Thursday at a Glance

	Hall B	Ballroom 201	Ballroom 202	Ballroom 203	Ballroom 204	A105-A106	C123-C124	B115-B116
09:00 to 10:30		**PAPERS** Small Devices 2	**PAPERS** Email and Security	**PAPERS** Public Life	**PAPERS/SHORT PAPERS** Social Behaviors/ Values & Design	**DESIGN EXPO** The Power of Design: Case Studies in Innovation	**SHORT PAPERS** Mobile HCI	**SIG** End Users Creating Effective Software
11:30 to 13:00	**INVITED PANEL** Can Usability Scale Up?	**PAPERS/ SHORT PAPERS** Display	**PAPERS/ SHORT PAPERS** Enhancing Virtual Spaces and Large Displays	**PAPERS/ SHORT PAPERS** Look	**PAPERS/ SHORT PAPERS** Papers on Presenting Papers	**SHORT PAPERS** Visual Feedback	**SHORT TALKS** Computer-Supported Collaborative Work	**SIG** Rapid User Centered Design Techniques
14:30 to 16:00		**PAPERS** Designing for and with Kids	**PAPERS** Educational Issues	**PAPERS** Understanding Users and Usage Patterns	**PAPERS/ SHORT PAPERS** Interruptions & Attention 2	**alt.chi** eksperience	**SHORT PAPERS** Ubiquitous Computing	**SIG** Designing Public Government Websites
16:30 to 18:00	**Closing Plenary – Hall B** Looking forward by looking back: early gestural interfaces for live electronic music composing and performance — a lecture concertante Michel Weisvisz							

THE COMMONS

POSTER HIGHLIGHT 2
10:30 – 11:30
Late Breaking Results

EXHIBITS OPEN
08:30 – 16:30

OTHER ACTIVITIES

INFORMATION BOOTH
08:30 – 16:30

REGISTRATION
08:00 – 14:00

RECRUITING BOARDS
08:30 – 16:30

09:00 - 10:30

PAPERS
Small Devices 2
Ballroom 201

Session Chair: Ben Bederson,
University of Maryland, USA

A Qualitative Cross-National Study of Cultural Influences on Mobile Data Service Design
Boreum Choi, Inseong Lee,
Jinwoo Kim,
Yonsei University, Korea
Yunsuk Jeon,
University of Helsinki, Finland

Learning User Interest for Image Browsing on Small-Form-Factor Devices
Xing Xie,
Microsoft Research Asia, China
Hao Liu,
Chinese University of Hong Kong, China
Simon Goumaz, Wei-Ying Ma,
Microsoft Research Asia, China

Summary Thumbnails: Readable Overviews for Small Screen Web Browsers
Heidi Lam,
University of British Columbia, Canada
Patrick Baudisch,
Microsoft Research, USA

PAPERS
Email and Security
Ballroom 202

Session Chair: Victoria Bellotti,
PARC, USA

Understanding Email Use: Predicting Action on a Message
Laura Dabbish, Robert E. Kraut,
Susan Fussell, Sara Kiesler,
Carnegie Mellon University, USA

How to Make Secure Email Easier to Use
Simson Garfinkel,
MIT CSAIL, USA
Jeffrey I. Schiller,
MIT Network Services, USA
David Margrave,
Amazon.com, USA

Designing Human Friendly Human Interaction Proofs, HIPs
Kumar Chellapilla, Kevin Larson,
Patrice Simard, Mary Czerwinski,
Microsoft Research, USA

= Best Paper Award Nominee

09:00 - 10:30

PAPERS
Public Life
Ballroom 203

Session Chair: Tom Erickson,
IBM TJ Watson Research Center, USA

Life on the Edge: Supporting Collaboration in Location-Based Experiences
Steve Benford, Duncan Rowland,
Martin Flintham, Adam Drozd,
University of Nottingham, UK
Richard Hull, Josephine Reid,
Hewlett-Packard Laboratories, UK
Jo Morrison, Keri Facer,
NESTA Futurelab, UK

Improving Orchestral Conducting Systems in Public Spaces: Examining the Temporal Characteristics and Conceptual Models of Conducting Gestures
Eric Lee, Marius Wolf, Jan Borchers,
RWTH Aachen University, Germany

Designing the Spectator Experience
Stuart Reeves, Steve Benford,
Clare O'Malley,
University of Nottingham, UK
Mike Fraser,
University of Bristol, UK

PAPERS/ SHORT PAPERS
Social Behaviors
Ballroom 204

Session Chair: Shelly Farnham,
Microsoft Research, USA

Values at Play: Design Tradeoffs in Socially-Oriented Game Design
Mary Flanagan,
Hunter College, USA
Daniel C. Howe, Helen Nissenbaum,
New York University, USA

Do People Trust Their Eyes More Than Ears? Media Bias While Seeking Expert Advice
Jens Riegelsberger, M. Angela Sasse,
John D. McCarthy,
University College London, UK

Homophily in Online Dating: When Do You Like Someone Like Yourself?
Andrew T. Fiore,
MIT Media Lab/University of California, Berkeley, USA

The Role of the Author in Topical Blogs
Scott Carter,
University of California, Berkeley, USA

Giving the Caller the Finger: Collaborative Responsibility for Cellphone Interruptions
Stefan Marti, Chris Schmandt,
MIT Media Lab, USA

DESIGN EXPO

The Power of Design: Case Studies in Innovation

A105-A106

Session Chairs: Aaron Marcus,
Aaron Marcus and Associates, USA
Julie Stanford,
Sliced Bread Design, USA

Unifying the Cisco Intranet through Hierarchical Navigation

Jim Beno, Michael Lenz,
Mathew Burns, Sharon Meaney,
Cisco Systems, USA

Use of Video in User Interfaces that Require Non-linguistic Cues

Sam Racine, Rachel Nilsson,
Unisys Corporation, USA

Advanced Technology for Streamlining the Creation of ePortfolio Resources and Dynamically-indexing Digital Library Assets: A Case Study from the Digital Chemistry Project

