# Mark Watson

## Porfolio

### Interaction Design, Computer Science

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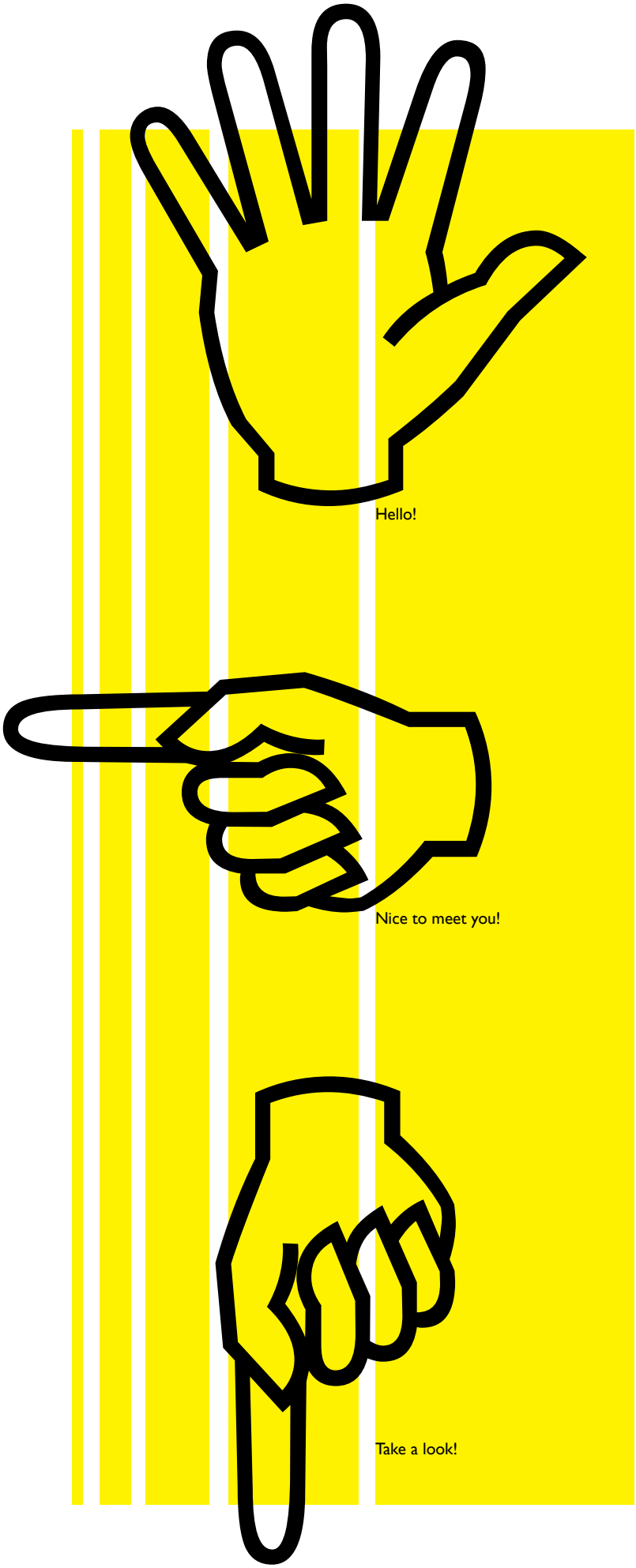

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*Physical Interfaces*

# LOCATION AWARE INFORMATION APPLIANCES

Digital information is useful but tied to specific locations in the home. Accessing it means going to a computer, disrupting normal activity. Using an ethnographic approach, this project explores how data could be distributed in ways more appropriate to how people live. The hand-built prototypes shown here each explore a different method of interacting with information in a simple, intuitive manner.

