Center for Human-Computer Interaction at Virginia Tech

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Abstract: Originally founded in 1996, recently reorganized and refocused, the Center for Human-Computer Interaction at Virginia Tech is an organization that is paving the way toward understanding the most difficult and relevant challenges emerging as concerns in human-computer interaction. The HCI community can expect new levels of leadership and diverse research contributions from this core group researchers—each a current or emerging leader in their sub-field—and the Center's multidisciplinary collaborators in academia and industry.
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1 Organization Vision

HCI at VT means facilitating human interaction—*interaction among humans*—with computers and network technology. The scope and power of the technologies available make this incredibly exciting. But the most important outcomes are social, cognitive, and behavioral. We are all about helping people to do things better and to experience what they do more positively and more richly, and indeed, to do and experience entirely new things. HCI, in our view, can enable new human communities as well as helping to reinvigorate traditional communities.

The Center for HCI has long been accustomed to providing a beacon for the field, and we continue to do so. Acting upon our vision, we tackle research objectives that would not otherwise be attainable. We do this by bringing together a unique blend of competencies, proven leadership, and a range of technical experiences.

2 People in the CHCI

A leader in HCI research since its inception and the director for the Center, John Carroll has helped to define usability engineering and establish a foundation of theory in HCI. His work on scenario-based design has had impacts beyond HCI in design studies, requirements engineering, human factors, and home-oriented informatics. Most recently, he has contributed to community computing. Carroll has published 13 books, and more than 250 technical papers. He has presented more than 30 plenary or distinguished lectures. Carroll won the Rigo lifetime achievement award from ACM SIGDOC for his work on the minimalist design model. In 2002, he was elected to the ACM CHI Academy, a small group of pioneers whose technical work enabled key advances in personal computing.

Another member is Mary Beth Rosson, who has been part of the HCI research community for over 20 years. She has investigated a variety of topics ranging from patterns in expert use among end users to interactive tools for professional programmers and published numerous articles, book chapters, tutorials, and the recent *Usability Engineering: Scenario-Based Development of Human-Computer Interaction* (Morgan Kaufmann, 2002). Her current research interests include design and evaluation of interactive systems, the use of network technology to support collaboration, and end-user programming tools.

With the addition of several faculty members in the past few years, the breadth of the Center has increased enormously. Doug Bowman specializes in 3D interaction research, leading design for virtual environment user interfaces and experimental analysis of human performance. His current efforts involve developing immersive VE applications for

teaching difficult educational concepts from computer graphics. He is also exploring the design of domain-specific 3D interaction techniques, for which he recently received an NSF CAREER grant.

Scott McCrickard, Best Paper award winner at INTERACT '01, investigates information design and interaction paradigms for ubiquitous and peripheral computing. His primary research focuses on new approaches to usability testing and design reuse. Through a series of articles and synergistic activities, his recent efforts are leading the emergence of the notification systems research field to a position marked by cohesive community effort, scientific method, and focus on relevant, real-world problems.

Chris North focuses on new visualization and software architecture strategies that enable the broad application of information visualization methods in diverse domains, including bioinformatics, data-mining, and geographic information systems. His current work is directed at extending his Snap-Together Visualization, which allows end users to rapidly construct, customize, and visualize their information requirements. His tools are published on the US Census Bureau's prominent 'Countries USA 2003' data product for improved citizen access.

Manuel Pérez-Quiñones, another NSF CAREER grant winner, brings expertise in user interface software development with a special interest in dialog-based systems. His current research pursues UI tool portability and platform-independent representation of dialog for interfaces deployed on multiple platforms. His development efforts include a community-based translation service for a digital library of educational computing material. He is the workshop and tutorial program co-chair for the Latin American Conference on HCI.

Other members of the Center for HCI include several research faculty, more than 30 graduate students, and affiliated faculty in other departments.

3   Ongoing Research Themes

The Center's thematic identity is formed by our common vision: *enabling humans to do and experience entirely new sorts of things*. We start very close to home—delivering educational impact for HCI and other learners and providing community outreach. Our long-term focus will forge even further reaching collaborative and field-leading initiatives.

3.1   Educational impact
The amalgamation of diverse research interests has allowed development of an entirely unique graduate HCI program at Virginia Tech, providing broad field coverage that extends deeply into many areas of active research. Students are able to build a firm research base with coursework options from more than twelve regularly scheduled courses. Two long-standing graduate courses each serve as core HCI courses: Models and Theories of HCI and Usability Engineering. Regular offerings of User Interface Software, Computer Supported Cooperative Work, Information Visualization, Virtual Environments, and the new offering of Design for Ubiquitous Systems add specialization to graduate student study. Advanced topic courses (recently—Communicating Information Using Peripheral Systems, Digital Cities and Internet Communities, and Design and Software Reuse) enable mastery of specialized knowledge and provide a springboard for original research. Our HCI certificate can be earned by graduate students in almost any department and is aimed at encouraging interdisciplinary cross-fertilization.

Additionally, we channel our collective research focus toward improving the state-of-the-art in education technology with several different efforts. One ongoing project, the Virtual School, is developing new classroom support mechanisms from ubiquitous, large screen solutions for collaborator awareness of project activities.

3.2   Community outreach
For almost ten years, we have developed and assessed new community network technology in the context of Blacksburg Electronic Village. A series of projects have allowed tremendous impact on Montgomery County schools, while developing interface evaluation methodologies. Current efforts investigate end-user creation of visual simulations in the context of cross-generational mentorship and community-oriented issues. The vision of community network research is inspiring—we can probe HCI issues while extending new opportunities for creative participation to citizens though computing.

3.3   Collaboration & future initiatives
Recent collaborations explore issues and emerging challenges at intersections of research areas—information-rich virtual environments, ubiquitous community computing, and dialog software systems for computer supported cooperative work. We are considering new ways to foster collaborative relationships complementary to our thematic identity. In our history, we have often invited visitors for speaking engagements and to participate in book writing sessions. We plan to expand our leadership role within the HCI field by hosting a themed, publication-oriented conference in the near future.