



industry

INNOVATION DAY

Intelligent Health

April 19, 2018 | Tech Square



GVU Center & Digital Media Research Showcase

Technology Square Research Building

April 19, 2018 | 2 - 5pm

IPaT Industry Innovation Day

The Institute for People and Technology's signature event – *Industry Innovation Day* – examines how emerging technologies will shape the future of our society. Headlining IID 2018 are keynotes and panel discussions with influential thinkers from business, government, and academia. The event also serves to showcase research at IPaT and Georgia Tech as well as highlight the many avenues of collaboration with industry, government, and non-profit partners.

As part of Industry Innovation Day, the **GVU Center & Digital Media Research Showcase** is a unique hands-on experience that gives attendees a glimpse of how technology will continue to enhance everyday activities in society and culture.

Imagine an artificial intelligence that can tell you why it makes a certain move in a game. Experience virtual reality worlds that allow you to move in your environment and immerse your senses. Or interact with the latest breakthroughs in augmented reality and wearable computing technology.

The biannual GVV Showcase is one the largest events for research discovery at Georgia Tech. This spring's event includes more than 100 demonstrations and provides access to our community of experts who are Creating the Next. Included are the **Convergence Innovation Competition** winners, who will demonstrate innovative, viable products and experiences for the consumer market.

Learn More About IID 2018

<http://ipat.gatech.edu/industry-innovation-day>

About Us

Institute for People and Technology

Georgia Tech's Institute for People and Technology (IPaT) was created in 2011 to embrace opportunities and needs in people-focused technology and to create a networked research ecosystem of GT faculty and industry partners. IPaT's goal is to amplify the combined thought leadership and on-the-ground results of its researchers to create positive economic and societal impact in critical systems that define much of everyday life: how people communicate, learn, heal, make decisions and take care of their communities.

Learn more at <http://ipat.gatech.edu>

GVU Center at Georgia Tech

The Gvu Center inspires and enables interdisciplinary research in people-centered computing by advancing a leading network of researchers involved in shaping cutting-edge innovations. Gvu has been instrumental in expanding the scope of the research landscape at Georgia Tech for 25 years through the formation of new academic research groups, programs and units, and new interdisciplinary partnerships.

Learn more at <http://gvu.gatech.edu>

Digital Media Program

The Digital Media graduate program at Georgia Tech provides students with a foundational, theoretical background in digital media and the opportunity to practice what is learned in the classroom through active participation in labs and research. The resources, facilities and industry connections established and maintained by the program make our students some of the most sought-after graduates in the field today.

Learn more at <http://dm.lmc.gatech.edu/>

GVU Center & Digital Media Research Showcase

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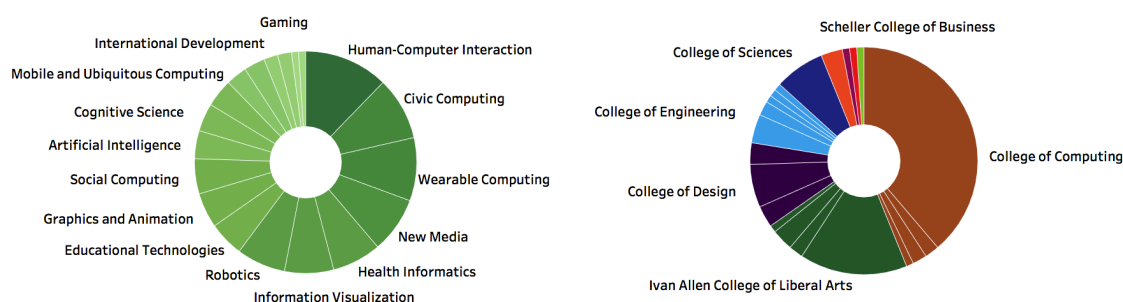
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Interact with our experts at gvu.gatech.edu/explore

Research

Organizations



GVU research includes the spectrum of human activity as it relates to the use of computing technology. Our research ecosystem broadly defines 22 areas where research contributions are made on a continuing basis.

Researchers represent Georgia Tech's six colleges as well as partners in other research centers. The ability to draw on a wide range of expertise is one of GVU's defining hallmarks.

TSRBB 2nd Floor



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★ Registration

TSRB 3rd Floor



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Projects by Topic

Projects are listed under one primary topic area with additional areas shown for each

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Research Groups and Project Details

Locations reflect demos for the showcase, not necessarily lab homes

ADAM Lab (325) *Artificial Intelligence, Human-Computer Interaction, Virtual Reality*



The Adaptive Media Lab explores how to create digital media experiences that tailor themselves to individual users. These adaptations may occur for dramatic purposes (e.g. interactive narrative), educational purposes (e.g. serious games), and / or purely for entertainment. This research involves work in design, artificial intelligence, and human computer interaction.



Faculty: *Brian Magerko*, Mark Riedl, Jason Freeman

Learn More at: <http://adam.cc.gatech.edu>

Sound Happening

Music Technology

Agneya Kerure, Dan Singer, Pedro Arevalo, Josh Moore, Duri Long

Sound Happening is a collaborative music-making installation that allows several people to explore and create music in a space by playing with colorful bouncy balls. Using a webcam and Max/MSP, Sound Happening tracks each ball's location relative to the space to manipulate and trigger various samples, resulting in intriguing sound combinations that are constantly changing as the balls move.

TuneTable

Educational Technologies, Graphics and Animation, Music Technology

Brian Magerko, Jason Freeman, Mikhail Jacob, Ryan Rose, Agneya Kerure, Anna Weisling, Duri Long

TuneTable is a responsive tabletop application with a tangible user interface. The intention is to teach basic computer programming concepts to middle school-aged and high school-aged students (9-16 years old) using physical blocks that work as snippets of code. TuneTable applies computational elements like: functions, parameters, and nested loops. Users compose short songs by building chains of blocks that represent code.

LuminAI: An Exploration of Human-AI Movement Improvisation

Artificial Intelligence, Cognitive Science, New Media

Brian Magerko, Mikhail Jacob, Lauren Winston, Duri Long, Dor Hananel, Chelsi Cocking, Alexis Perkins

LuminAI is an interactive art installation that explores the improvisation of proto-narrative movement between humans and virtual AI agents using full body, expressive, movement-based interaction. Interactors can co-create

movement with an autonomous virtual agent that learns movement, response, and improvisation directly from interacting with human teachers. It analyses their movement using Viewpoints movement theory.

SoundCage

Jason Freeman, Ryan Rose, Avneesh Sarwate

SoundCage is an installation that allows people to solve an aural puzzle using their entire body. Audience members enter a phone booth sized enclosure and find themselves surrounded by a network of strings. As they move around and touch the strings, their body position will warp the sounds playing all around them. Different movements will result in different sounds, and the audience is encouraged to reveal the hidden message in the soundscape.

Animal-Computer Interaction Lab (243)

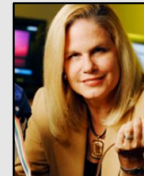
Human-Computer Interaction, Wearable Computing



We explore the emerging area of Animal-Computer Interaction focusing on interfaces for inter-species communication and on the design and evaluation of interactive technology for users of multiple species.

Faculty: *Melody Jackson*, Thad Starner, Clint Zeagler, Scott Gilliland

Learn More at: <http://aci.gatech.edu/>



FIDO - Facilitating Interactions for Dogs with Occupations

Human-Computer Interaction, Mobile and Ubiquitous Computing, Wearable Computing

Melody Jackson, Thad Starner, Clint Zeagler, Scott Gilliland, Giancarlo Valentin, Larry Freil, Ceara Byrne

The FIDO Sensors team is creating wearable technology to allow working dogs to communicate. Assistance dogs can tell their owners with hearing impairments what sounds they have heard; guide dogs can tell their owners if there is something in their path that must be avoided. We will be demonstrating a variety of wearable sensors designed for dogs to activate.