■ Graphical display

■ Flower opens and closes according to criteria (e.g. deadlines)

■ The device uses colored lights to indicate positive or negative numbers (e.g. the temperature)

■ Display in the context of a home

■ Handheld interface with simple single button control

■ The displays know their location in the home via RFID tags

Elliot, K., Watson, M., Neustaedter, C. and Greenberg, S. "Location-Dependent Information Appliances for the Home." Graphic Interfaces 2007.
Elliot, K., Watson, M., Neustaedter, C. and Greenberg, S. "Location-Dependent Domestic Information Appliances." Pervasive 2007. (Paper and Video)

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*Multi-User Interfaces*

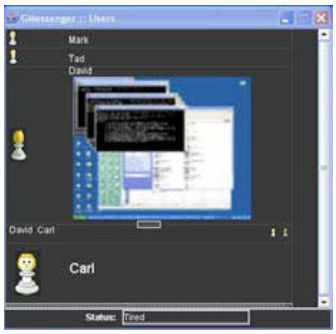
# OPEN-OFFICE STYLE MESSENGERS

Instant messenger services provide little information about the current state of users' activity. This leads to frustrations. No matter how busy someone may be, digital small talk can disrupt and distract them. Yet if they are not online, they may miss vital information. This undermines the utility of the communication system.

This messenger system provides detailed information on someone, so you can decide whether to contact them. Dragging to expand a user's profile gradually reveals this information: initially their status, then which programs they are running, and eventually a screenshot. To prevent snooping, all other users can see which profiles you are viewing and how 'hard' you are looking.


■ The user can see the interactions of others on the network. In this case, one user is observing another while others are in a chat


■ The prototype went through numerous iterations, but was was written in Java




■ A user is observing another by pulling on that user's name, revealing a snapshot of their screen

Birnholtz, J., Gutwin, C., Ramos, G., and Watson, M. "OpenMessenger: Gradual Initiation of Interaction for Distributed Workgroups," Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI 2008). In press.

# EXHIBIT DESIGN

Toronto's annual Interior Design Show is an enormous, multi-day event promoting Canadian interior design. However, The Institute without Boundaries' primary focus is interdisciplinary design and research. The exhibit had to present the novel ideas and designs the school was exploring. The result was a newspaper written and designed expressly for the show. This meant it was possible to give the complete contents of the booth away to every visitor. To be more visually attractive, a stand was constructed to display copies of the paper.


■ The newspaper was printed broadsheet size


■ The booth was based around the content: newspapers

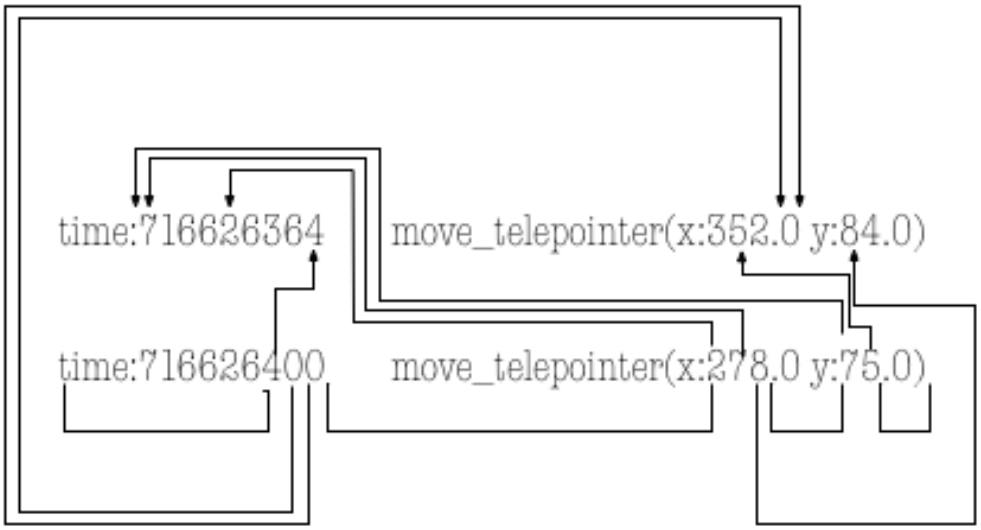
■ All of the materials were recycled or repurposed after the show's concusion

■ Visitors were given newspapers to take away, thus taking the display home with them

*Algorithms*

## GROUPWARE COMMUNICATION AND COMPRESSION

In multi-user systems (video games, instant messenger, shared workspaces) networks can become congested and the programs unusable. This compression algorithm find similarities between individual network messages and removes them. In tests, the technique was able to reduce the network traffic to less than 8% of the original load, a dramatic improvement in user experience.