Alex Cuthbert, Mark Kubinec,
University of California, Berkeley, USA
David O. Tanis,
Grand Valley State University, USA
Fan Ieong, Lois Wei,
David Schlossberg,
University of California, Berkeley, USA

Tangible UIs for Media Control - Probes Into the Design Space

Andreas Butz,
University of Munich, Germany
Michael Schmitz,
Saarland University, Germany
Antonio Krüger,
Westfälische Wilhelms-Universität, Germany
Harald Hullmann,
Academy for Fine Arts and Design, Germany

SHORT PAPERS

Mobile HCI

C123-C124

Session Chair: Kai Richter,
Computer Graphics Center (ZGDV), Germany

TxtBoard: from text-to-person to text-to-home

Kenton O'Hara,
Hewlett-Packard Laboratories, UK
Richard Harper,
Microsoft Research, UK
Axel Unger, *IDEO, Germany*
James Wilkes, Bill Sharpe,
Marcel Jansen,
The Appliance Studio, UK

Parallel Worlds : Immersion in location-based experiences.

Josephine Reid, Erik Geelhoed,
Richard Hull,
Hewlett-Packard Laboratories, UK,
Kirsten Cater, Ben Clayton,
University of Bristol, UK

An Experiment in Discovering Personally Meaningful Places from Location Data

Changqing Zhou, Pamela Ludford,
Dan Frankowski, Loren Terveen,
University of Minnesota, USA

Effect of Location-Awareness on Rendezvous Behaviour

David Dearman, Kirstie Hawkey,
Kori Inkpen,
Dalhousie University, Canada

Imprints of Place: Creative Expressions of the Museum Experience

Kirsten Boehner, Jennifer Thom-Santelli, Angela Zoss, Geri Gay,
Tucker Barrett, Justin S. Hall,
Cornell University, USA

Mixed Interaction Space - Designing for Camera Based Interaction with Mobile Devices

Thomas Riisgaard Hansen,
Eva Eriksson,
University of Aarhus, Denmark
Andreas Lykke-Olesen,
Aarhus School of Architecture, Denmark

SIG

End Users Creating Effective Software

B115-B116

Brad A. Myers,
Carnegie Mellon University, USA

Margaret Burnett,
Oregon State University, USA

Mary Beth Rosson,
Pennsylvania State University, USA

11:30 - 13:00

INVITED SESSION
Debate: Can Usability Scale Up?
Hall B

Moderator: Aaron Marcus,
Aaron Marcus and Associates, USA

Jared Spool,
User Interface Engineering, USA

Eric Schaffer,
Human Factors International, USA

PAPERS/ SHORT PAPERS
Display
Ballroom 201

Session Chair: Dan Olsen, *BYU, USA*

mudibo: Multiple Dialog Boxes for Multiple Monitors
Dugald Hutchings, John Stasko,
Georgia Institute of Technology, USA

Multi-Monitor Mouse
Hrvoje Benko, Steven Feiner,
Columbia University, USA

Feature Congestion: A Measure of Display Clutter
Ruth Rosenholtz, Yuanzhen Li,
Jonathan Mansfield, Zhenlan Jin,
MIT, USA

Improving Revisitation in Fisheye Views with Visit Wear
Amy Skopik, Carl Gutwin,
University of Saskatchewan, Canada

11:30 - 13:00

PAPERS/ SHORT PAPERS
Enhancing Virtual Spaces and Large Displays
Ballroom 202

Session Chair: Daniel Russell,
IBM Almaden Research Center, USA

Martial Arts in Artificial Reality
Perttu Hämäläinen,
Helsinki University of Technology, Finland
Johanna Höysniemi,
University of Tampere, Finland
Tommi Ilmonen,
Helsinki University of Technology, Finland
Ari Nykänen, Mikki Lindholm,
Animaatiokone Industries Co-op, Finland

Spotlight: Directing Users' Attention on Large Displays
Azam Khan, Justin Matejka,
George Fitzmaurice,
Gordon Kurtenbach,
Alias, Canada

Modal Spaces: Spatial Multiplexing to Mediate Direct-Touch Input on Large Displays
Katherine Everitt,
MERL/University of Washington, USA
Chia Shen, Kathy Ryall,
Clifton Forlines, *MERL, USA*

Chit Chat Club: Bridging the Virtual and Physical Space for Social Interaction
Karrie G. Karahalios,
University of Illinois, USA
Kelly Dobson,
MIT Media Lab, USA

PAPERS/ SHORT PAPERS
Look
Ballroom 203

Session Chair: Maria Stone,
Google, USA

MultiView: Spatially Faithful Group Video Conferencing
David Tong Nguyen, John Canny,
University of California, Berkeley, USA

Media EyePliances: Using Eye Tracking for Remote Control Focus Selection of Appliances
Roel Vertegaal, Aadil Mamuji,
Daniel Cheng, Changuk Sohn,
Queen's University, Canada

WebGazeAnalyzer: A System for Capturing and Analyzing Web Reading Behavior Using Eye Gaze
David Beymer, Daniel M. Russell,
IBM Almaden Research Center, USA

PAPERS/ SHORT PAPERS

Papers on Presenting Papers

Ballroom 204

Session Chair: Ken Hinckley,
Microsoft Research, USA

Less Visible and Wireless: Two Experiments on the Effects of Microphone type on Users' Performance and Perception
Clifford Nass, Jane Wang,
Stanford University, USA

Digital Backchannels in Shared Physical Spaces: Experiences at an Academic Conference
Joseph McCarthy,
Interrelativity, USA
danah boyd,
University of California, Berkeley, USA

Virtual Rear Projection: Do Shadows Matter?
Jay Summet, Gregory Abowd,
Gregory Corso, James Rehg,
Georgia Institute of Technology, USA

SHORT PAPERS

Visual Feedback

A105-A106

Session Chair: Patrick Baudisch,
Microsoft Research, USA

A Transformation Strategy for Multi-Device Menus and Toolbars
Kai Richter,
Computer Graphics Center, Germany

Dynamic dimensional feedback: An interface aid to business rule creation
Sharon Greene,
IBM T.J. Watson Research Center, USA
Tracy Lou,
Stanford University, USA
Paul Matchen, *I*
BM T.J. Watson Research Center, USA