Augmented Environments Lab (233)

Augmented Reality, Mobile and Ubiquitous Computing



Lab activities focus on understanding how to build interactive computing environments that directly augment a user's senses with computer-generated material. Researchers are interested in augmenting the user's perception, and place particular emphasis on the interaction between the users and their environment.

Faculty: *Blair MacIntyre, Jay Bolter*

Learn More at: <http://ael.gatech.edu/lab/>



Auburn Avenue - Women in Civil Rights

Augmented Reality, New Media

Jay Bolter

Many women played important roles in the Civil Rights Movement. Their efforts to lead the movement were often overshadowed by men, who still get more attention and credit for its successes in historical narratives. The motivation of the project is to design an engaging way that draw people's attention to women's achievements, and helps people feel closer to the events and women that made history during the Civil Rights Movement.

Aware Home Research Initiative (309)

Health Informatics, Human-Computer Interaction, Mobile and Ubiquitous Computing



The Aware Home Research Initiative (AHRI) at Georgia Institute of Technology is an interdisciplinary research endeavor aimed at addressing the fundamental technical, design, and social challenges for people in a home setting. Central to this research is the Aware Home, a 3-story, 5,040-square-foot facility designed to facilitate research, while providing an authentic home environment. Research domains include: 1. Health and Well-being, 2. Sustainability, 3. Entertainment, 4. Connected Living / Home Management.



Learn More at: <http://awarehome.gatech.edu>

Faculty: **Brian D. Jones**

RERC TechSage: A Mobile Application to Measure Gait Speed

Health Informatics, Mobile and Ubiquitous Computing

Brian Jones, David Byrd, Akhil Oswal, Youssef Asaad

Multiple studies have shown a consistently strong association between gait speed of frail older adults and negative functional (e.g., survival) and activity outcomes. However, health care professionals have been slow to measure this physiologic parameter, largely due to the lack of a simple, standardized way of measuring it.

Facilitating family connection in a smart home setting

Human-Computer Interaction, Mobile and Ubiquitous Computing

Brian Jones, Graduate: Sharon Ang, Jayanth Krihsna, Sunil Nair, Jessica Tsui

Connected living is the fast-growing intersection of mobile, wearable, home, community, car and other technologies to assist individuals in accomplishing more seamless interactions and goals in daily life. The Aware Home is the perfect environment for exploring how smarthome systems may be advanced in the future. Student design projects are an opportunity for students to research the preferences of the end users and design prototype systems that will inform this future.

DIY Smart Homes

Human-Computer Interaction, Mobile and Ubiquitous Computing, Requirements Engineering

Brian Jones, Jayanth M

Using the Z-wave protocol stack, we are building a controller for the Aware Home using a Raspberry Pi that will allow users to control and query device data on a dashboard. This collected data will then be used to predict usage

patterns and serve tips for power saving. Finally, a user-friendly rules engine enables users to create certain rules using sensor data.

Ambient Alerting

Health Informatics, Human-Computer Interaction, Mobile and Ubiquitous Computing

Brian Jones, Kristin Hare, Jayanth Krihsna, Akhil Oswal, William Gao, Fengrui (ChenChen) Zou; Previous: Youssef Asaad, Alex Kim, Reema Upadhyaya

No matter what age we are, we have likely forgotten to turn off the stove or oven, iron, heater or even water. Forgetfulness can lead to serious events that may result in costly damage to the home or even injury or death. Older adults are more prone to such forgetfulness. When an older adult forgets to turn off a hazardous appliance, it is often attributed to losing mental capacity and may lead to loss of self-confidence, embarrassment, and judgment from others.

Simplifying the setup required to integrate multiple Smart Home devices for Older Adults

Artificial Intelligence, Human-Computer Interaction, Mobile and Ubiquitous Computing

Brian Jones, Sharon Ang

The smart home consists of primarily sensors (detectors) and controls (actuators) connected by a set of user-defined rules that determine when to trigger the controls based on sensor events. Often, life is more complex than a simple if (sensor event like motion), then (e.g. turn on control, like a light) type rule and requires more complex logic. Even with the simplest rules, the interfaces used to setup that logic can be tedious. Many users of smart homes have trouble configuring the "smarts" of the home.

RERC TechSAge: SmartBathroom

Health Informatics, Human-Computer Interaction, Mobile and Ubiquitous Computing

Jon A. Sanford; Brian Jones; Peter Presti; Brad Fain, Su Jin Lee, Harshal Mahajan, Prasanna Natarajan, Shambhavi Mahajan

The needs and abilities of people who are aging with progressive chronic conditions, such as MS, Parkinson's, ALS and Arthritis fluctuate from day to day. Yet, even when they have supportive AT, such as grab bars, to compensate for functional limitations, those features are fixed, only able to support some abilities, some of the time. The purpose of this project is to develop a SmartBathroom environment capable of assessing an individual's abilities at any point in time and spontaneously adjusting supportive environmental features to accommodate those abilities.

Computational Enterprise Science Lab (334)

Collaborative Work, Health Informatics, Human-Computer Interaction



The Computational Enterprise Science Lab focuses on the design, analysis, and management of complex enterprise systems (e.g. organizations, supply chains, business ecosystems) using information visualization, modeling/simulation, and system science approaches.



Learn More at: cc.gatech.edu/people/rahul-basole

Faculty: **Rahul Basole**

Logomaps: A Computer Vision Based Approach to Emerging Business Ecosystem Intelligence

Information Visualization, Machine Learning, Computer Vision

Rahul Basole, Peter Presti, Tyler LaBean

Business analysts create logomaps in order to better understand and communicate trends in the world of business. Humans can intuitively make sense of these maps, while computers struggle to extract the same knowledge. Using computer vision and human-in-the-loop machine learning, this research aims to create tools and methods for automating knowledge extraction from graphical logomaps.

DocPlot: A visual exploration of physician networks

Information Visualization

Rahul Basole, Timothy Major

Many interesting data sources are large, structured, and multivariate. However, existing visualization systems and approaches often make a trade-off between exploring network structure or data attributes and values. We consider the spectrum of unit visualization approaches - visualizations that encode each data case as an individual mark - and explore the ways in which blending techniques from across the spectrum can improve the exploration of large multivariate networks. The different forms of context found in unit visualizations are also defined and considered as paths for exploration.

Helping Data Analysis Novices Conduct Pairwise Comparisons

Artificial Intelligence, Human-Computer Interaction, Information Visualization

Rahul C. Basole, Po-Ming Law

Data analysis novices often encounter barriers in executing low-level operations for pairwise comparisons. They may also run into barriers in interpreting the artefacts (e.g., visualizations) created as a result of the operations. We developed Duet, a visual analysis system designed to help data analysis novices conduct pairwise comparisons by

addressing execution and interpretation barriers. To reduce the barriers in executing low-level operations during pairwise comparison, Duet employs minimal specification: when one object group (i.e.

Interactive Pattern Mining of Event Sequence Data

Health Informatics, Human-Computer Interaction

Rahul C. Basole, Po-Ming Law

As event sequence data grow in prominence, sequential pattern mining algorithms have been widely adopted to discover interesting patterns in data. For instance, ecommerce websites use these algorithms large-scale clickstream data to understand the common paths taken by customers. In the healthcare domain, sequential pattern mining algorithms open the door to investigating the sheer volume of patients in a hospital.

Contextual Computing Group (243)

Wearable Computing, Human-Computer Interaction



The Contextual Computing Group (CCG) creates wearable and ubiquitous computing technologies using techniques from artificial intelligence (AI) and human-computer interaction (HCI). We focus on giving users superpowers through augmenting their senses, improving learning, and providing intelligent assistants in everyday life. Members' long-term projects have included creating wearable computers (Google Glass), teaching manual skills without attention (Passive Haptic Learning), improving hand sensation after traumatic injury (Passive Haptic Rehabilitation), educational technology for the Deaf community, and communicating with dogs and

dolphins through computer interfaces (Animal-Computer Interaction).