■ The compression algorithm functioned by finding common passages between messages

Gutwin, C., Fedak, C., Watson, M., Bell, T., and Dyck, J. "Improving Network Efficiency in Real-Time Groupware with General Messagei Compression" ACM Conference on Computer-Supported Cooperative Work, 2006.

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*Psychology*

# CHILDREN AND PAIN SCALES

Pain scales were created to help sick or injured children communicate the level of their discomfort to medical practitioners. Children simply point to pictures of faces that correspond to their pain level. While a very common psychological technique, there has been some question of how effectively children estimate pain that others are in. In a study, their responses were recorded and analyzed by a computer system designed in cooperation with psychologists. The study found that of 185 children, over half answered with identifiable patterns. This indicated that they did not understand what was asked of them. The results demonstrate how computing can be used to aid psychologists in research by uncovering patterns that humans have difficulty identifying.

■ children selected their level of pain from this series of images

Von Baeyer, C., Forsyth, S., Stanford, E., Watson, M. and Chambers, C. "Response biases in preschool children's use of a pain scale: Are they really rating pain?" Accepted for , European Journal of Pain, 2008.

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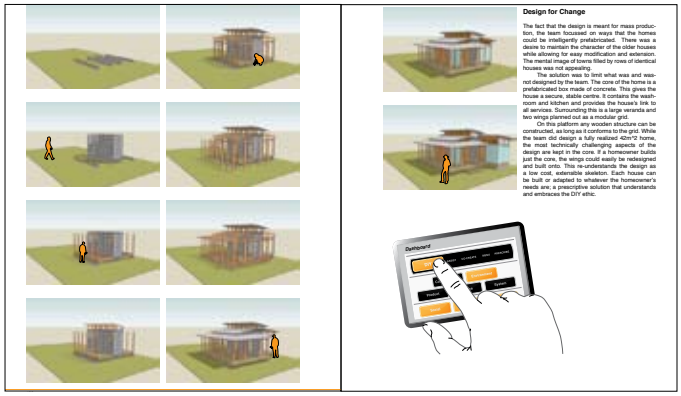
*Design Research*

# RESEARCH AND PLANNING BOOK

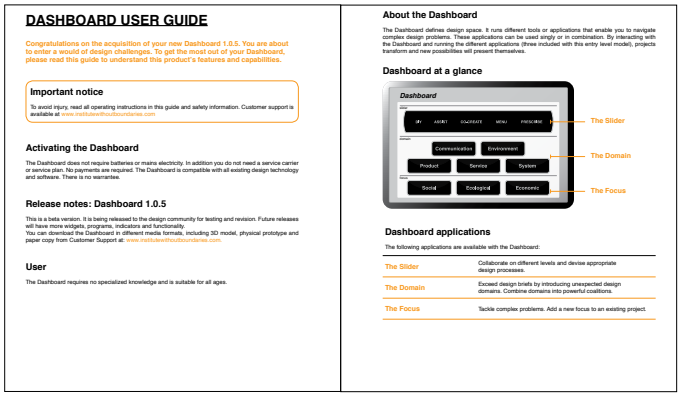
The Institute without Boundaries is exploring rural renewal and planning for the Government of Costa Rica. The design for the project is collected in a publication. The work is far reaching, covering subjects as diverse as how communities are maintained to economic models. To negotiate the complexities of encountered, a novel design theory, presented as a piece of technology, is used. The intent is to release the work mid-to-late 2008.