Flexible Timeline User Interface using Constraints
Kazutaka Kurihara,
The University of Tokyo, Japan
David Vronay,
Microsoft Research Asia, China
Takeo Igarashi,
The University of Tokyo, Japan

Impact of Progress Feedback on Task Completion: First Impressions Matter
Frederick Conrad, Mick Couper,
Roger Tourangeau, Andrey Peytchev,
University of Michigan, USA

Benefits of Animated Scrolling
Christian Klein, Benjamin Bederson,
University of Maryland, College Park, USA

A Logic Block Enabling Logic Configuration by Non-Experts in Sensor Networks
Susan Cotterell, Frank Vahid,
University of California, Riverside, USA

SHORT PAPERS

Computer-Supported Collaborative Work

C123-C124

Session Chair: Elizabeth Churchill,
PARC, USA

Traveling Blues: The Effect of Relocation on Partially Distributed Teams
Nathan Bos, Judith Olson,
Arik Cheshin, Yong-Suk Kim,
Ning Nan,
University of Michigan, USA

Privacy Gradients: Exploring ways to manage incidental information during co-located collaboration
Kirstie Hawkey, Kori Inkpen,
Dalhousie University, Canada

Project View IM: A Tool for Juggling Multiple Projects and Teams.
Peter Scupelli, Sara Kiesler,
Susan Fussell, Congrui Chen,
Carnegie Mellon University, USA

eyeView: Focus+Context Views for Large Group Video Conferences
Tracy Jenkin, Jesse McGeachie,
Roel Vertegaal,
Queen's University, Canada

Beyond Being in the Lab: Using Multi-Agent Modeling to Isolate Competing Hypotheses
Ning Nan, Erik Johnston,
Judith Olson, Nathan Bos,
University of Michigan, USA

A Meeting Browser Evaluation Test
Pierre Wellner, Mike Flynn,
IDIAP Research Institute, Switzerland
Simon Tucker, Steve Whittaker,
University of Sheffield, UK

SIG

Rapid User Centered Design Techniques: Challenges and Solutions

B115-B116

Karen Holtzblatt,
InContext Enterprises, USA

Joerg Beringer,
SAP, Germany

Lisa Baker,
LANDesk, USA

PAPERS
Designing for and with Kids
Ballroom 201

Session Chair: Kori Inkpen,
Dalhousie University, Canada

Children and Emerging Wireless Technologies: Investigating the Potential for Spatial Practice
Morris Williams,
University of the West of England, UK
Constance Fleuriot,
University of Bristol, UK
Owain Jones,
University of Exeter, UK
Lucy Wood,
Ordnance Survey, UK

Testing the Media Equation with Children
Sonia Chiasson, Carl Gutwin,
University of Saskatchewan, Canada

Camera Talk: Making the Camera a Partial Participant
K.K. Lamberty, Janet Kolodner,
Georgia Institute of Technology, USA

PAPERS
Educational Issues
Ballroom 202

Session Chair: John Canny,
University of California, Berkeley, USA

The Syntax or the Story Behind It? A Usability Study of Student Work with Computer-Based Programming Environments in Elementary Science
Loucas Louca,
University of Cyprus, Cyprus

Extending Tangible Interfaces for Education: Digital Montessori-Inspired Manipulatives
Oren Zuckerman,
MIT Media Laboratory, USA
Saeed Arida,
MIT, USA
Mitchel Resnick,
MIT Media Laboratory, USA

Effectiveness of End-User Debugging Software Features: Are There Gender Issues?
Laura Beckwith, Margaret Burnett,
Oregon State University, USA
Susan Wiedenbeck,
Drexel University, USA
Curtis Cook, Shraddha Sorte,
Michelle Hastings,
Oregon State University, USA

PAPERS
Understanding Users and Usage Patterns
Ballroom 203

Session Chair: Robin Jeffries,
Sun Microsystems, USA

Patterns of Media Use in and Activity Centric Collaborative Environment
David R Millen, Michael J. Muller,
Werner Geyer, Eric Wilcox,
Elizabeth Brownholtz,
IBM T.J. Watson Research Center, USA

Assessing Differential Usage of Usenet Social Accounting Meta-Data
A.J. Bernheim Brush,
Microsoft Research, USA
Xiaoqing Wang,
University of Pittsburgh, USA
Tammara Combs Turner,
Marc A. Smith,
Microsoft Research, USA

When Participants Do the Capturing: The Role of Media in Diary Studies
Scott Carter,
University of California, Berkeley, USA
Jennifer Mankoff,
Carnegie Mellon University, USA

PAPERS/ SHORT PAPERS
Interruptions and Attention 2: Attending to Interruptions
Ballroom 204

Session Chair: John Tang,
IBM Almaden Research Center, USA

Using Context-Aware Computing to Reduce the Perceived Burden of Interruptions from Mobile Devices
Joyce Ho, Stephen S. Intille,
MIT, USA

Interaction in 4-Second Bursts: The Fragmented Nature of Attentional Resources in Mobile HCI
Antti Oulasvirta,
Helsinki Institute for Information Technology, Finland
Sakari Tamminen,
Helsinki University of Technology, Finland
Virpi Roto,
Nokia Research Center, Finland
Jaana Kuorelahti,
Helsinki University of Technology, Finland

A Study on the Use of Semaphoric Gestures to Support Secondar y Task Interactions
Maria Karam, m.c. schraefel,
University of Southampton, UK

Augmented Reading: Presenting Additional Information Without Penalty
Eric Bahna,
Microsoft Corporation, USA
Rob Jacob,
Tufts University, USA

alt.chi
eksperience
A105-A106

Venue Chairs: Andrew Duchowski, *Clemson University, USA;* Roel Vertegaal, *Queens University, Canada*

Attention-Based Design of Augmented Reality Interfaces
Leonardo Bonnanni, Chia-Hsun Lee, Ted Selker, *MIT Media Laboratory, USA*

