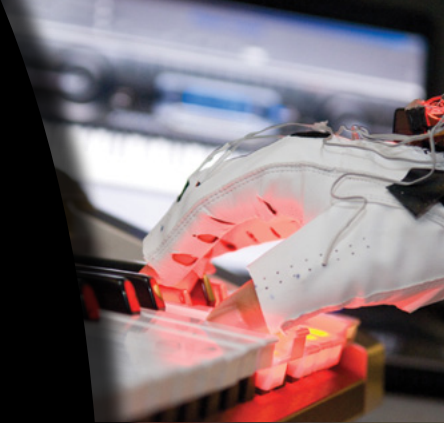




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Celebrating 20 Years of Impact





About Us

The GVU Center at Georgia Tech is a university-wide interdisciplinary research center dedicated to developing innovative interactive computing technologies to advance the human condition. GVU's 75 faculty and almost 400 students span all six colleges at Georgia Tech, bringing together deep insight into human behavior and motivation, technical savvy to invent cutting edge technologies, and the creativity to imagine and design the future.



Research Focus Areas

- | | |
|----------------------------|---------------------------------|
| Augmented Reality | Mobile and Ubiquitous Computing |
| Civic Computing | Music Technology |
| Collaborative Work | New Media |
| Educational Technologies | Online Communities |
| Gaming | Perception |
| Graphics and Animation | Robotics |
| Health Informatics | Social Computing |
| Human-Computer Interaction | Virtual Reality |
| Information Visualization | Wearable Computing |
| International Development | |

Brown Bag Seminar Series

The GVU Center's longstanding commitment to technology discovery and cross-disciplinary collaboration is showcased weekly in the highly rated Brown Bag Seminar Series hosted by the center. The series features technology leaders, Georgia Tech researchers, and experts in academia and industry who are leading innovation. Free admission and lunch are included.

For more information go to:
gvu.gatech.edu/brownbags

MESSAGE FROM THE DIRECTOR

The future is being invented at GVU. Our researchers are pushing the boundaries of interactive technology, and exploring how technology can further societal goals in domains as diverse as health, education, entertainment, and civic responsibility. By bringing together a multidisciplinary group of faculty and students, spanning all six colleges at Georgia Tech, the GVU Center provides a unique home for research that crosses the boundaries of traditional academic units.

These are exciting times for GVU, and for Georgia Tech. Our faculty and students' research continues to lead the world in many areas at the intersection of computing technology and people. The news highlights in this report give a sense of not only the level of excellence they have achieved, but also the societal relevance of their work. My own priorities are —first and foremost— to ensure that GVU continues to be a world-class incubator for this dynamic community of researchers.

Over the past year we have launched some exciting new initiatives designed to extend our research capabilities and move into new areas of focus.

For example, we have worked to expand our connections to the vibrant undergraduate community at Tech, launching our new App Lab, focused on mobile applications development. We have greatly added to the capabilities of our Prototyping Lab, providing a unique hackerspace for the Georgia Tech community. We have launched a major new effort on Civic Social Computing, centered around the use of social media to promote more effective and wide-reaching civic engagement. And we have broadened our base of critical research funding support by increasing our partnerships with industry.

All in all, the 2011-2012 fiscal year has been an outstanding one for the GVU Center. And the coming year marks an important milestone for us as we celebrate our 20th anniversary. Please visit the GVU website at gvu.gatech.edu for details; I hope you'll be able to join us for the celebration.

Keith Edwards
Director, GVU Center

FOLEY SCHOLARS



GVU Director Keith Edwards and Founder Jim Foley stand with the 2011 Foley Scholar candidates and recipients: (l to r) Edwards, Eugene Medynskiy, Matthias Grundmann, Brian O'Neill, Jill Dimond, Foley, Zhicheng "Leo" Liu, Kurt Luther, Lana Yarosh and Jenay Beer.

The Foley Scholars Endowment supports two scholarships annually for graduate students engaged in research that shows personal vision, brilliance and potential impact on human centered computing. Through the generous support of alumni, faculty and friends of GVU, the endowment - named in honor of GVU founder Dr. Jim Foley - has provided for eight \$5,000 graduate fellowships since 2007.



Visualization Interface Offers Dynamic Data Analysis

HCC Ph.D. alumnus Zhicheng "Leo" Liu, now a postdoctoral fellow at Stanford University, set out to develop next-generation visualization tools in order to make the analysis of a broad range of data more manageable. His research led to the development of a software system, called Ploceus, to support human sense-making and data analysis. Ploceus facilitates the creation of network visualizations from tabular data and is based on an algebraic framework that offers building blocks for users to incrementally construct and refine network visualizations.