■ Spread on pre-fab housing design/construction


■ The cover of the publication, showing the fictional technology


■ An introductory spread on globalization




■ A portion of the fictional user guide for the design framework

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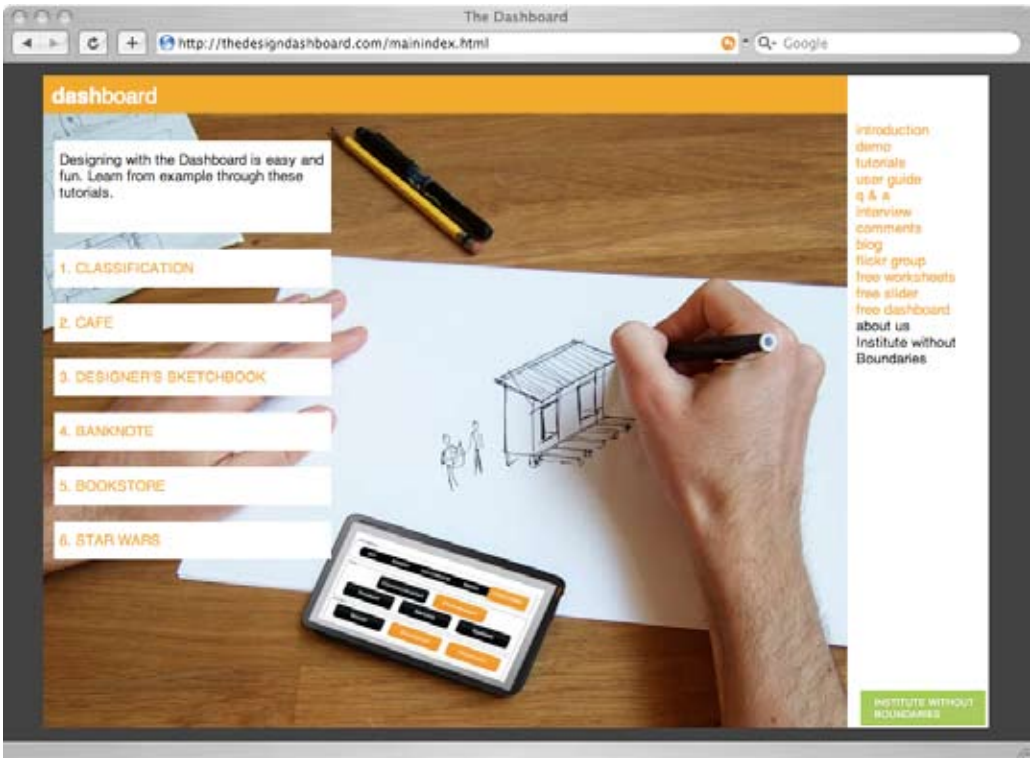
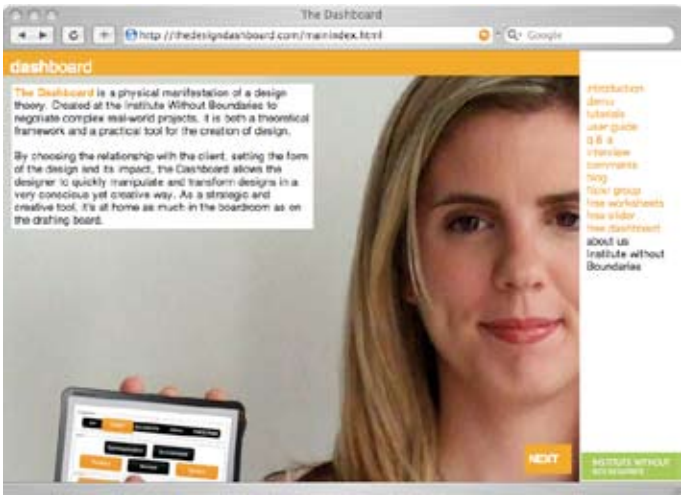
*Communication Design*

# WWW.THEDESIGNDASHBOARD.COM




■ Tutorials aid visitors in quickly understanding the sometimes complex ideas




■ By transforming theory into a product, it was much easier to explain and promote.

The Dashboard is a physical manifestation of a design theory. Created at the Institute Without Boundaries to negotiate complex real-world projects, it is both a theoretical framework and a practical tool for the creation of design.