Faculty: Thad Starner

Learn More at: <https://research.cc.gatech.edu/ccg/>

Passive Haptic Learning: Learn to Type or Play Piano Without Attention Using Wearables

Wearable Computing

Thad Starner, Caitlyn Seim

Our Passive Haptic Learning gloves teach the "muscle memory" of how to play piano melodies without the learner's active attention. These gloves can also help wearers recover sensation in their hands after a traumatic event, such as a partial spinal cord injury. The PHL gloves are fingerless gloves equipped with vibrators at each knuckle. As a mobile MP3 player plays each note of a song, the gloves tap the finger that corresponds to the respective piano key.

Passive Haptic Rehabilitation: Improve Sensation and Dexterity after Traumatic Injury Using Wearables

Health Informatics, Wearable Computing

Thad Starner, Caitlyn Seim

Our Passive Haptic Learning gloves teach the "muscle memory" of how to play piano melodies without the learner's active attention. These gloves can also help wearers recover sensation in their hands after a traumatic event, such as a partial spinal cord injury. The PHL gloves are fingerless gloves equipped with vibrators at each knuckle. As a mobile MP3 player plays each note of a song, the gloves tap the finger that corresponds to the respective piano key.

PopSign: Teaching American Sign Language Using Mobile Games

Educational Technologies, Gaming

Thad Starner, Cheryl Wang

CopyCat and PopSign are two games that help deaf children and their parents acquire language skills in American Sign Language. 95% of deaf children are born to hearing parents, and most of those parents never learn enough sign language to teach their children. As short term memory skills are learned from acquiring a language, many deaf children enter school with short term memory of less than 3 items, much less than hearing children of hearing parents or Deaf children of Deaf parents. Our systems address this problem directly.

CopyCat: Helping Young Deaf Children Acquire Language Skills Using Sign Language Recognition

Educational Technologies, Gaming, Perception

Thad Starner, Cheryl Wang, Kshitish Deo, Aditya Vishwanath

CopyCat and PopSign are two games that help deaf children and their parents acquire language skills in American Sign Language. 95% of deaf children are born to hearing parents, and most of those parents never learn enough sign language to teach their children. As short term memory skills are learned from acquiring a language, many deaf children enter school with short term memory of less than 3 items, much less than hearing children of hearing parents or Deaf children of Deaf parents. Our systems address this problem directly.

Optimal Display Placement for Wearable Computers

Wearable Computing

Thad Starner, Malcolm Haynes

Where should a head worn display (HWD) be placed for optimal viewing? Does the optimal position change between reading, working on a physical task like order picking, or social conversation? How do we test such issues? Our ongoing studies on user comfort and performance suggest the optimal placement is somewhere between 10 and 20 degrees off-center toward the ear.

CHAT (Cetacean Hearing Augmentation and Telemetry) and UHURA (Unsupervised Harvesting and Utilization of Recognizable Acoustics)

Artificial Intelligence, Perception, Wearable Computing

Thad Starner, Scott Gilliland, Chad Ramey

Working with Dr. Denise Herzing of the Wild Dolphin Project, we are creating wearable computers for conducting two-way communication experiments with cetaceans. With CHAT, one researcher uses the waterproof system to broadcast a sound, associated with an object with which dolphin's like to play. A second researcher, upon detecting the sound, passes the object to the first. The researchers pass objects back and forth, further associating the sound with the object. The goal is to see if the dolphins mimic the sound in order to "ask" for the play object.

Order Picking with Wearable Computers

Human-Computer Interaction, Mobile and Ubiquitous Computing, Wearable Computing

Thad Starner, Shawn Wu, Malcolm Haynes

Warehouses throughout the world distribute approximately \$1 trillion in goods per year from nearly a million warehouses. Order Picking is the process of collecting items from inventory and sorting them into orders for distribution. It represents one of the main activities performed in warehouses. About 60% of the total operational costs of these warehouses is order picking. Most are still picked by hand, often using paper pick lists. Our objective is to implement and compare various order-picking systems.

Contextualized Support for Learning (329)

Educational Technologies, Human-Computer Interaction, New Media



The Contextualized Support for Learning (CSL) lab has as its aim the creation of "collaborative Dynabooks." We design and implement innovative technology for the goal of improving learning, then empirically explore the benefits and usefulness of the technology with real users. Our vision of collaborative Dynabooks involves inventing new kinds of computer-based media; creating tools to make media composition and sharing easier; helping users to learn how to compose media; developing collaborative supports for reviewing, critiquing, and composing; evaluating our tools and methods in practice; and summarizing and communicating our design lessons learned to inform other designers.



Faculty: Mark Guzdial

Learn More at: <http://home.cc.gatech.edu/csl>

CSLearning4U: Creating Electronic Books for Teacher CS Learning

Educational Technologies, Human-Computer Interaction, New Media

Briana Morrison, Miranda Parker, Barbara Ericson, Stephen Moore

A key idea in CSLearning4U is that we can design CS learning opportunities. Simply wrestling an interpreter or compiler can't be the best way to learn about computer science. Throwing people into the deep end of the pool can teach people to swim, but there are better ways. We want to do better than a book for CS learning, and we want to design the phonics of computing education to integrate with the "whole language learning" of programming. We are creating a new distance-learning medium for computing education especially for in-service high school teachers based on ideas from instructional design and educational psychology.

Why sketch when solving programming problems?

Cognitive Science, Educational Technologies, Computing Education

Mark Guzdial, Kathryn Cunningham

Foundational math, physics, biology, and chemistry instruction all have established traditions of using sketching and drawing to solve problems. From long division to Punnett squares, from free-body diagrams to molecular structures, students create diagrams and manipulate them to problem-solve. Introductory computer science and programming classes lack such well-developed and widely-used methods, even as computer science classes grow in popularity.

CSLearning4U: Creating Electronic Books for Teacher CS Learning

Educational Technologies, Human-Computer Interaction, New Media

Miranda Parker, Barbara Ericson, Kantwon Rogers (Formerly: Briana Morrison, Stephen Moore)

A key idea in CSLearning4U is that we can design CS learning opportunities. Simply wrestling an interpreter or compiler can't be the best way to learn about computer science. Throwing people into the deep end of the pool can teach people to swim, but there are better ways. We want to do better than a book for CS learning, and we want to design the phonics of computing education to integrate with the "whole language learning" of programming.

Measuring and Improving Self-efficacy and Belongingness of Students in Introductory Computer Science Courses

Educational Technologies

Mark Guzdial, Kantwon Rogers

Bite-sized CS: Learn programming more efficiently with varied contexts

Cognitive Science, Educational Technologies

Mark Guzdial, Kathryn Cunningham

An Analysis of Influences on and Barriers to Adopting Computer Science in Georgia Public High Schools

Mark Guzdial, Miranda Parker

Educational policy at the state-level plays a critical role in increasing access to Computer Science (CS) in an equitable way through increasing the adoption of CS by public schools. In order to reach all students with computer science

access and opportunities, we need to understand what is preventing students, teachers, schools, districts, and states from adopting CS education. Once we understand these barriers, we can better design and implement policy and curricula to provide computer science for all.

Culture And Technology Lab (CAT) (328)

Civic Computing, Educational Technologies, Mobile and Ubiquitous Computing



The CAT Lab studies how culture impacts the use and production of technology with a focus on learning applications, computer science education and designing new technologies with culture as a point of convergence.



Faculty: *Betsy DiSalvo*

Learn More at: <http://catlab.gatech.edu/>

The Role of Gesture in Learning Computer Science: How Our Hands Help

Educational Technologies, Computing Education

Betsy DiSalvo, Mark Guzdial, Amber Solomon, Vedant Pradeep, Sarah Li

Teacher's dashboard for exploring formative assessment data

Educational Technologies, Human-Computer Interaction

Betsy DiSalvo, Akansha Gupta

Design & Intelligence Laboratory (229)

Artificial Intelligence, Cognitive Science



The Design & Intelligence Laboratory conducts research into human-centered artificial intelligence and computational cognitive science, with a focus on computational creativity. Current projects explore analogical reasoning in biologically inspired design, visual reasoning on intelligence tests, meta-reasoning in game-playing software agents, and learning about ecological and biological systems in science education.