"It's Just a Method!": A pedagogical experiment in interdisciplinary design
Steven Harrison, *Virginia Tech, USA* Maribeth Back, *USA*

Engaging Augmented Reality in Public Places
Stuart Reeves, *University of Nottingham, UK* Mike Fraser, *University of Bristol, UK* Holger Schnadelbach, Claire O'Malley, Steve Benford, *University of Nottingham, UK*

Innovative User Experience Design: Two Case Studies of Commercial Success
David Gilmore, *IDEO, USA*

SHORT PAPERS
Ubiquitous Computing
C123-C124

Session Chair: Louise Barkhuus, *University of Glasgow, UK*

Reach: Dynamic Textile Patterns for Communication and Social Expression
Margot Jacobs, Linda Worbin, *Interactive Institute Play Studio, Sweden*

Experience Buffers: A Socially Appropriate, Selective Archiving Tool for Evidence-Based Care
Gillian Hayes, Khai Truong, Gregory Abowd, *Georgia Tech*, USA Trevor Pering, *Intel Research, USA*

Indexing Unstructured Activities with Peripheral Cues
Heather Richter, Andrew Skaggs, Gregory Abowd, *Georgia Tech, USA*

Breakaway: An Ambient Display Designed to Change Human Behavior
Nassim Jafarinaimi, Jodi Forlizzi, Amy Hurst, John Zimmerman, *Carnegie Mellon University, USA*

A Living Laboratory for the Design and Evaluation of Ubiquitous Computing Technologies
Stephen S. Intille, Kent Larson, Jennifer S. Beaudin, Jason Nawyn, Emmanuel Munguia Tapia, Pallavi Kaushik, *MIT, USA*

The Domestic Economy: a Broader Unit of Analysis for End User Programming
Jennifer A. Rode, *University of California, Irvine, USA;* Eleanor F. Toye, *Intel Research Cambridge, UK;* Alan F. Blackwell, *University of Cambridge, UK*

SIG
Designing Public Government Websites
B115-B116

Juan Pablo Hourcade, *US Census Bureau, USA*

Jean E. Fox, *US Bureau of Labor Statistics, USA*

16:30 - 18:00

CLOSING PLENARY

Hall B

Looking Forward by Looking Back: Early Gestural Interfaces for Live Electronic Music Composing and Performance

a lecture concertante

Michel Waisvisz
STEIM Foundation, The Netherlands

At present the future of human computer interfacing is coming from a relatively short and largely unwritten history. It's a good moment for an early look back, and to find leads for future developments. Waisvisz will present observations on early interfaces he designed for music and music theater practice, and will play and demonstrate some of these instruments.

The precision and complexity of musical perception puts high demands on interfaces for music performance; the relatively simple and sometimes home built solutions Waisvisz applied to the field have proven to be very effective and reliable in a performance practice of about 35 years.

The hearing and appreciation of music runs via an extremely refined sonic perception of timing and layering of sound events. The performer's minute changes in tempo and dynamics induce into the receptive and sensitive body/mind of the listener/dancer a sensation of musical 'grooves' and 'streams'. To achieve this the instruments that convey the performer's intentions and musical drives need to allow for: high sensitivity, immediacy, repeatability/reliability, fast interaction loops, intuitive physical interaction with complex data fields and for mastering of effort management (ergonomics being replaced by consciously designing for physical effort in order to increase musical tension).

Augmented Reading: Presenting Additional Information Without Penalty
Eric Bahna,
Microsoft Corporation, USA
Rob Jacob,
Tufts University, USA

We present a new interaction technique for computer-based reading tasks. Our technique leverages users? peripheral vision as a channel for information transfer by using a video projector along with a computer monitor. In our experiment, users of our system acquired significantly more information than did users in the control group. The results indicate that our technique conveys extra information to users nearly "for free," without adversely affecting their comprehension or reading times.

Effectiveness of End-User Debugging Software Features: Are There Gender Issues?
Laura Beckwith, Margaret Burnett, *Oregon State University, USA;* Susan Wiedenbeck, *Drexel University, USA;* Curtis Cook, Shraddha Sorte, Michelle Hastings, *Oregon State University, USA*

Although gender differences in a technological world are receiving significant research attention, much of the research and practice has aimed at how society and education can impact the successes and retention of female computer science professionals - but the possibility of gender issues within software has received almost no attention. If gender issues exist with some types of software features, it is possible that accommodating them by changing these features can increase effectiveness, but only if we know what these issues are. In this paper, we empirically investigate gender differences for end users in the context of debugging spreadsheets. Our results uncover significant gender differences in self-efficacy and feature acceptance, with females exhibiting lower self-efficacy and lower feature acceptance. The results also show that these differences can significantly reduce females' effectiveness.

Life on the Edge: Supporting Collaboration in Location-Based Experiences
Steve Benford, Duncan Rowland, Martin Flintham, Adam Drozd, *University of Nottingham, UK*
Richard Hull, Josephine Reid, *Hewlett-Packard Laboratories, UK*
Jo Morrison, Keri Facer, *NESTA Futurelab, UK*

We study a collaborative location-based game in which groups of "lions" hunt together on a virtual savannah that is overlaid on an open playing field. The game implements a straightforward approach to location-based triggering in which players must be in the same spatial locale in order to share information and act together. Comparison of video recordings of physical play with system recordings of game events reveals subtle and complex interactions between highly dynamic player behavior and the underlying technology. While players exhibit a fluid approach to group formation, the system embodies a more rigid view, leading to difficulties with sharing context and coordinating actions, most notably when groups of players span virtual locale boundaries or initiate actions while on the move. We propose techniques for extending locales to support more flexible grouping and also discuss the broader implications of our findings for location-based applications in general.