The best way to promote the Dashboard to other designers was through a website. Full-featured, it contais an interactive, flash component, a blog, numerous free downloads (including worksheets, a user-manual, and STL files for rapid-prototypers), and tutorials. Further, it leveraged some Web 2.0 technologies to establish a forum for users of the tool to share ideas and experience.

Though it required product design, graphic design, illustration, copywriting, ideation, programming, web design, and more, the website was completed in a twenty day window of time by two people.

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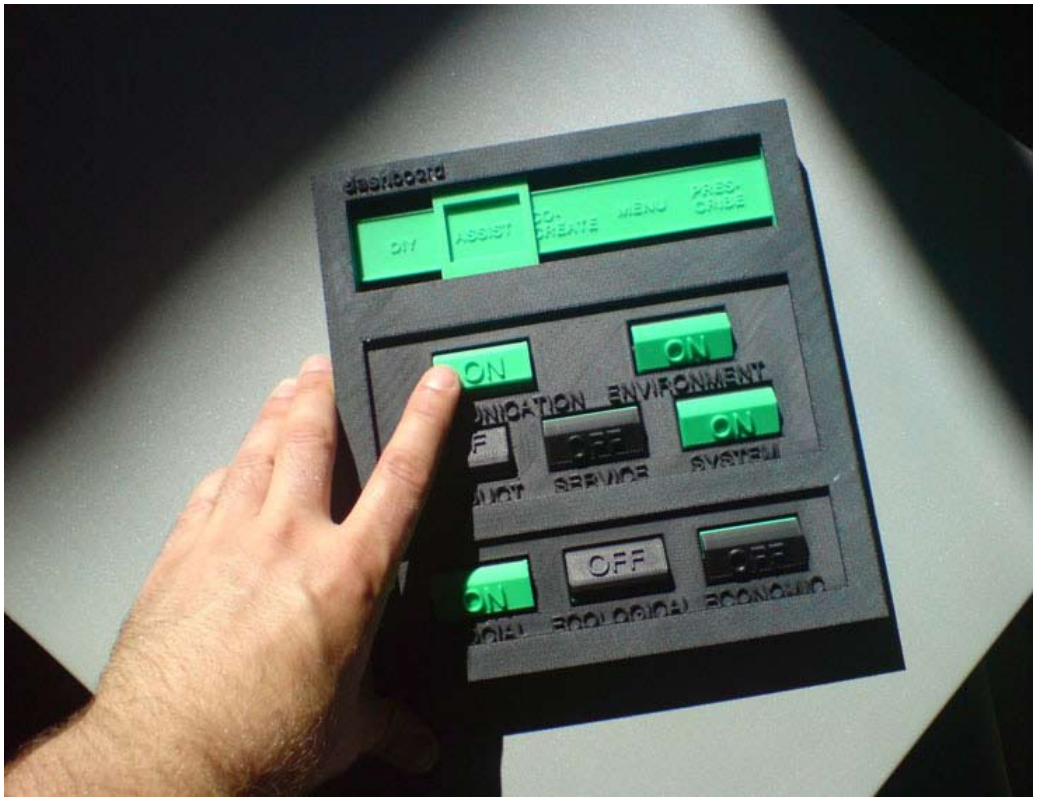
*Product Design*

# Analog Design Devices

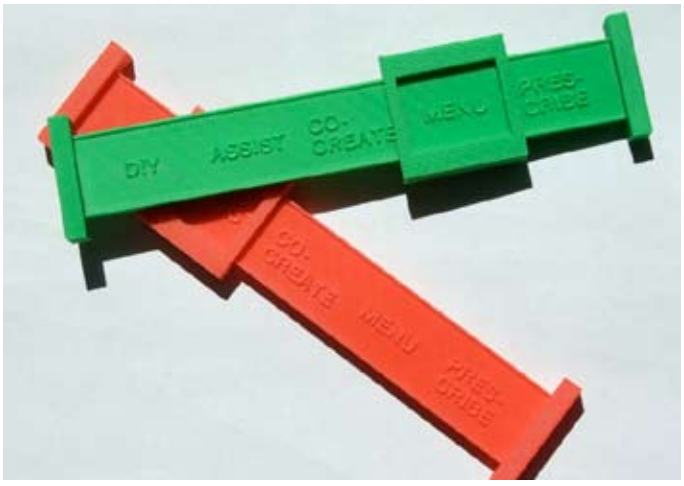
To better communicate a design theory, it was modeled as an interactive system. This was so successful, there were requests for a physical version.