Faculty: *Ashok Goel*, Keith McGregor, Spencer Rugaber

Learn More at: <http://dilab.gatech.edu/>

Intelligent Biologically Inspired Design

Artificial Intelligence, Cognitive Science

Engineers are interested in solving some practical problem, such as capturing water vapor in arid regions. They intend to use biological analogs as a source of inspiration. Doing so, however, raises several problems. First, the biological literature is immense, and keyword-based search produce voluminous hits, but most of the retrieved documents are of no use. That is, there is high recall but low precision. The second problem is that even when a document looks like it might be relevant, it is still burdensome for the engineer to make a determination.

Virtual Teaching Assistant: Jill Watson

Artificial Intelligence, Cognitive Science, Educational Technologies

Ashok Goel, David Joyner, Spencer Rugaber, Lalith Polepeddi, Jose Delgado, Bobbie Eicher, Marissa Gonzales, Joshua Killingsworth, Sydni Peterson, Mike Lee, Kunaal Naik, Marc Marone, Roy Hong

It has been said that Jill Watson is the most famous teaching assistant in the world. Jill's origin actually is quite humble. She was conceived in summer 2015 with the purpose of helping Georgia Tech's Online MS in CS Program (OMSCS) and specifically with my online course on knowledge-based artificial intelligence (KBAI) as a part of OMSCS program (<http://www.omscs.gatech.edu/cs-7637-knowledge-based-artificial-intellige...>). Jill had a very difficult birth in fall 2015. Jill was quite precocious almost from the beginning.

Virtual Ecological Research Assistant (VERA)

Artificial Intelligence, Cognitive Science, Educational Technologies

Ashok Goel, Robert Bates, Spencer Rugaber, Akshay Agarwal, Christopher Cassion, Taylor Hartman, Animesh Mehta, Abhinayaa Subrahmanian

Protecting the environment is among the biggest challenges facing our society. Big data is an essential element of addressing this big challenge. Encyclopedia of Life (EOL) is the world's largest database of biological species and other biodiversity information. EOL also works closely with scores of other biodiversity datasets such as BISON,

GBIF, and OBIS. We seek to make EOL and related biodiversity data sources accessible, usable, and useful, by integrating extant AI tools for information extraction, modeling and simulation, and question answering; we call the resulting system EOL+.

Human-guided Task Transfer in Interactive Robots

Artificial Intelligence, Cognitive Science, Robotics

Ashok Goel, Tesca Fitzgerald

As robots become more commonplace, they will need to address a wide variety of problems. Since a robot cannot be programmed to complete every task, it is necessary for robots to learn new tasks by interacting with a human teacher. Current methods require that the robot receive many demonstrations of a task, or they are limited to completing tasks which are nearly identical to previous demonstrations. We are developing a cognitive system based on case-based analogical learning that may enable a robot to collaborate with a human teacher to transfer task knowledge to a range of target problems.

Design & Social Interaction Studio (209)

Civic Computing, Educational Technologies, Information Visualization



Design and Social Interaction Studio brings an interdisciplinary group of faculty and students together to examine the experiential and participatory dimensions of digital media and their relationship to establishing and supporting democratic forms of social interaction. Research at the studio spans both theoretical inquiry and experimental design, situated at the intersection of Design, the Humanities, and Human-Computer Interaction. We design and investigate a variety of design products and services (e.g., locative media, visualizations and mapping, policy media, social and educational media) drawing on a range of design methods and strategies. Projects are often in collaboration with other units on campus, other schools, as well as local non-profit organizations.



Faculty: Nassim JafariNaimi

Learn More at: <http://designstudio.gatech.edu>

Came From Nothing: An Interactive Documentary

Civic Computing, Collaborative Work, New Media, Design & Social Justice

Nassim JafariNaimi, Nick Tippens

Came From Nothing is an interactive documentary that chronicles the incredible life story of Benjamin "Big Mouth Ben" Graham, an entrepreneur and motivational entertainer in Atlanta's Historic Sweet Auburn community. Big Mouth Ben overcame 17 years of addiction and homelessness on Auburn Avenue to open, together with his wife Tanya, a convenience store just two blocks from the same bridge under which he once slept.

Smart Cities: Experimental Media

Artificial Intelligence, Civic Computing, New Media, smart cities; human values; science and technology studies

Nassim JafariNaimi

Recent discourses on smart cities have been primarily focused on the deployment of technical infrastructure such as sensor installation, data collection, and security measures. These practices, however, are accompanied with tacit and explicit ideas about ideal cities and human values. This paper presents the preliminary results of an ethnographic study that looks closely at the North Avenue Smart Corridor in Atlanta, Georgia aimed at unpacking the driving ideas behind smart cities initiatives and critically engaging its key assumptions of progress and efficiency.

Heart Sense: Experiments in Design as a Catalyst for Feminist Reflections on Embodiment

Human-Computer Interaction, Information Visualization, Perception

Anne Pollock, Nassim JafariNaimi, Lewis Wheaton, Regan R. Lawson, Shruti Rajeev, Udaya Lakshmi Tattamangalam Ananthanarayanan

Eyes darting, or maintaining a steady gaze straight ahead. Heartbeat racing, or maintaining a slow, even rhythm. If we encounter these phenomena in another, how do we respond - not just affectively, but physiologically? Eye movements and heartbeats are among the most intuitively meaningful physiological characteristics that humans observe in one another. Without necessarily consciously realizing it, we often respond empathetically.

Psi and Delta (Experiential Approach to Quantum Mechanics Education)

Educational Technologies, Gaming, Information Visualization

Nassim Jafarinaimi (DM); Azad Naeemi (ECE), Aditya Anupam, Andy Jin, Nora Hong

Theories of Quantum Mechanics(QM) have been central to the philosophical and technological advances in physics and related fields. Some of the most important aspects of these theories are outside the bounds of human experience, predominantly explained and taught drawing on abstract mathematical formulas.

Untangling the perception of sex difference

Collaborative Work, Human-Computer Interaction, Online Communities

Nassim JafariNaimi, Aditya Anupam

How do we understand sex difference for sex-balanced pre-clinical research? It is critical to acknowledge and include the difference in clinical research because we don't all have same bodies. We seek to bring this conversation of inclusion to Reproductive Justice Advocates and Molecular Biologists through a conversational web narrative. They will see each other's ideas and vocabularies, coming to an understanding and cornerstone for future dialogue.

BellSouth Calendar Project: Interactive Installation Celebrating Black Voices

New Media

Nassim JafariNaimi, Brooke Bosley

The BellSouth Calendar project was originally curated by Pamela Pryor and Jo Edwards. The purpose of the project is to expand on this work, remembering these narratives, and celebrate these individuals from the community. The project has two components: an interactive exhibit that will be on display at the APEX Museum(African-American Panoramic Experience) and the second is a website that will allow teachers, students, and community members to learn more.

Digital World & Image Group (325)

Educational Technologies, Human-Computer Interaction, Virtual Reality



The Digital World and Image Group focuses on two main areas: virtual spaces and real-time imagery gathered from them. We see game spaces and game media as important forms of self-expression. That is why we work to improve creative access and the expressive range available in interactive digital media such as games. Research is conducted in a combination of theory, analysis, and practical experimentation.



Faculty: *Michael Nitsche*

Learn More at: <http://dwig.lmc.gatech.edu>

In Perspective : Puppetry-Based Interfaces for Virtual Reality

Gaming, Virtual Reality

Michael Nitsche, Ian Bogost, Jay Bolter, Pierce McBride

Virtual reality as a medium and design space continues to grow, but we suggest that the range of experiences offered rarely stray from the first person perspective. Most experiences, especially video games, have the user directly embody their avatar. In Perspective is a project that explores alternate interfaces that place the user outside of the body of the avatars they inhabit and uses multiple forms of puppetry as design references for new interfaces that blend procedural and physical motion.