Assessing Differential Usage of Usenet Social Accounting Meta-Data
A.J. Bernheim Brush,
Microsoft Research, USA
Xiaoqing Wang,
University of Pittsburgh, USA
Tammara Combs Turner, Marc A. Smith,
Microsoft Research, USA

We describe a usage study of Netscan\Tech, a system that generates and publishes daily a range of social metrics across three dimensions: newsgroup, author, and thread, for a set of approximately 15,000 technical newsgroups in Usenet. We bring together three interlinked datasets: survey data, usage log data and social accounting data from Usenet participation, to triangulate the relationship between various user roles and differential usage of social metrics in Netscan\Tech. We found our most frequent users focused on information related to individual authors far more than any other information provided. In contrast, users that visited less frequently focused more on information related to newsgroups and viewing newsgroup metrics. Our results suggest features that designers and developers of online communities may wish to include in their interfaces to support the cultivation of different community roles.

WebGazeAnalyzer: A System for Capturing and Analyzing Web Reading Behavior Using Eye Gaze

David Beymer, Daniel M. Russell, *IBM Almaden Research Center, USA*

Capturing and analyzing the detailed eye movements of a user while reading a web page can reveal much about the ways in which web reading occurs. The WebGazeAnalyzer system described here is a remote-camera system, requiring no invasive head-mounted apparatus, giving test subjects a normal web use experience when performing web-based tasks. While many such systems have been used in the past to collect eye gaze data, WebGazeAnalyzer brings together several techniques for efficiently collecting, analyzing and re-analyzing eye gaze data. We briefly describe techniques for overcoming the inherent inaccuracies of such apparatus, illustrating how we capture and analyze eye gaze data for commercial web design problems. Techniques developed here include methods to group fixations along lines of text, and reading analysis to measure reading speed, regressions, and coverage of web page text.

When Participants Do the Capturing: The Role of Media in Diary Studies

Scott Carter, *University of California, Berkeley, USA;* Jennifer Mankoff, *Carnegie Mellon University, USA*

In this paper, we investigate how the choice of media for capture and access affects the diary study method. The diary study is a method of understanding participant behavior and intent in situ that minimizes the effects of observers on participants. We first situate diary studies within a framework of field studies and review related literature. We then report on three diary studies we conducted that involve photographs, audio recordings, location information and tangible artifacts. We then analyze our findings, specifically addressing the following questions: How do context information and episodic memory prompts captured by participants vary with media? In what way do different media "jog" memory? How do different media affect the diary study process? These questions are particularly important for diary studies because they can be especially useful as compared to other methods when a participant intends to do an action but does not or when actions are particularly difficult to sense. We also built and tested a tool based on participant and researcher frustrations with the method. Our contribution includes suggested modifications to traditional diary techniques that enable annotation and review of captured media; a new variation on the diary study appropriate for researchers using digital capture media; and a lightweight tool to support it, motivated by past work and findings from our studies.

Designing Human Friendly Human Interaction Proofs, HIPs

Kumar Chellapilla, Kevin Larson, Patrice Simard, Mary Czerwinski, *Microsoft Research, USA*

HIPs, or Human Interactive Proofs, are challenges meant to be easily solved by humans, while remaining too hard to be economically solved by computers. HIPs are increasingly used to protect services against automatic script attacks. To be effective, a HIP must be difficult enough to discourage script attacks by raising the computation and/or development cost of breaking the HIP to an unprofitable level. At the same time, the HIP must be easy enough to solve in order to not discourage humans from using the service. Early HIP designs have successfully met these criteria [1]. However, the growing sophistication of attackers and correspondingly increasing profit incentives have rendered most of the currently deployed HIPs vulnerable to attack [2,7,12]. Yet, most companies have been reluctant to increase the difficulty of their HIPs for fear of making them too complex or unappealing to humans. The purpose of this study is to find the visual distortions that are most effective at foiling computer attacks without hindering humans. The contribution of this research is that we discovered that 1) automatically generating HIPs by varying particular distortion parameters renders HIPs that are too easy for computer hackers to break, yet humans still have difficulty recognizing them, and 2) it is possible to build segmentation-based HIPs that are extremely difficult and expensive for computers to solve, while remaining relatively easy for humans.

Testing the Media Equation with Children

Sonia Chiasson, Carl Gutwin, *University of Saskatchewan, Canada*

Designers of children's technology are often more interested in user motivation than those who design systems for adults. Since children's technology often has aims such as education or practice, keeping the user engaged and interested is an important objective. The Media Equation - the idea that people respond socially to computers - shows potential for improving engagement and motivation. Studies have shown that people are more positive about both themselves and the computer when software exhibits certain social characteristics. To explore the possible value of the Media Equation as a design concept for children's software, we replicated two of the original Media Equation studies, concerning the effects of praise and team formation. Our results, however, were contrary to our expectations: we did not find evidence that children were significantly affected by social characteristics in software, and adults were influenced in only a few cases. These results raise questions about using the Media Equation as a design principle for children's software.

A Qualitative Cross-National Study of Cultural Influences on Mobile Data Service Design

Boreum Choi, Inseong Lee, Jinwoo Kim, *Yonsei University; Korea* Yunsuk Jeon, *University of Helsinki, Finland*

As the use of mobile data services has spread across the globe, the effect of cultural differences on user requirements has become important issue. To date, however, little research has been conducted on the role cultural factors play in the design of mobile data services. This paper proposes a set of critical design attributes for mobile data services that takes cross-cultural differences into account. To determine these attributes, we devised a qualitative method and conducted in-depth long interviews in Korea, Japan, and Finland. We found 52 attributes considered important by mobile data service users, and 11 critical attributes that showed a clear correlation with characteristics of the user's culture. The paper concludes with a discussion of limitations and of implications for developers of mobile data services.

Understanding Email Use: Predicting Action on a Message

Laura Dabbish, Robert E. Kraut, Susan Fussell, Sara Kiesler, *Carnegie Mellon University, USA*

Email consumes significant time and attention in the workplace. We conducted an organizational survey to understand how and why people attend to incoming email messages. We examined people's ratings of message importance and the actions they took on specific email messages, based on message characteristics and characteristics of receivers and senders. Respondents kept half of their new messages in the inbox and replied to about a third of them. They rated messages as important if they were about work and required action. Importance, in turn, had a modest impact on whether people replied to their incoming messages and whether they saved them. The results indicate that factors other than message importance (e.g., their social nature) also determine how people handle email. Overall, email usage reflects attentional differences due both to personal propensities and to work demands and relationships.