Prototyped in free CAD software and built in a 3D-printer, the physical version captured the logical interaction of the digital interface in a tangible form.

The resulting product was an effective communication tool, a brainstorming aid, and just incredibly fun to play with.




■ The finished product, fresh from the rapid-prototyping machine.




■ Each component of the case could be removed and used independently.


■ To mimic on/off switches or buttons, multi-colored rollers were constructed.

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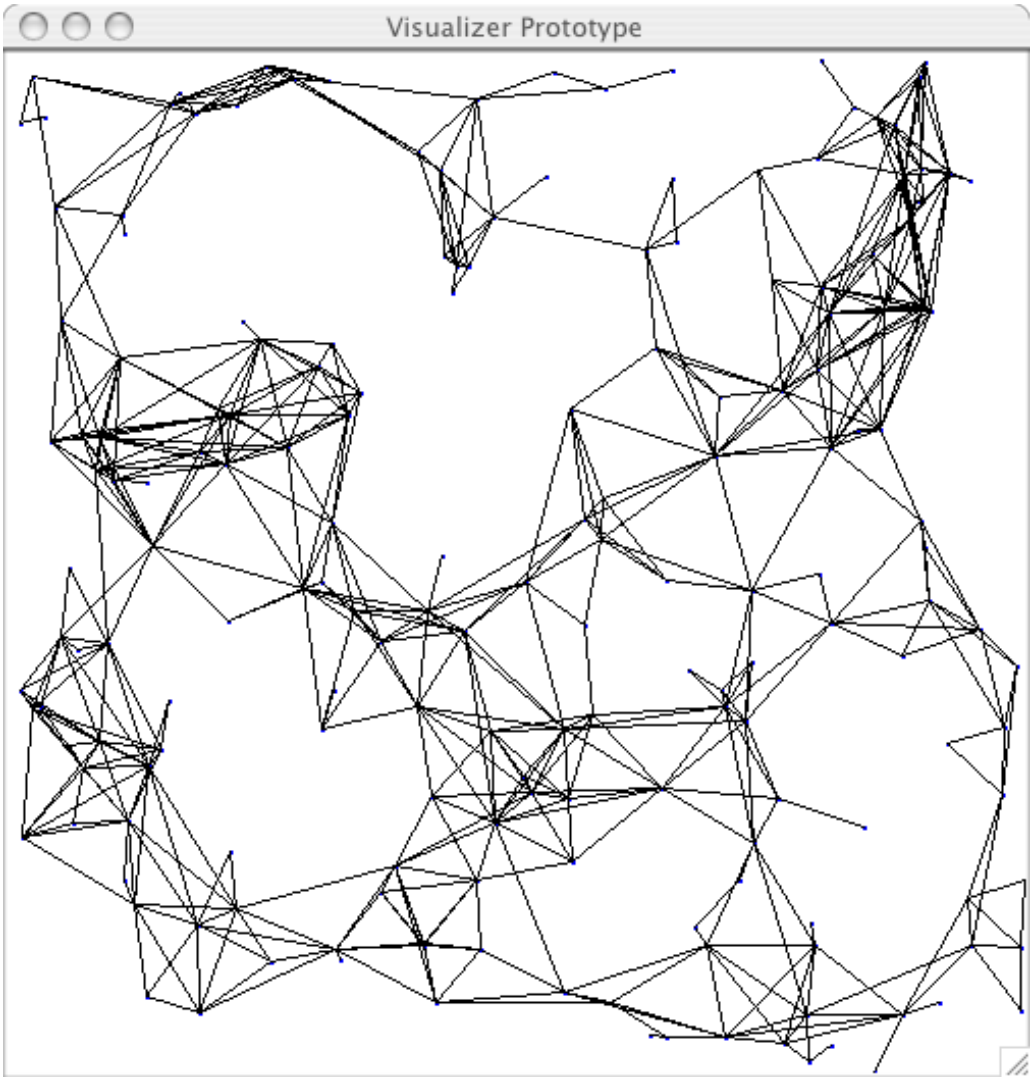
*Algorithms*