Electronic Learning Communities (*GVU Café*)



The concept that people learn best when they are making something personally meaningful - also known as constructionism - is the lab's guiding philosophy. Computer networks have the potential to facilitate community-supported constructionist learning. The Electronic Learning Communities Lab examines ways communities of learners can motivate and support one another's learning experiences.



Faculty: Amy Bruckman

Learn More at: <http://www.cc.gatech.edu/elc/index.shtml>

The Role of Social Computing Technologies in Grassroots Movement Building

Collaborative Work, Social Computing

Amy Bruckman

Social movement organizing is becoming increasingly dependent on communication technologies. How can CSCW systems support grassroots organizations in facilitating collective action through democratic participation? In this project, we studied Science for the People-Atlanta, a social movement organization dedicated to building a grassroots movement around science activism. We used action research, both participating in the organization and studying it. Further, we interviewed ten active members of the organization.

Detecting Potential Human Trafficking Victims using Geospatial Patterns

Human-Computer Interaction, Information Visualization, Social Computing

Amy Bruckman, Julia Deeb-Swihart

This project focuses on building technology for law enforcement working on human trafficking cases. We leverage available data to build tools that help law enforcement identify potential victims and collaborate with partners to best intervene on these cases.

The Internet in Cuba

International Development, Online Communities, Social Computing

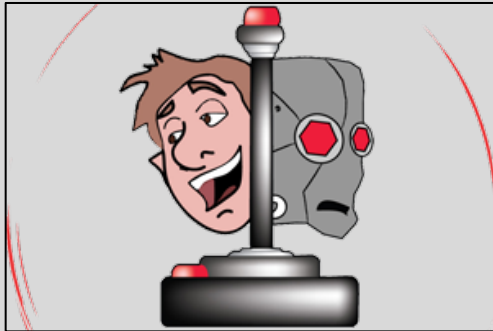
Amy Bruckman, Neha Kumar, Michaelanne Dye

With nearly four billion people still lacking access to the internet, efforts to expand internet access are growing rapidly across the world. Cuba remains one of few emerging nations where this access is still affected by historical trade embargoes and restrictions. Since the 2014 announcement of the normalization of relations between Cuba

and the U.S., however, internet access in Cuba is increasing. This work is situated during this time of transition to explore the impacts of increasing internet access on individuals and communities living in Havana.

Entertainment Intelligence Lab (228B)

Artificial Intelligence, Gaming



The Entertainment Intelligence Lab focuses on computational approaches to creating engaging and entertaining experiences. Some of the problem domains they work on include, computer games, storytelling, interactive digital worlds, adaptive media and procedural content generation. They expressly focus on computationally "hard" problems that require automation, just-in-time generation, and scalability of personalized experiences.



Faculty: Mark Riedl

Learn More at: <https://research.cc.gatech.edu/eilab/>

Explainable AI

Artificial Intelligence, Gaming, Ethics

Mark Riedl, Upol Ehsan, Brent Harrison, Pradyumna Tambwekar, Cheng Hann Gan, Jiahong Sun

In the near future, autonomous and semi-autonomous systems will interact with us with greater frequency. When they fail or perform unexpected behaviors, non-experts must be able to determine what went wrong. We introduce "rationalization", a technique for automatically generating natural language explanations as if another human were describing what the autonomous system was doing.

Interactive Improv Storytelling AI

Artificial Intelligence, Cognitive Science, Natural Language Processing

Mark Riedl, Lara Martin, Prithviraj Ammanabrolu, Xinyu Wang, Richa Arora, Pradyumna Tambwekar

Improvisational storytelling involves one or more people interacting in real-time to create a story without advanced notice of topic or theme. Human improvisation occurs in an open-world that can be in any state and characters can perform any behaviors expressible through natural language. In this project, we strive toward the grand challenge of computational improvisational storytelling in open-world domains. The goal is to develop an intelligent agent that can sensibly co-create a story with one or more humans through natural language.

Everyday Computing Lab (344)

Human-Computer Interaction, Online Communities



We introduce a new area of interaction research, everyday computing, by focusing on scaling ubiquitous computing with respect to time. Our motivations for everyday computing stem from wanting to support the informal and unstructured activities typical of much of our everyday lives. Our goal is understanding the transformation of everyday life as computing is ubiquitously integrated into informal, daily activities and routines.



Faculty: *Beth Mynatt*

Learn More at: <https://research.cc.gatech.edu/ecl/>

Designing Adaptive Technology to Provide Personalized Support to Cancer Patients

Health Informatics, Human-Computer Interaction, Mobile and Ubiquitous Computing

Beth Mynatt, James Clawson, Maia Jacobs, Florian Foerster

We design, deploy, and evaluate mobile health tools that support and meet patients needs over time from diagnosis of a chronic disease, through treatment and into survivorship. Our research explores the ability for personalized, adaptable, mobile tools to support patients over the course of their individual breast cancer journeys.

Everyday epilepsy self-management tools for patients and families

Human-Computer Interaction, Mobile and Ubiquitous Computing, Wearable Computing

Beth Mynatt, Jonathan Bidwell

Many patients and caregivers struggle to complete everyday epilepsy self-management practices: remembering to take daily medications, reporting seizure events and self-regulating behaviors such as getting enough sleep. Jon Bidwell and Beth Mynatt are working with adolescents patients (11-18 years old), caregivers and clinicians from the Children's Healthcare of Atlanta (CHOA) to investigate how mobile and wearable health tracking technologies can support these everyday self-management needs.

Defining Digital Self Harm: A case study of clinically diagnosed eating disorders

Social Computing

Elizabeth Mynatt, Jessica Pater

This project aims to define the concept of digital self-harm for the HCI community. In this project we have explored the limited HCI scholarship related to self-harm within a social computing context. We offer the community an operationalized definition of digital self-harm and propose a theoretical base to orientate related research questions into actionable activities. We also describe a research agenda for digital self-harm, highlighting how the HCI

community can contribute to the understanding and designing of technologies for self-harm prevention, mitigation, and treatment.

GT-Bionics Lab (223)

Human-Computer Interaction, Wearable Computing



We design and develop state-of-the-art medical and scientific instruments for a wide variety of clinical and research applications. Our focus is on Assistive Technologies, Rehabilitation Engineering, Wearable Devices for Smart Health and Wellbeing, Implantable Microelectronic Devices, and Wireless Neural Interfacing. We are involved in true multidisciplinary research addressing all aspects of complex biomedical systems from hardware, software, and smart algorithm design to evaluation of their full functionality and efficacy on animal subjects or in clinical settings.



Faculty: *Maysam Ghovanloo*

Learn More at: <http://gtbionics.ece.gatech.edu/>

Articuracy

Graphics and Animation, Information Visualization, Wearable Computing, Speech Science

Maysam Ghovanloo, Nordine Sebkhi

The motion of our articulators is responsible for generating speech. To re-learn how to speak intelligibly after a brain injury, practicing enunciation when learning a new language, or change our native accent to fit in a new place or required as part of our job, accessing and correcting our articulators' motion is crucial. Few practical solutions exist in the market, and our system is filling this gap by providing an affordable, unobtrusive, portable and user-friendly solution to visualize and generate feedback to the user about their speech performance (e.g., tongue and lips gesture).

A Multimodal Human Computer Interface Combining Head Movement, Speech and Tongue Motion for the People with Tetraplegia

Collaborative Work, Human-Computer Interaction, Wearable Computing

Maysam Ghovanloo, Md Nazmus Sahadat

Assistive technologies (ATs) play a crucial role in the lives of individuals with severe disabilities by enabling them to have greater autonomy in performing daily tasks. The Tongue Drive System (TDS) developed at the Georgia Tech Bionics Lab is such an AT, empowering people with severe Spinal Cord Injury (SCI) to be more independent. Earlier versions of the TDS have offered tongue motion and speech as means of driving mouse activity and keyboard input.

