

## 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 paving the way toward understanding the most difficult and relevant challenges in human-computer interaction. Positioned outside of any college or department, the CHCI can provide the HCI community both within the university and across the globe with new levels of leadership and diverse research contributions from our core group of researchers and its multidisciplinary collaborators in academia and industry.

**Keywords:** scenario-based design, community networks, education, collaboration support, dialogue-based interaction, information visualization, notification systems, virtual environments

### 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 help people do things better and achieve more positive and richer experiences—and indeed, experience entirely new things. HCI, in our view, can enable new human communities and help reinvigorate existing ones.

The Center for HCI has long been accustomed to providing a beacon for the field (having a presence in the field since the 1970s), and we continue to do so. Propelled by a relentless belief in 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, the founder of the Center in 1996, and its director until 2003, 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. He received the 2003 ACM SIGCHI lifetime achievement award.

Other noteworthy current and former members include Mary Beth Rosson, H. Rex Hartson, Deborah Hix, and Robert C. Williges. Rosson's work includes the investigation of topics ranging from patterns in expert use among end users and collaboration to interactive tools for professional programmers. Hartson, Hix, and Williges have dealt more closely with usability methods and tools, particularly the User Action Framework that guides inspection and classification of usability problems.

With the addition of several faculty members in the past few years, the breadth of the Center has increased enormously. Doug Bowman specializes in virtual environment research, leading design for user interfaces and experimental analysis of human performance. Current efforts involve developing immersive VE applications for teaching difficult educational concepts and the design of domain-specific three-dimensional 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 strategies that enable the broad application of information visualization methods in diverse domains, including data-mining, bioinformatics, 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.

Manuel Pérez-Quiñones brings expertise in user interface software development and special interest in dialog-based systems. His current research pursues user interface tools and platform-independent representation of dialog for interfaces. He is a program co-chair for the Latin American Conference on HCI and an NSF CAREER grant recipient.

Other members of the Center include several research faculty, more than 30 graduate students, and affiliated faculty in several 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*. The majority of the Center's funding is provided through NSF awards. A fine infrastructure supports current efforts, including: testing facilities for multi-user evaluation with one-way glass observation, instrumented control and video capture, a collaboration laboratory specially equipped to support research in computer-supported cooperative work and small group remote conferencing, and more than 3000 sq ft of conference and office space for graduate students and faculty research associates. Through weekly lunch meetings, regular emails, and a new interactive web presence, we can quickly organize to compete for internal university initiatives as well as national and international opportunities. 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. 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, and Virtual Environments add specialization to graduate student study. Advanced topic courses (recently—Peripheral Displays, Digital Cities and Internet Communities, and Design and Software Reuse in HCI) 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.

#### 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. One ongoing project, the Virtual School, is developing new classroom support mechanisms from ubiquitous, large screen solutions for collaborator awareness of project activities. 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 through computing.

#### 3.3 Collaboration & future initiatives

Recent collaborations explore emerging challenges at intersections of our research areas—information-rich virtual environments, ubiquitous community computing, and dialog software systems for CSCW. These collaborations are a direct result of regular contact and our commitment to education, stemming from our group's preparation for our PhD qualifying exam. In creating the exam, we examined the common topics within our research areas and developed three areas of common experience to focus our educational and research efforts.

With this as a model, we are considering new ways to foster collaboration with relationships complementary to our thematic identity, pursuing funding opportunities with other universities, inviting visitors for speaking and work sessions, and hosting a regular themed, publication-oriented conference. We are currently searching for a new director that will continue and enhance our vision, extend our impact, and lead the Center into the future.