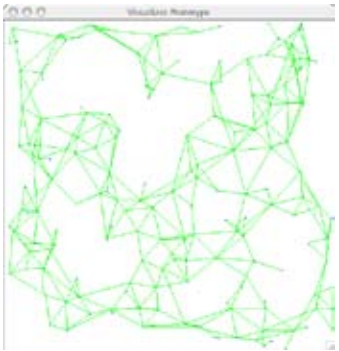
# GEOMETRIC AD-HOC WIRELESS ROUTING




Mobile phones, PDAs, and laptops are all fitted to be network capable. Using wireless receivers and transmitters, two devices can communicate if they are in range. This does not address how two devices far away from each other can communicate.

An example is a disaster zone where rescue workers are communicating via small wireless devices. If the workers' devices work together to send messages part of the way, then everyone will be able to communicate. This project tests a novel approach for wireless routing by developing an algorithm, visualizing it, and verifying it experimentally.

■ This interactive visualizer, written in Java, generated, displayed, and analyzed routing structures



Watson, M. "The Localized Delaunay Triangulation and Ad-Hoc Routing in Heterogeneous Environments," M.Sc. Thesis, Dec, 2005.

Watson, M. and Keil, J. "Routing Properties of the Localized Delaunay Triangulation over Heterogeneous Ad-Hoc Wireless Networks," In Proceedings of CGA'06 as part of The International Conference on Computer Science and its Applications 2006, LNCS 3980, pages 121-130, 2006.

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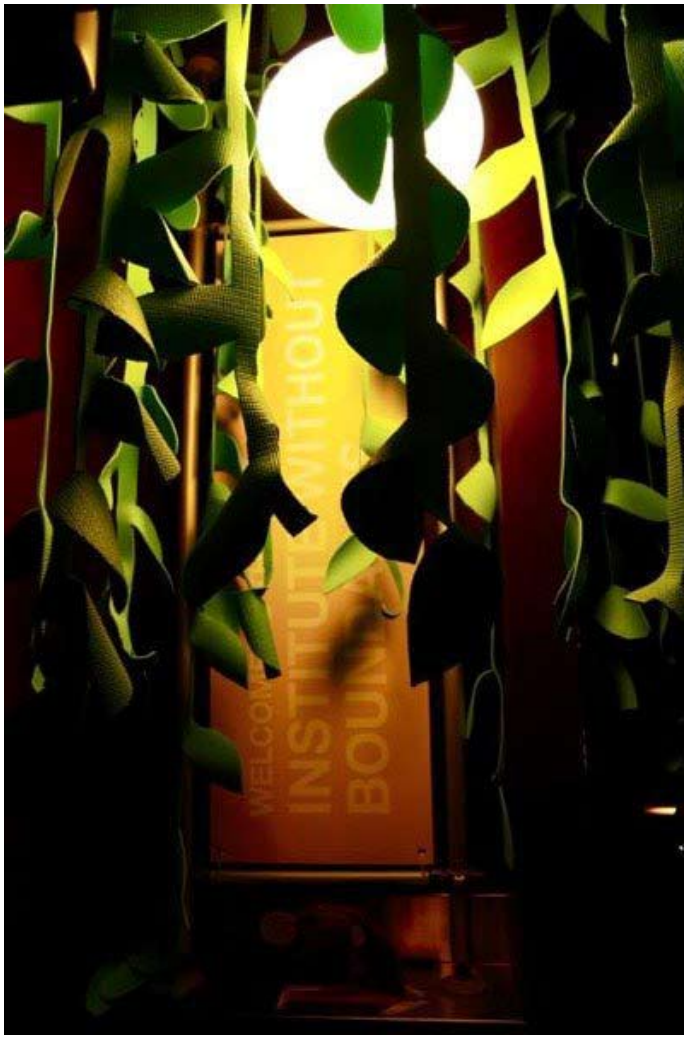
# EVENT MANAGEMENT