Values at Play: Design Tradeoffs in Socially-Oriented Game Design

Mary Flanagan, *Hunter College, USA;* Daniel C. Howe, Helen Nissenbaum, *New York University, USA*

Significant work in the CHI community has focused on designing systems that support human values. Designers and engineers have also become increasingly aware of ways in which the artifacts they create can embody political, social, and ethical values. Despite such an awareness, there has been little work towards producing practical methodologies that systematically incorporate values into the design process. Many designers struggle to find a balance between their own values, those of users and other stakeholders, and those of the surrounding culture. In this paper, we present the RAPUNSEL project as a case study of game design in a values-rich context and describe our efforts toward navigating the complexities this entails. Additionally, we present initial steps toward the development of a systematic methodology for discovery, analysis, and integration of values in technology design in the hope that others may both benefit from and build upon this work.

How to Make Secure Email Easier to Use

Simson Garfinkel,
MIT CSAIL, USA
Jeffrey I. Schiller,
MIT Network Services, USA
David Margrave,
Amazon.com, USA

Cryptographically protected email has a justly deserved reputation of being difficult to use. Based on an analysis of the PEM, PGP and S/MIME standards and a survey of 470 merchants who sell products on Amazon.com, we argue that the vast majority of Internet users can start enjoying digitally signed email today. We present suggestions for the use of digitally signed mail in e-commerce and simple modifications to webmail systems that would significantly increase integrity, privacy and authorship guarantees that those systems make. We then show how to use the S/MIME standard to extend such protections Internet-wide. Finally, we argue that software vendors must make minor changes to the way that mail clients store email before unsophisticated users can safely handle mail that is sealed with encryption.

Using Context-Aware Computing to Reduce the Perceived Burden of Interruptions from Mobile Devices

Joyce Ho, Stephen S. Intille, *MIT, USA*

The potential for sensor-enabled mobile devices to proactively present information when and where users need it ranks among the greatest promises of ubiquitous computing. Unfortunately, mobile phones, PDAs, and other computing devices that compete for the user's attention can contribute to interruption irritability and feelings of information overload. Designers of mobile computing interfaces, therefore, require strategies for minimizing the perceived interruption burden of proactively delivered messages. In this work, a context-aware mobile computing device was developed that automatically detects postural and ambulatory activity transitions in real time using wireless accelerometers. This device was used to experimentally measure the receptivity to interruptions delivered at activity transitions relative to those delivered at random times. Messages delivered at activity transitions were found to be better received, thereby suggesting a viable strategy for context-aware message delivery in sensor-enabled mobile computing devices.

Martial Arts in Artificial Reality

Perttu Hämäläinen,
Helsinki University of Technology, Finland
Johanna Höysniemi,
University of Tampere, Finland
Tommi Ilmonen, *H*
elsinki University of Technology, Finland
Ari Nykänen, Mikki Lindholm,
Animaatiokone Industries Co-op, Finland

This paper presents Kick Ass Kung-Fu, a martial arts game installation where the player fights virtual enemies with kicks and punches as well as acrobatic moves such as cartwheels. Using real-time image processing and computer vision, the video image of the user is embedded inside 3D graphics. Compared to previous work, our system uses a profile view and two displays, which allows an improved view of many martial arts techniques. We also explore exaggerated motion and dynamic slow-motion effects to transform the aesthetic of kung-fu movies into an interactive, embodied experience. The system is described and analyzed based on results from testing the game in a theater, in a television show, and in a user study with 46 martial arts practitioners.

Chit Chat Club: Bridging the Virtual and Physical Space for Social Interaction

Karrie G. Karahalios, *University of Illinois, USA;* Kelly Dobson, *MIT Media Lab, USA*

In this work, we create an audio-video link via an interactive sculpture to facilitate casual, sociable communication between two remote spaces. This communication installation was designed to blend the benefits of online interaction such as low risk interaction, lower barriers to entry, and minimized geographical constraints with the ease and the affordances of interacting and signalling in physical space. We describe the creation and the iterative design process for creating a social virtual-physical hybrid space-interface we call the Chit Chat Club. In describing our design decisions, we note the advantages and disadvantages of two Chit Chat Club installations and their effect on interaction.

A Study on the Use of Semaphoric Gestures to Support Secondary Task Interactions

Maria Karam, m.c. schraefel, *University of Southampton, UK*

We present results of a study that considers (a) gestures outside the context of a specific implementation and (b) their use in supporting secondary, rather than primary tasks in a multitasking environment. The results show semaphoric gestures offer significant benefits over function keys in such interactions, and how our findings can be used to extend models of design and evaluation for ubiquitous computing environments that support multitasking.

Spotlight: Directing Users' Attention on Large Displays

Azam Khan, Justin Matejka, George Fitzmaurice, Gordon Kurtenbach,
Alias, Canada

We describe a new interaction technique, called a spotlight, for directing the visual attention of an audience when viewing data or presentations on large wall-sized displays. A spotlight is simply a region of the display where the contents are displayed normally while the remainder of the display is somewhat darkened. In this paper we define the behavior of spotlights, show unique affordances of the technique, and discuss design characteristics. We also report on experiments that show the benefit of using the spotlight a large display and standard desktop configuration. Our results suggest that the spotlight is preferred over the standard cursor and outperforms it by a factor of 3.4 on a wall-sized display.

Summary Thumbnails: Readable Overviews for Small Screen Web Browsers

Heidi Lam, *University of British Columbia, Canada;* Patrick Baudisch, *Microsoft Research, USA*

In order to display web pages designed for desktop-sized monitors, some small-screen web browsers provide single-column or thumbnail views. Both have limitations. Single-column views affect page layouts and require users to scroll significantly more. Thumbnail views tend to reduce contained text beyond readability, so differentiating visually similar areas requires users to zoom. In this paper, we present Summary Thumbnails - thumbnail views enhanced with readable text fragments. Summary Thumbnails help users identify viewed material and distinguish between visually similar areas. In our user study, participants located content in web pages about 41% faster and with 71% lower error rates when using the Summary Thumbnail interface than when using the Single-Column interface, and zoomed 59% less than when using the Thumbnail interface. Nine of the eleven participants preferred Summary Thumbnails over both the Thumbnail and Single-Column interfaces.