Software Helps Online Collaborative Communities Succeed

HCC Ph.D. alumnus Kurt Luther, now a postdoctoral fellow at Carnegie Mellon University, researched online collaborative communities and examined how people could build successful projects online together. He developed an open-source software platform called Pipeline, where collaborators organize creative projects like movies over the web. At its core, Pipeline explores the role of leadership in crowdsourcing and online creative collaboration. The completely web-based collaboration software is optimized specifically for multimedia and all within a browser environment.

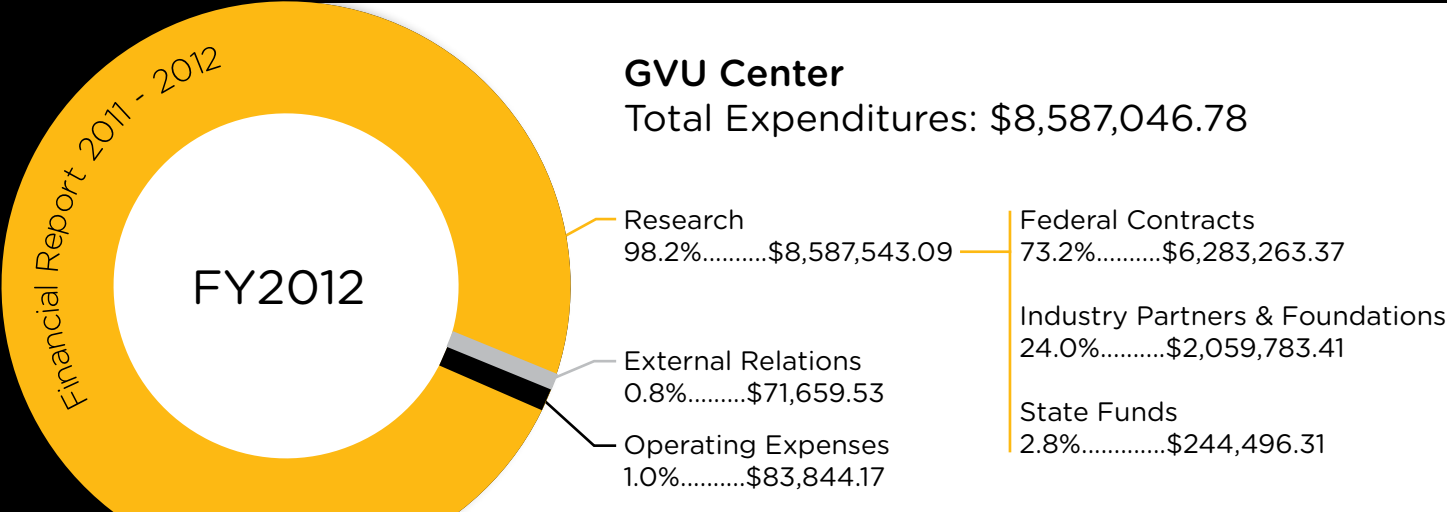
2011 Research & Engagement Grants

The GVU Center, in collaboration with the Institute for People and Technology (IPaT), funded several grants for the 2011-12 fiscal year. Research Grants provided seed funding to conduct interdisciplinary research that had a high probability of leading to further funding from outside sources and had a strong interdisciplinary component. Engagement Grants were awarded based on the potential the projects had for fostering new sorts of engagements and collaboration, whether internally or externally.

For a full overview of these projects go to:
gvu.gatech.edu/2011-research-and-engagement-grants

Funded Projects (details at URL below):

- New Media Nollywood
Team: Mike Best and Angela Dalle Vacche
- Visual Analytics for Innovation Ecosystem Intelligence
Team: Rahul Basole and John Stasko
- Driving Advances in Computing Education Through Application of Educational Psychology Principles
Team: Richard Catrambone and Mark Guzdial
- Electronic Textiles Swatch Book (eSwatchBook) Workshops
Team: Clint Zeagler and Thad Starner



2012 GVU

ANNUAL REPORT

UNLOCKING HUMAN POTENTIAL THROUGH TECHNICAL INNOVATION

► To learn more about these and other research endeavours, please visit: gvu.gatech.edu

The 2012 GVU Center Annual Report includes a snapshot of the research taking place in the center and among its faculty and students. It shows our dynamic approach to technology discovery and its application throughout culture and society. This fall, GVU celebrates 20 years of impact in technology research and beyond. Here we recognize some members of our community and their innovation, vision and pursuit of research excellence.