Health Experience & Applications Lab (346)

Health Informatics, Human-Computer Interaction



We investigate how interactive technologies can be designed and developed to facilitate personal health-related information awareness and understanding. We study, design and develop computing tools for digital communication of health status and progress, drawing from the perspectives of clinical caregivers, families, and individuals.



Faculty: Lauren Wilcox

Learn More at: <http://www.hx.gatech.edu>

The Joy of Eating (Remotely)

Human-Computer Interaction

Lauren Wilcox, Victoria Chai

Family and friends connect and bond through food, during mealtimes or just by simply sharing a photo of their meal. This strengthens the bond between people. However, modern life has required us to travel for work, for education, or to temporarily relocate, causing us to be apart from loved ones. As a result, this has made it hard to maintain in-person mealtimes. This project focuses on exploring ways that people can connect to loved ones when they are apart through food.

Rapport: Pediatric Patient and Family Oriented Radiology Report

Health Informatics, Human-Computer Interaction

Lauren Wilcox, Matthew Hong, Clayton Feustel, Max Silverman, Meeshu Agnihotri

Diagnostic radiology reports are increasingly being made available to patients and their family members. However, these reports are not typically comprehensible to lay recipients, impeding effective communication about report findings. Rapport is a prototype system that aims to facilitate communication about radiology imaging findings among pediatric patients, their family members and clinicians in the clinical setting.

Information Interfaces Group (334) *Information Visualization*



At the Information Interfaces Group, computing technologies are developed that help people take advantage of information to enrich their lives. The lab develops ways to help people understand information via user interface design, information visualization, peripheral awareness techniques and embodied agents. The goal is to help people make better judgments by learning from all the information available to them.



Faculty: John Stasko

Learn More at: <http://www.cc.gatech.edu/gvu/ii/>

Unimodal Vs Multimodal interfaces

Human-Computer Interaction, Information Visualization

John Stasko, Ayshwarya Saktheeswaran, Arjun Srinivasan

SpaceSketch - Multitouch Exploration of Urban Public Safety Data

Human-Computer Interaction, Information Visualization

John Stasko, Alex Godwin

Visualization tools for spatio-temporal data utilize map-based representations to help a user understand trends and outliers within a given region over time. Multitouch visualization tools allow us to recreate many of the capabilities of sketching directly on maps while still taking advantage of computational models of public safety. We will be demonstrating SpaceSketch, a multitouch approach to spatio-temporal visualization. Visitors will be allowed to explore crime and transit data in the city of Atlanta using our high-resolution Surface Hub Interface.

Orko: Multimodal Interaction for Exploring Network Visualizations

Human-Computer Interaction, Information Visualization

John Stasko, Arjun Srinivasan, Ayshwarya Saktheeswaran

Data visualization systems have predominantly been developed for WIMP-based direct manipulation interfaces. Only recently have other forms of interaction begun to appear, such as natural language or touch-based interaction, though usually operating only independently. Prior evaluations of natural language interfaces for visualization have indicated potential value in combining direct manipulation and natural language as complementary interaction techniques. Unfortunately, however, little work has been done in exploring such multimodal visualization interfaces.

Data Illustrator

Human-Computer Interaction, Information Visualization

John Stasko, John Thompson

Data Illustrator is a system that helps graphic designers create data-driven visualizations and infographics without the need to do any programming. More specifically, it is a vector editing tool for creating data visualizations and infographics. Graphic designers can use Data Illustrator to craft their own visualizations by repeating and styling shapes with data-driven rules. The tool supports the creation of expressive, flexible, and parametrically defined visualizations without the need to program them.

Visualizing the Top Golf Courses in the US

Information Visualization

John Stasko, Josh Kulas, John Thompson

We have created a visual interface to explore the history of the top 100 U.S. golf course rankings from Golf Digest and Golf Magazines. A viewer can explore the courses geographically via a map or through the individual ordered lists from the magazines. The system shows how each course's ranking has changed over the years, and it allows the viewer to explore courses by particular architects.

Interactive Media Technology Center (309)

Augmented Reality, Civic Computing, Educational Technologies



IMTC is a multimedia research center comprised of teams of interactive media experts that include computer scientists, electrical engineers, and graphic artists. IMTC has grown and adapted to meet the needs of business and industry in the U.S. and abroad by developing and using multimedia technology for enhancement of their core business. IMTC's mission is to assist companies in developing advanced multimedia systems while educating students in multimedia technologies and techniques. IMTC collaborates with a number of partners



including the Georgia Center for Advanced Telecommunications Technology, a joint research effort by Georgia Tech, Emory, Medical College of Georgia, Georgia State, and UGA.

Faculty: Maribeth Gandy

Learn More at: <http://www.imtc.gatech.edu>

Augmented Reality experiments on Support for Political Protest vs. Terrorism

Augmented Reality, Virtual Reality

Jeremy Johnson, Maribeth Gandy, Jeff Wilson, Scott Robertson, Amy Lambeth, Dhruv Karunakaran

In collaboration with political science researchers from Georgia State University and University at Albany, we are developing augmented reality-based experiments to examine the impact of grievance, opportunity and risk as motivating factors when choosing to engage in political protest or terrorism. Study participants assume the role of a fictional ethnic minority in a fictional country and engage in dialogs with virtual characters that attempt to persuade the participant to join a peaceful student-led protest or join a violent resistance movement.

R&D at the Interactive Media Technology Center

Augmented Reality, Mobile and Ubiquitous Computing, Wearable Computing

Maribeth Gandy, Peter Presti, Scott Robertson, Clint Zeagler, Brian Jones, Jeff Wilson, Jeremy Johnson, Laura Levy

We will be showcasing a variety of projects that highlight our applied research and development at the intersections of wearable computing, machine learning, smart textiles, internet of things, virtual/augmented reality, health and wellness, games with a purpose, educational technologies, assistive technology, connected living, and the arts.

Interactive Product Design Lab (304)

Human-Computer Interaction, Mobile and Ubiquitous Computing, Wearable Computing



IPDL is a purpose-built lab designed to support both teaching and research by allowing students to investigate, explore, and experiment with an extensive array of new technologies. Central to this concept, the School of Industrial Design has placed a high priority on the need to foster and develop interdisciplinary, team-based collaboration with other educational and research units from across the campus. The lab opened in fall semester 2011.



Faculty: *Jim Budd*

Learn More at: <http://ipdl.gatech.edu/>

The Light Orchard

Collaborative Work, Human-Computer Interaction, Information Visualization

James Hallam, Clement Zheng, Noah Posner, Heydn Ericson, Matthew Swarts

The Light Orchard is an interactive installation that invites people to walk into a grove of futuristic trees, lit with color. The trees are aware of the presence of people in their space, and can respond in many different ways. User can play different games, watch animations, and work together with different simulations, that allow them to easily collaborate, learn, and play together.

Local Data Design Lab (209) *Civic Computing, Collaborative Work, Information Visualization*



The Local Data Design Lab is focused on bridging the substantial divide between two complimentary, but largely disconnected areas of work: data studies and data visualization. The first is an area of scholarly inquiry that has emerged recently in response to the phenomenon of Big Data and seeks to make sense of data from a social perspective. The second is a form of design practice, which produces informative and expressive interfaces to data.



Faculty: **Yanni Loukissas**

Learn More at: <http://loukissas.lmc.gatech.edu/>

Wearable Carbon Footprint

Information Visualization, Social Computing, Wearable Computing

Stephanie Dykes

Data visualization can be an important guiding force in scientific debates and casual discussions alike. Bringing data visibly into the world can inform and bring attention to critical issues, as well as help us develop a more personal relationship with the data. This project aims to promote awareness and stimulate discussion about climate change through visualizing personal carbon footprint data on clothing. It explores placement of visualizations in the social sphere, as well as revealing unseen individual and systematic responsibility for carbon emissions.