Camera Talk: Making the Camera a Partial Participant

K.K. Lamberty, Janet Kolodner, *Georgia Institute of Technology, USA*

In this paper, we describe how encouraging children to talk to the camera can structure their behavior and provide them opportunity for reflection. Encouraging "camera talk," interactions directed at the camera, can effectively elicit verbal comments from children participants. We describe a study in which children participants were told that they could tell the camera anything they wanted to about the designs they were making using a piece of educational software, but not to behave in a disruptive manner for the camera. By allowing children to interact with the camera in a particular way, rather than encouraging them to ignore its presence, we were able to elicit information about some children's design activities, thoughts, and struggles. The camera became an integral part of the socio-technical system for some children. This method may be useful to researchers interested in what children are thinking about in-the-moment as they work with software.

Improving Orchestral Conducting Systems in Public Spaces: Examining the Temporal Characteristics and Conceptual Models of Conducting Gestures
Eric Lee, Marius Wolf, Jan Borchers, *RWTH Aachen University, Germany*

Designing interactive conducting exhibits for public spaces poses unique challenges, primarily because the conceptual model of conducting music varies amongst users. In a user study, we compared how conductors and non-conductors place their beats when conducting to a fixed orchestral recording of Radetzky March, and found significant differences between these two groups. Conductors lead the actual music beat with their gestures by an average of 150 ms, compared to 50 ms for non-conductors; non-conductors also vary their placement of the beat 50% more than conductors. Furthermore, we found differences in how users conceptually mapped their gestures to the music, such as conducting to the musical rhythm rather than to the beat. We are incorporating these results into an upcoming conducting system for public spaces to increase its usability; we believe they also apply to a more general class of musical gestures such as dance.

The Syntax or the Story Behind It? A Usability Study of Student Work with Computer-Based Programming Environments in Elementary Science
Loucas Louca, *University of Cyprus, Cyprus*

This is a descriptive case study investigating the use of two computer-based programming environments (CPEs), MicroWorldsTM Logo (MW) and Stagecast CreatorTM (SC) for collaborative scientific modeling. The purpose of the study was to investigate and comparatively describe student approaches to scientific modeling through the use of textual or graphical program languages (PL). I analyzed student activities and conversations in two after-school clubs, one working with MW and the other with SC, using contextual inquiry, analysis of student conversation and artifact analysis. The findings suggest that student work with CPEs differed between different PL. Students used SC to create games (focusing on the overall story) whereas MW students used MW through a frame of formal programming. Programming in SC was much easier than MW, whereas reading code in MW was more tangible. Findings suggest that differences in student approaches to scientific modeling through programming need to be considered by educators seeking to engage students in such activities and software developers seeking to develop CPEs for young learners.

Patterns of Media Use in and Activity Centric Collaborative Environment
David R Millen, Michael J. Muller, Werner Geyer, Eric Wilcox, Elizabeth Brownholtz, *IBM T.J. Watson Research Center, USA*

This paper describes a new collaboration technology that is based on the support of lightweight, informally structured, opportunistic activities featuring heterogeneous threads of shared items with dynamic membership. We introduce our design concepts, and we provide a detailed analysis of user behavior during a five month field study. We present the patterns of media use that we observed, using a variety of analytical methods including thread clustering and analysis. Major findings include four patterns of media use: communicating, exchanging mixed objects, coordinating, (e.g., of status reports), and semi-archival filing. We observed differential use of various media including highly variable use of chats and surprisingly informal uses of files. We discuss the implications for the design of mixed media collaborative tools to support the work activities of small to medium sized work teams.

Less Visible and Wireless: Two Experiments on the Effects of Microphone type on Users' Performance and Perception
Clifford Nass, Jane Wang, *Stanford University, USA*

When devices become less visible and recede to the background, what kinds of influences would they have on users?? This paper presents two experiments (N=48 and N=96) that examine the effects of four different types of microphones (and voice vs. text output) on user's behaviors and attitudes. The microphones differ with respect to their visibility and Users' mobility. Participants performed two different tasks: a standard creativity task and a standard disclosure task. Mobility facilitated creativity and disclosure of personal information. Recording reminder discouraged creativity and disclosure. Output modality had no significant effect. Implications for ubiquitous computing and voice user interfaces are discussed.

MultiView: Spatially Faithful Group Video Conferencing
David Tong Nguyen, John Canny, *University of California, Berkeley, USA*

MultiView is a new video conferencing system that supports collaboration between remote groups of people. MultiView accomplishes this by being spatially faithful. As a result, MultiView preserves a myriad of nonverbal cues, including gaze and gesture, in a way that should improve communication. Previous systems fail to support many of these cues because a single camera perspective warps spatial characteristics in group-to-group meetings. In this paper, we present a formal definition of spatial faithfulness. We then apply a metaphor-based design methodology to help us specify and evaluate MultiView's support of spatial faithfulness. We then present results from a low-level user study to measure MultiView's effectiveness at conveying gaze and gesture perception. MultiView is the first practical solution to spatially faithful group-to-group conferencing, one of the most common applications of video conferencing.

Interaction in 4-Second Bursts: The Fragmented Nature of Attentional Resources in Mobile HCI
Antti Oulasvirta, *Helsinki Institute for Information Technology, Finland;* Sakari Tamminen, *Helsinki University of Technology, Finland;* Virpi Roto, *Nokia Research Center, Finland;* Jaana Kuorelahti, *Helsinki University of Technology, Finland*

When on the move, cognitive resources are reserved partly for passively monitoring and reacting to contexts and events, and partly for actively constructing them. The Resource Competition Framework (RCF), building on the Multiple Resources Theory, explains how psychosocial tasks typical of mobile situations compete for cognitive resources and then suggests that this leads to the depletion of resources for task interaction and eventually results in the breakdown of fluent interaction. RCF predictions were tested in a semi-naturalistic field study measuring attention during the performance of assigned Web search tasks on mobile phone while moving through nine varied but typical urban situations. Notably, we discovered up to eight-fold differentials between micro-level measurements of attentional resource fragmentation, for example from spans of over 16 seconds in a laboratory condition dropping to bursts of just a few seconds in difficult mobile situations. By calibrating perceptual sampling, reducing resources from tasks of secondary importance, and resisting the impulse to switch tasks before finalization, participants compensated for the resource depletion. The findings are compared to previous studies in office contexts. The work is valuable in many areas of HCI dealing with mobility.