Robot Design for Older Adults Enables Independence



The transformative effects of robots in older adults' homes are potentially limitless. The PR2 project, involving the Human Factors and Aging Laboratory (Professor **Wendy Rogers**, Psychology) and the Healthcare Robotics Laboratory (Assistant Professor **Charlie Kemp**, Biomedical Engineering and Interactive Computing), focuses on creating assistive capabilities for the Willow Garage PR2 robot. Engineering Psychology Ph.D. student **Jenay Beer** (pictured) helped conduct a recent study that showed robots were preferred over human helpers in 28 of 48 home-based tasks. Cleaning kitchens, bathrooms and windows were all jobs willingly handed off to robots. Respondents also preferred robots when it was necessary to reach in high or low places, retrieve items or pick up heavy objects. They were less preferential toward robot help when it came to sorting mail, laundry and washing dishes. Based on the findings, the team recommended home robots be customizable and that they have the ability to collaborate with users.



Interactive Technology Helps Hospitalized Kids Cope



Technology adoption is becoming commonplace among all ages, with even toddlers able to play apps on their parents' mobile devices. But when kids become ill, technology also helps them in the healing process. HCC Ph.D. student **Matthew Bonner** (pictured) offers a realistic look at a mobile computing intervention in a children's hospital using a participatory design approach with Child Life Specialists, who work with hospitalized kids. Bonner co-authored "Activity-Based Interaction: Designing with Child Life Specialists in a Children's Hospital" with HCI Master's student **Lan Wang** and Professor **Elizabeth D. Mynatt** (Interactive Computing). Their research found that children using a mobile device prototype for activity-based interaction improved their relationships with Child Life Specialists and helped them adapt better to the stress of illness.



Children use smartphones to discover "hidden" graphics in hospitals.

Crowdsourced Instructional Program Helps Autistic People Learn Social Norms



CS Ph.D. alumna **Fatima A. Boujarwah** (pictured), now an assistant professor at Kuwait University, and her collaborators tackled a difficult social challenge in developing technology to help those with autism learn complex social skills. "Socially Computed Scripts to Support Social Problem Solving Skills," co-authored by Boujarwah, Regents' Professor **Gregory D. Abowd** (Interactive Computing) and Senior Research Scientist **Rosa I. Arriaga** (Interactive Computing), looks at creating computational models that can be used to help build "socially scripted" instructional computer programs for individuals with autism. They used crowdsourcing to address the challenge of modeling a wide variety of relevant scenarios for the autistic learners.



A computer program teaches autistic people how to respond in social scenarios.

"The future is being invented at GVU. Our researchers are pushing

New System Helps Home Users Manage Internet Bandwidth Better



"You're Capped!" Understanding the Effects of Bandwidth Caps on Broadband Use in the Home" discusses the multiple uncertainties Internet users face regarding limited bandwidth access. Home and mobile Internet usage is impacted by these uncertainties. A new system by Postdoctoral Researcher **Marshini Chetty** (pictured, Interactive Computing) and Professor **Rebecca E. Grinter** (Interactive Computing),

teamed with Microsoft Research collaborators, gives home users better tools for visualizing and controlling their home bandwidth usage. Chetty and her colleagues give insight into widespread bandwidth issues, including difficulty of knowing when a cap is close to being reached, what applications steal the most bandwidth and the repercussions of multiple users sharing a data plan.

Tool Shows that Social Media Networks Need Better Social Cues



Assistant Professor **Eric Gilbert** (pictured, Interactive Computing) puts Twitter under a spotlight in "Designing Social Translucence Over Social Networks," which shows differences between social network structures and in-person social dynamics. A tool developed for the study called Link Different lets a user know how many of his or her followers have already seen a link in Twitter before sending the same link. The research uncovered surprising results from 150,000 users in how they continued to share the same links with their followers after seeing it had already been shared previously with a majority of them. Gilbert believes the research addresses a fundamental issue for modern social media: the need to provide social cues over social networks. Based on the widespread and viral response found in the study, the research approach has the potential to uncover other social cue problems lurking in social media.



Technology Helps Find Relevant Experts Willing to Help



HCC Ph.D. alumna **Svetlana Yarosh** (pictured), now a researcher at AT&T Research Labs, and her collaborators at IBM worked on a prototype expert-finding system, which helps workers locate experts for a specific task, in a paper titled "Asking the Right Person: Supporting Expertise Selection in the Enterprise." The current challenge is to select the best experts from a list of search results. Some may not be able to answer the question or might not take the time to respond, what the paper coins as a "strikeout." While the current top expert-finding approach has a 28 percent strikeout rate, the team's research study reduced this rate to 9 percent, essentially decreasing the time needed to look for help and increasing time for work.