A Beltline for All? Visualizing indicators of gentrification

Human-Computer Interaction, Information Visualization

Yanni Loukissas

This map visualizes demographic indicators of gentrification in neighborhoods (defined by census tracts) along the current and proposed path of the Atlanta Beltline, an "urban redevelopment" project under construction along a loop of disused railroad tracks that circumvent the city, stitching together some of its most historic neighborhoods.

MS-HCI Project Lab (324) *Human-Computer Interaction*



Students in Georgia Tech's interdisciplinary MS in Human-Computer Interaction program do multiple group class projects, and a capstone individual project. Some projects are presented as part of other labs listed here; others are showcased in the MS-HCI Project Lab. The two-year program spans four schools: Industrial Design; Interactive Computing; Literature, Media and Communications (Digital Media Program); and Psychology. Approximately 50 new students enroll each fall semester.

Faculty: Richard Henneman, Carrie Bruce

Learn More at: <http://mshci.gatech.edu/research/labs>

Tools for Student Life

Human-Computer Interaction, Accessibility

Jon Sanford, Carolyn Phillips, Phillip Roberts

Students with disabilities face a number of challenges in today's educational system. Despite being guaranteed a fair and equitable education under the IDEA act in 1975, we find that students with disabilities graduate highschool at a rate of 63%, 20% lower than their peers (2014). The state Georgia was among five others that graduated students with disabilities at a rate of less than 50% compared to their peers.

Increasing awareness on hearing loss in adults

Human-Computer Interaction, Perception, Hearing impairment

Bruce Walker, Diego Osorio

Hearing loss is an invisible condition, and from which only its effects can be measured, and its effects may be hard to recognize specially when there is not point of comparison. Effects of hearing loss may be attributed to distraction, environmental noise, aloofness, confusion, or personality changes. It is a major public health issue representing the third most common physical condition after arthritis and heart disease. It affects a quarter of US population in the ages of 20 to 69, although few acknowledge the problem. One in six adults aged 18 and over (16.

Developing an innovative experience for off-premise ordering at Moe's Southwest Grill using a Contextual Design Methodology

Human-Computer Interaction, Service Design, Contextual Design

Richard Henneman, Jordan Movish, Laurane Saliou, Ryan McManus

Off-premise ordering is a rapidly expanding revenue channel for the restaurant industry, especially among younger, millennial customers (ages 18-34). Fast casual restaurants are making radical changes to capture more of this market segment and increase their share of online sales. However, Moe's Southwest Grill is struggling to keep up, and seeks to improve its customer experience.

Looking for Group - Facilitating Tabletop Gaming

Gaming, Social Computing

Ryan Krepps

Reducing Wait Times and Stress in the Airport Experience

Human-Computer Interaction

Carrie Bruce, John Bordoni

The air travel experience is notorious for being cumbersome, tiring, and downright stressful. Is there a way we could help eliminate or reduce some of these pain points for travelers? The goal of this study is to understand the needs of different kinds of travelers and see how the air travel experience could be improved from a baggage perspective. The output of this project is a functional prototype to help travelers get their bags where they need to go and spend as little time waiting at the airport as possible.

Enhancement of Personal Experiences at Fine Art Museums

Human-Computer Interaction

Carrie Bruce, Xinyu Li, Kaiwei Wang

SafeCrossing

Civic Computing, Human-Computer Interaction

Ellen Zegura, Nishant Panchal

Pedestrians are the largest group of road-users and they represent a large proportion of road casualties. The researchers have found some evidence that divided attention disrupts walking, making people less likely to notice novel stimuli and more likely to cross a street in a risky fashion. More than 1,500 pedestrians were estimated to be treated in emergency rooms in 2010 for injuries related to using a cell phone while walking, according to a new nationwide study.

Chatbot Simulation for Palliative Care Communication Training

Educational Technologies, Human-Computer Interaction, Online Communities

Paul Baker, Elizabeth Hill

Spiritual care is an important aspect of palliative care. Yet, there are few educational tools to prepare nurses and doctors for conversations about their patients' spirituality. With the intention of being used as part of a larger education program- this chatbot simulates patient responses to help the user practice these often delicate conversations. The chatbot's responses were created using social media data mined from online support groups.

Jet Edit

Human-Computer Interaction

Professor Thornton, Carrie Bruce, Devon Peet

JetEdit is designed to exponentially accelerate the time it takes filmmakers to go from shooting footage to a rough cut by leveraging their impressions of takes while filming, and using that semantic data to generate a rough cut instantly.

Experiment-Based Design in the Physical World

Human-Computer Interaction

Richard Henneman, James Field

Working with brick-and-mortar venues to deploy and optimize printed signage within poster stands embedded with facial detection sensors. A methodology for monitoring, evaluating, and actioning insights derived from remote monitoring is proposed and tested. The methodology takes parallels from agile digital development processes to continually test and refine designs based on a constant flow of data reflecting real user behaviors.

Socioretail Platform for Creative Hobbies

Human-Computer Interaction, Social Computing

Richard Catrambone, Bradlyn Walker

This project is focused on centralizing the disparate resources for information gathering and material sourcing for craft-based hobbies such as cosplay and knitting.

Participatory Publics Lab (323)

Civic Computing, Mobile and Ubiquitous Computing



The Participatory Publics Lab is concerned with community engagement and design. We explore the design of mobile and social media in the context of community development and activism. We do this through the design of technologies, development of discourses about them and in their use, adoption, and appropriation. We investigate forms of civic and community engagement through participatory design, design research, ethnographic research, and critical scholarship.



Faculty: *Christopher Le Dantec*

Learn More at: <http://dm.lmc.gatech.edu/research/labs/participatory-publics-lab/>

Defining a Community Lens Through Capturing Individual Oral Histories

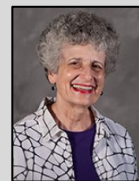
Collaborative Work, Human-Computer Interaction

Christopher Le Dantec, Meghana Melkote

Prototyping eNarrative Lab (113, 322) *HCI, Virtual Reality*



The Prototyping eNarrative Lab (PeN Lab) at Georgia Tech applies digital information design and interaction design principles to digital storytelling to create more complex and expressive narratives, focusing on emerging platforms like experimental television, virtual reality, and augmented reality, and on the intersection of storytelling with game design and simulation design.



Faculty: *Janet Murray*

Learn More at: <http://etv.gatech.edu>

Singularity

Virtual Reality

Janet Murray, Charlie Denton, Morgan Ott, Edward Zhang

Singularity is a VR application created with Unity and the Oculus Rift Touch. The experience aims to explore how players interact in a virtual reality environment as different characters with unique modes of movement. Players have the opportunity for bipedal movement in a room-scale scenario, as well as flight from the seat of a swiveling chair. We explored ways of communicating changes in the player's environment using these core mechanics and atmospheric clues. For example, switching to a different body allows the players to see their previous body through a glass panel.

ZenSpace

Virtual Reality

Janet Murray, Ishaani, Lindsay Kelly, Nikhila Nyapathy, Danielle Schechter

Through this interaction we aim to see if doing physical movements in a virtual space, coupled with a peaceful environment, can help users destress. The interactor enters a mystical fairy land when suddenly he/she sees a flash of light hurling towards the ground. The flash of light injures one of the 5 fairies in the scene. The injured fairy falls down, upon being hit by the light, and can no longer fly. The other fairies in the scene ask for the interactor's strength to help them heal the injured fairy.

Star Wars Escape

Virtual Reality

Janet Murray, Kyeungbum Kim, Vi Nguyen, Chris Purdy, Ziyin Zhang

Star Wars Escape is an room escape experience that adds in a morally-challenging twist. Interactors first start off in a sci-fi-themed jail cell with a potential friend to be found -- or built.