Designing the Spectator Experience
Stuart Reeves, Steve Benford, Clare O'Malley, *University of Nottingham, UK;* Mike Fraser, *University of Bristol, UK*

Interaction is increasingly a public affair, taking place in our theatres, galleries, museums, exhibitions and on the city streets. This raises a new design challenge for HCI ? how should spectators experience a performer's interaction with a computer? We classify public interfaces (including examples from art, performance and exhibition design) according to the extent to which a performer's manipulations of an interface and their resulting effects are hidden, partially revealed, fully revealed or even amplified for spectators. Our taxonomy uncovers four broad design strategies: "secretive," where manipulations and effects are largely hidden; "expressive," where they tend to be revealed enabling the spectator to fully appreciate the performer's interaction; "magical," where effects are revealed but the manipulations that caused them are hidden; and finally "suspenseful," where manipulations are apparent but effects are only revealed as the spectator takes their turn.

Feature Congestion: A Measure of Display Clutter
Ruth Rosenholtz, Yuanzhen Li, Jonathan Mansfield, Zhenlan Jin, *MIT, USA*

Management of clutter is an important factor in the design of user interfaces and information visualizations, allowing improved usability and aesthetics. However, clutter is not a well defined concept. In this paper, we present the Feature Congestion measure of display clutter. This measure is based upon extensive modeling of the saliency of elements of a display, and upon a new operational definition of clutter. The current implementation is based upon two features: color and luminance contrast. We have tested this measure on maps that observers ranked by perceived clutter. Results show good agreement between the observers' rankings and our measure of clutter. Furthermore, our measure can be used to make design suggestions in an automated UI critiquing tool.

Improving Revisitation in Fisheye Views with Visit Wear
Amy Skopik, Carl Gutwin, *University of Saskatchewan, Canada*

The distortion caused by an interactive fisheye lens can make it difficult for people to remember items and locations in the data space. In this paper we introduce the idea of visit wear - a visual representation of the places that the user has previously visited - as away to improve navigation in spaces affected by distortion. We outline the design dimensions of visit wear, and report on two studies. The first shows that increasing the distortion of a fisheye view does significantly reduce people's ability to remember object locations. The second study looks at the effects of visit wear on performance in revisitation tasks, and shows that both completion time and error rates are significantly improved when visit wear is present. Visit wear works by changing the revisitation problem from one of memory to one of visual search. Although there are limitations to the technique, visit wear has the potential to substantially improve the usability both of fisheye views and of graphical information spaces more generally.

Virtual Rear Projection: Do Shadows Matter?
Jay Summet, Gregory Abowd, Gregory Corso, James Rehg, *Georgia Institute of Technology, USA*

Rear projection of large-scale upright displays is often preferred over front projection because of the lack of shadows that occlude the projected image. However, rear projection is not always a feasible option for space and cost reasons. Recent research suggests that many of the desirable features of rear projection, in particular shadow elimination, can be reproduced using new front projection techniques. We report on the results of an empirical study comparing two new projection techniques with traditional rear projection and front projection.

Children and Emerging Wireless Technologies: Investigating the Potential for Spatial Practice
Morris Williams, *University of the West of England, UK;* Constance Fleuriot, *University of Bristol, UK;* Owain Jones, *University of Exeter, UK;* Lucy Wood, *Ordnance Survey, UK*

In this paper, we describe design work with 36 children aged 9 and 10 in Bristol, United Kingdom. The design work was conducted using emerging mobile and wireless technology which has the potential to impact on the problematic issue of children's access to, use of, and safety within the wider urban environment. A series of workshops are described in which children were encouraged to think about their use of an outdoor space before their introduction to the technology. The children designed and created "soundscapes" in the outdoor environment. The future potential impact of the technology on children's spatial practice is discussed and the concept of children "tagging" environmental hazards is raised.

Learning User Interest for Image Browsing on Small-Form-Factor Devices
Xing Xie, *Microsoft Research Asia, China;* Hao Liu, *Chinese University of Hong Kong, China;* Simon Goumaz, Wei-Ying Ma, *Microsoft Research Asia, China*

Mobile devices which can capture and view pictures are becoming increasingly common in our life. The limitation of these small-form-factor devices makes the user experience of image browsing quite different from that on desktop PCs. In this paper, we first present a user study on how users interact with a mobile image browser with basic functions. We found that on small displays, users tend to use more zooming and scrolling actions in order to view interesting regions in detail. From this fact, we designed a new method to detect user interest maps and extract user attention objects from the image browsing log. This approach is more efficient than image-analysis based methods and can better represent users' actual interest. A smart image viewer was then developed based on user interest analysis. A second experiment was carried out to study how users behave with such a viewer. Experimental results demonstrate that the new smart features can improve the browsing efficiency and are a good compliment to traditional image browsers.

Extending Tangible Interfaces for Education: Digital Montessori-Inspired Manipulatives
Oren Zuckerman, *MIT Media Laboratory, USA;* Saeed Arida, *MIT, USA;* Mitchel Resnick, *MIT Media Laboratory, USA*

This paper introduces a new framework for thinking about tangible interfaces in education, with specific focus on abstract problem domains. Manipulatives are physical objects specifically designed to foster learning. We offer a new classification of Manipulatives: "Froebel-inspired Manipulatives" (FiMs) and "Montessori-inspired Manipulatives" (MiMs). We argue that FiMs are design materials, fostering modeling of real-world structures, while MiMs foster modeling of more abstract structures. We show that our classification extends to computationally enhanced versions of manipulatives.