person (at a time)



The screenshot shows the Ticket2Talk interface. At the top, it displays a profile for Joe McCarthy, Intel Research Seattle. Below this is a video player showing a bottle of beer with the text "Amazon: ecstasy is a bottle". At the bottom, there are four small video thumbnails for other speakers: Sasi Soroczak, Al R., Joe McCarthy, and David Noyens.

Ticket2Talk



Ticket2Talk

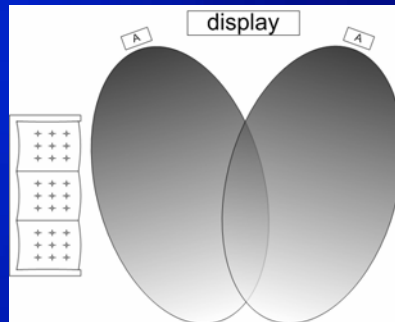
- Queue Management: balancing freshness & fairness
 - Tag recency: +
 - Ticket recency: -
 - Minimize thrashing
 - 5 seconds of fame

$$P_i = w_1 \cdot \frac{(TimeOutPeriod - TimeSinceTagSeen_i)}{TimeOutPeriod} \times w_2 \cdot \frac{\min(NumTickets, TicketCounter_i)}{NumTickets}$$



Neighborhood Window

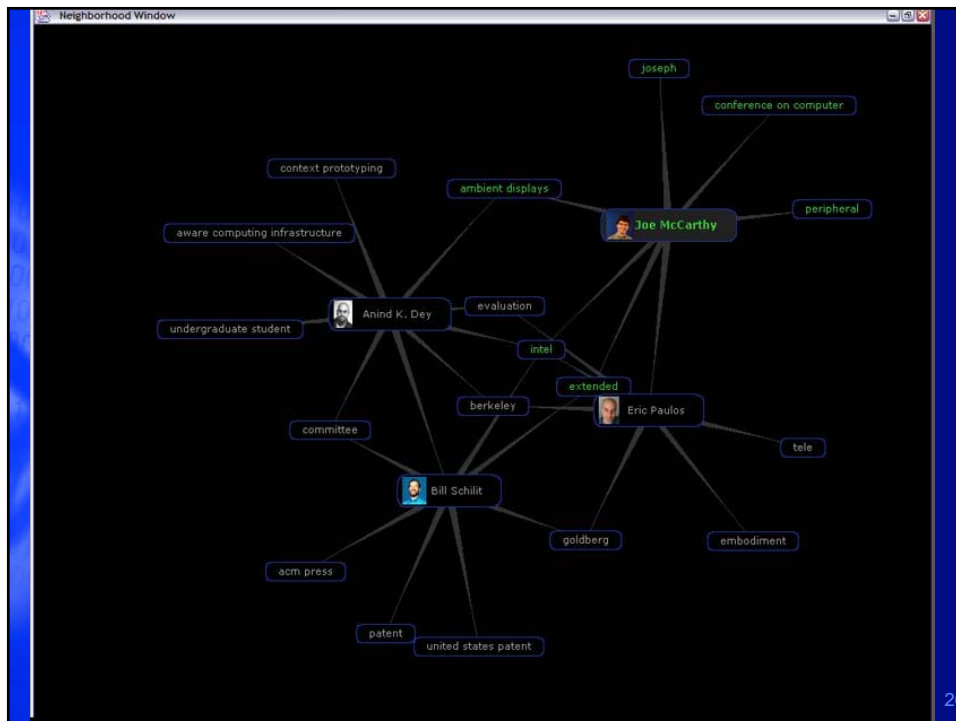
- Demonstrations & Poster Session
 - *Implicit* content (mined from homepages)
 - *Groups* of people (& their words / phrases)



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Neighborhood Window

- TouchGraph visualization tool
 - People (picture, name)
 - Words from homepages (and/or interests)
 - N “unique” words (TFIDF)
 - 2(N-1) “shared” words
- Crawling
 - Only within domain
 - Issues: frames, size, language
- Phrases
 - NP = [adjective]* noun+ [PP]*
 - PP = preposition NP

Evaluation

- Survey (as of Nov. 6, 2003)
 - 500 attendees
 - 250 participants (50%)
 - 94 respondents (61 were participants)

	Positive	Negative	No Impact / NR
AutoSpeakerID	71	10	13
Ticket2Talk	39	3	52
Neighborhood Window	21	2	71

Experiences

- **AutoSpeakerID**
 - 50% of questioners' tags detected
 - Introductions: oral only, visual only, visual + oral
 - Spelling, intelligibility (international conference)
 - Liberties taken with pictures, names and/or affiliations
 - "I'm the real Trevor!", "University of Tigger"
- **Ticket2Talk**
 - Conversations, awareness about new & old
 - Amarone, Kiteboarding, PLAY Studio
 - "Who's Ken Anderson?!"
- **Neighborhood Window**
 - Similar to T2T, though more of a novelty factor (and more noise)
 - Common acquaintances
 - "red bishops", Death Valley

Lessons Learned

- Prepare for failures
 - Networking issues
- Prepare for success
 - No kiosks like more kiosks (5% vs. 50% vs. 95%)
- Don't be overprotective
 - Expect unanticipated uses ... within limits
- Design for noise
 - Expect noise, leverage it in the design
- Limits of "informed consent"
 - Conflict between statistical paradigm and UI paradigm

Future Work

- Conference apps
 - ASID: additional sensor (floor mat)
 - T2T: queue management
 - NW: mining algorithms
- New contexts (or living labs)
 - “Third” places
 - Coffee shop, campus commons
- Additional sources of content
 - Bluetooth (phones, Personal Server)
 - WiFi (laptops, Place Lab)
 - Blogs, wishlists, playlists, ...
- Visualizations
 - Abstract / generative
 - WebCollage, Emotional Map



The risks & rewards of Living Labs

- Outside the lab
 - Uncontrolled conditions, multiple potential failure points
 - More realistic scenarios of use
- Outside participants
 - Value propositions, usability, safety
 - More realistic usage
- On the whole
 - Not a replacement for carefully controlled experimentation
 - Necessary for exploring community-oriented technologies
 - ... and many other technologies as well

For more information

- Joe McCarthy
 - joseph.f.mccarthy@intel.com
 - seattleweb.intel-research.net/people/mccarthy
- Proactive Displays
 - www.proactivedisplays.org
- UbiComp
 - www.ubicomp.org
- Intel Research
 - www.intel.com/research

Thanks! ~~Questions?~~