Design for Technology Considers User Socioeconomic Levels



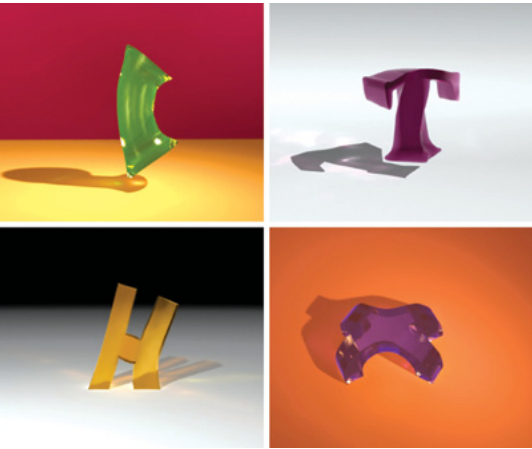
HCC Ph.D. alumna **Sarita Yardi** (pictured), now an assistant professor at the University of Michigan, and Professor **Amy Bruckman** (Interactive Computing) study the growing importance of technology design in HCI research as consumer technology finds a broader user base, and how design must take into account users below the poverty level. Their paper "Income, Race, and Class: Exploring Socioeconomic Differences in Family

Technology Use" finds that all three of these affect access to devices, responsibility for those devices, and ability to monitor teens' use of them. Parents across the spectrum, regardless of socioeconomic status, struggle with how much their teens use cell phones and the Internet and the content they view, but poorer families face particular challenges, including single-parent households and working teens with more independence.



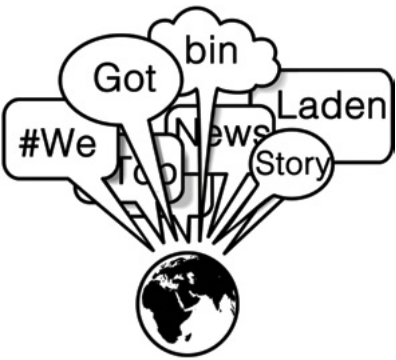
Eyes-free App Could Revolutionize Texting

A team led by Postdoctoral Fellow **Mario Romero** (pictured, Interactive Computing), HCC Ph.D. student **Caleb Southern**, HCI Ph.D. student **Brian Frey** at the University of Maryland and Regents’ Professor **Gregory D. Abowd** (Interactive Computing) is aiming to change the way texting takes place. The researchers have built the BrailleTouch app for touch-screen devices that lets users text with gestures and without looking at the screen. Early studies with visually impaired participants proficient in Braille typing have demonstrated that users can input at least six times the number of words per minute when compared to other research prototypes for eyes-free texting on a touch screen. Users reach up to 32 words per minute with 92 percent accuracy with the prototype app for the iPhone.



Animation Control for Boneless Characters Made Simple

Attempts to create and control skeleton-free computer generated characters using current animation techniques are often time-consuming and laborious. CS Ph.D. student **Jie Tan** (pictured), Associate Professor **Karen Liu**, and Professor **Greg Turk** (Interactive Computing) have found a possible solution to this challenge by developing a way to simulate and control movement of boneless CG characters, anything from starfish and earthworms to an elephant’s trunk. Their computer models were made with customizable muscles and mimic nature’s soft body organisms and their movement. The researchers developed a simple point-and-click functionality to allow animators the ability for incremental improvements in motion. The algorithms used for balancing the soft bodies may also be applicable to other animation control methods, giving animators a new tool for creation.



Study Shows How Twitter Scooped Story of the Decade

One of the biggest stories of the decade - the death of Osama Bin Laden - was first spread through Twitter, a claim confirmed by the research team behind “Breaking News on Twitter,” and led by HCC Ph.D. student **Mengdie Hu** (pictured) and her advisor **John Stasko** (Interactive Computing). The team found evidence that Twitter had convinced the majority of its audience of the news by the time the mainstream media announced it. They also discovered that attention on Twitter was highly concentrated on a small number of “opinion leaders,” including celebrities, and demonstrate their assertion that Twitter has great potential as a news medium.



Researchers Make Mobile Push for Healthier Decision-Making

Sending texts or snapping photos on your mobile device may not seem like a clear path to tighter abs, more sleep or a balanced diet, but researchers at Georgia Tech aim to change that with a software development tool for health-based applications called Salud. HCC Ph.D. alumnus **Eugene Medynskiy** (pictured) led the research to design and build the technology that allows people to use their personal health data to track their habits and reach self-defined goals. The open-source software supports app developers for mobile devices and PCs in creating apps that measure any health metric from calorie intake and exercise regimen to helping those with long-term illnesses. Medynskiy is now co-founder of Atlanta startup Usable Health.