The Institute without Boundaries is run with a very tight budget. To help fund a research trip to Costa Rica, the institute threw a fundraiser in its studio. Themed around "transformation," the team converted the studio-space into a slightly surreal Costa Rican paradise. The one night event raised thousands of dollars and showcased the design school's unique approach to both work and play.

For promotion, managing the event required leading graphic design, writing email blasts, writing copy, and assembling donor packages. As an exercise in resource management, it required budgeting time and money, while directing a team of young designers.


■ Poster and sample signage from the event



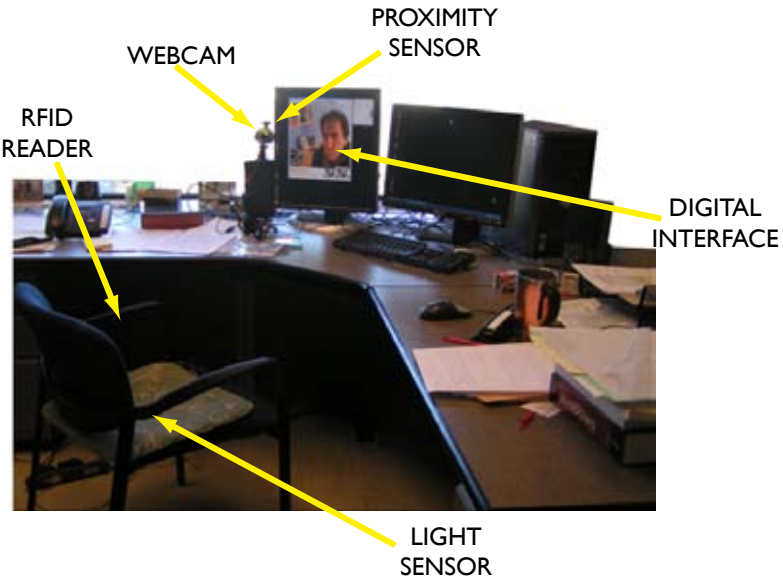
■ Entry-way with vines made from yoga mats


■ An email blast advertising the event


■ A variety of Costa Rica themed environments were created

# PHYSICAL VIDEO CONFERENCING

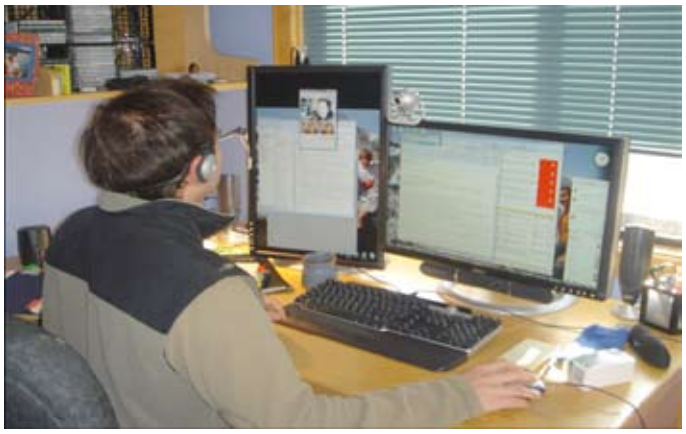
Video conferencing makes working from home easier but requires very different behaviors from meeting normally. This system enables people at the office to treat their teleconferencing co-workers like regular ones. You simply go to their office to talk with them. If they are available, their office door will be open. RFID tags in your clothing identify you when you take a seat at their desk. This places a call; they pick up, the cameras turn on, and you meet as usual.




■ The interfaces consisted of physical and digital components



■ Prototype of the digital interface for work and for home



■ The home office