Salud! analyzes health data collected on mobile devices.



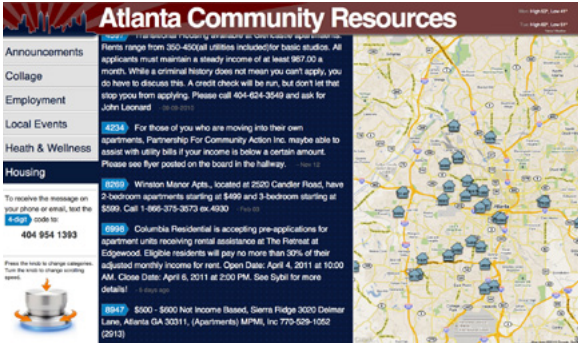
Technology Takes Healthy Habits into Community

Researchers exploring health from a community perspective developed technology to promote nutritious eating through activism. A team led by Postdoctoral Fellow **Andrea Parker** (pictured, Interactive Computing) created Community Mosaic, a program for users to share healthy eating ideas via mobile-phone texts and photos, which were then visualized on a large touch-screen display at a local YMCA accessible to anyone. “Health Promotion as Activism: Building Community Capacity to Effect Social Change” describes Community Mosaic’s impact in facilitating activism and shifting attitudes to enable health advocacy.



Marginalized Groups Use Technology in Social Services

Assistant Professor **Chris Le Dantec** (pictured, Literature, Media and Communication) examines the most marginalized of groups, researching how technology shapes the relationship between social service providers and homeless mothers and their children. “Participation and Publics: Supporting Community Engagement” demonstrates how Le Dantec’s system of an electronic community board -linked with cell phones- helped shelter staff members to coordinate services and counseling with homeless mothers staying at the shelter. The technology allowed sharing of real-time information to help prioritize goals and reestablish stability for the homeless participants.



Musical Glove Improves Mobility in Those with Spinal Cord Injury

Mobile Music Touch, a revolutionary glove-based wearable computing system that can provide tactile stimulation to fingers, may improve sensation and motor skills for people with paralyzing spinal cord injury (SCI). Researchers at Georgia Tech and Atlanta’s Shepherd Spinal Center had participants with SCI use the MMT glove for 30 minutes, three times a week. Participants performed a variety of common grasping and sensation tests to measure their improvement. Those who used the MMT system performed significantly better than a control group. HCC Ph.D. alumna **Tanya Markow** (pictured), now an assistant professor at the U.S. Military Academy, led the study and believes the increased motor abilities could be caused by renewed brain activity that sometimes becomes dormant in persons with SCI.



App Gives Harassment Victims a Powerful Tool and Voice

With her Android app Hollaback, HCC Ph.D. Alumna **Jill Dimond** (pictured), now co-owner of Sassafra technology collective, has enabled users to snap a photo or text a message of harassment incidents in public. The mobile app sends the incidents of harassment or violence directed towards them to the web. On multiple, geo-specific websites, the Hollaback app maps where the incidents take place - web users are able to see harassment activity and testimonials in different cities around the world. The Hollaback network spans 40 websites in 13 countries. Master’s student **Daphne LaRose** built a new version of the app to let bystanders report harassment as well.



GVU Center 20th Anniversary Celebration

You are invited to join us for the GvU Center's 20th Anniversary Celebration in fall 2012. The 20th Anniversary program will offer a thought-provoking look at the future of interactive technology and the role of university research in technology discovery. We will also present the GvU Impact Awards, recognizing the contributions of alumni and current GvU members and their impact on the world. The center's top graduate researchers will be honored with the Foley Scholarship, named after GvU founder Jim Foley.

Over the three-day celebration you are invited to register for Innovation Workshops to engage with and learn from members of our talented research community. A centerpiece of our program will be the Research Showcase where you will see firsthand the innovation taking place at GvU and the people who bring it to life. On display will be many interactive demonstrations. We look forward to celebrating with you!

Register now

gvu.gatech.edu/gvu20



**Celebrate 20 Years
of Vision in
Technology Research!**

20th Anniversary Celebration

Oct 23-25, 2012

GVU Center
Georgia Institute of Technology
Atlanta, GA

Gala Event Highlights



Special Keynote

Jessica Hodgins
Disney Research &
Carnegie Mellon University



Distinguished Alumni Seminar

James O'Brien
University of California, Berkeley

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