Maliang and the Magic Brush

Virtual Reality

Janet Murray, Phenix Tang, Hao Wu, Shengxi Wu

Our project was Inspired by the Chinese traditional fairy tale Magic Brush. The interactor has a unique brush with magic power that could turn anything he draws to life. They will use the magic brush to escape from a room by creating/interacting with the artifacts he draws. We want to design the agencies of creating interactive user-generated content in VR.

Public Design Workshop (323) *New Media*



The Public Design Workshop is a pedagogically structured lab created to explore new ways to teach, learn, and do social design within the university. We explore how design contributes to the construction of publics, articulates contemporary social and political issues, and fosters new forms of engagement with technology. We do this through participatory workshops & events, speculative design, and theory & criticism. We design events, workshops, objects, and systems. We also do theory and criticism. We are always open to new collaborators. Current topics of



interest include: food and food systems, hackathons, infrastructure, visualizations, tools, and maps.

Faculty: *Carl DiSalvo*

Learn More at: <http://publicdesignworkshop.net>

Enhanced Data Collection for Decreasing Food Insecurity

Civic Computing, Collaborative Work, Human-Computer Interaction, Service Design

Carl DiSalvo, Morgan Orangi

For the 2017-18 academic year, HCI master's student Morgan Orangi has been collaborating with Concrete Jungle, a local organization that forages local produce and distributes it to smaller pantries and shelters. The research has involved interviews, contextual inquiry, focus groups, and participatory design workshops to better understand the processes of Concrete Jungle and their partner organizations with the ultimate goal of designing a tool that connects these processes and produces valuable data.

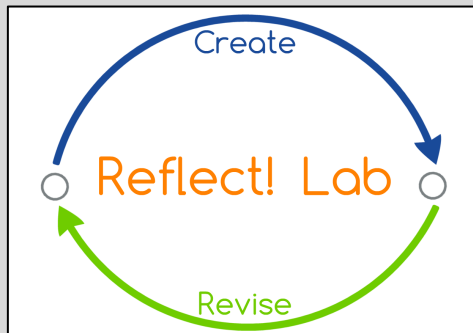
Prototyping and Testing Chatbots

Human-Computer Interaction

Carl DiSalvo, Nick Vernon

Chatbots are one of the newest media in consumer facing technologies. A chatbot can be defined broadly as any service that users interact with primarily through text. More and more companies and organizations are choosing to communicate with their users through bots. There are a couple reasons for this: one, the barrier to entry is relatively low since users don't have to download a new app, or learn a new UI; and, two, since chatbots communicate primarily through text, a bot affords an organization the opportunity to add personality to their brand.

Reflect! Lab (223) *Cognitive Science, Collaborative Work, Educational Technologies*



The Reflect! Lab develops technologies that support self-correcting reasoning and reflective deliberation in teams.

Faculty: *Michael Hoffmann*

Learn More at: <http://reflect.gatech.edu/>



Reflective Consensus Building on Wicked Problems

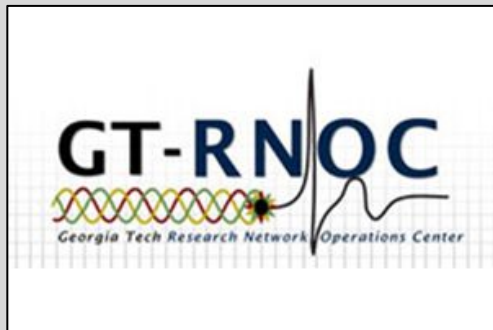
Cognitive Science, Collaborative Work, Educational Technologies, Problem solving

Michael Hoffmann, DeAnna Brown

The Reflect! platform is designed to organize Reflective Consensus Building on Wicked Problems in small teams. Examples of wicked problems are complex policy issues such as health care reform, poverty, global trade, or climate change; the regulation of new and emerging technologies; the design of products and technologies; and planning processes that involve different stakeholders.

Research Network Operations Center (333)

Collaborative Work, Human-Computer Interaction, Mobile and Ubiquitous Computing



The Georgia Tech Research Network Operations Center (GT-RNOC) exists to accelerate innovation in networking, computing, mobility and convergence by enabling communities of collaboration. GT-RNOC provides, supports and maintains a unique end-to-end infrastructure within a realistic operational setting, accessible to world class students, researchers and innovators from various disciplines across the many Georgia Tech research centers. GT-RNOC leverages the unique position of Georgia Tech as



a pre-eminent network and network service hub and provides researchers with access to this unique network infrastructure.

Faculty: *Matt Sanders, Russ Clark*, Siva Jayaraman, Bill Eason, Sean Donovan

Learn More at: <http://rnoc.gatech.edu>

Smart Cities - Metro SDX

Civic Computing, Collaborative Work, Networking

Russ Clark, Sean Donovan

Smart communities have many different network providers, often sharing underground conduits or telephone poles. Their proximity cannot be closer in many cases. Unfortunately, in order for one network to send traffic to the other, providers often must connect through a third party, or must send their nearby city to exchange traffic. Further, a network may fail, and there is no alternative for the end user other than to wait for their provider to fix the failure.

LinkedIn Conference Product

Human-Computer Interaction, Online Communities, Social Computing, Social Networking, Product Design

Bill Eason, Carrie Bruce, Geunbae "GB" Lee

There are hundreds and thousands of professional conferences across the globe. While a lot of people come to seek new insights, learn and present, a huge chunk of people also look for networking opportunities with other attendees. However, initial discoveries were made that actually, there are some gaps in how attendees network with others especially before and after the conferences.

Convergence Innovation Competition

Civic Computing, Collaborative Work, Educational Technologies

The Convergence Innovation Competition (CIC) is a unique competition open to all Georgia Tech students and is run in both the Fall and Spring semesters. Each year the categories in the CIC are defined by our Industry partners who provide mentorship, judging, and category specific resources which are often available exclusively to CIC competitors. While the competition is not tied to any specific course, competitors are often able to take advantage of class partnerships where lecture and lab content, guest lectures, and projects are aligned with competition categories.

GT Journey: APIs for facilities and other campus data

Augmented Reality, Civic Computing, Collaborative Work

Matt Sanders, Russ Clark, Siva Jayaraman, Brian Davidson

GTJourney is an opportunity for all members of the Georgia Tech community to collaborate on applications and solutions that benefit the campus. It is a virtual focal point for students, faculty, and staff to develop ideas and solutions, find technical support and resources, advertise and access campus data, and share applications and experiences.

IoT Testbed

Civic Computing, Human-Computer Interaction, Mobile and Ubiquitous Computing

Russ Clark, Bill Eason, Geunbae Lee, Abdoulie Njie, Chris Blackstone, Jack Bordoni

The Internet of Things (IoT) will soon touch nearly all of the interactions we have with our world and with the things around us, and the interaction of those things with each other. GT-RNOC is developing a number of IoT-related

projects that help students demonstrate and better understand some of the complexity and range of applications that the IoT encompasses.

Software Defined Exchange (SDX)

Russ Clark, Nick Feamster, Siva Jayaraman

The SDX project is applying the principles of Software Defined Networking and Infrastructure to the problems of peering between network operators and service providers. This work seeks to overcome the traditional limitations of peering protocols such as BGP to enable operators and their customers to express rich, application specific policies that facilitate the integration of cloud computing and virtualization into numerous applications.

Social Dynamics & Wellbeing Lab (*outside 222*)

Health Informatics, Social Computing

Social Dynamics and Wellbeing Lab

We study, mine, and analyze social media to derive insights and develop mechanisms toward improving our health and well-being. As social media technologies are adopted more pervasively, the line between our online and offline lives is disappearing slowly but steadily. Content shared on these platforms often revolves around day-to-day happenings and experiences in our personal lives, and in our physical and social environments. As such, social media provides a means to capture attributes relevant to our thinking, mood,



communication, activities, socialization, and psychological states. We employ this rich repository of information in addressing outstanding challenges relating to personal and societal well-being.

Faculty: Munmun De Choudhury

Learn More at: <http://www.munmund.net/>

Social media interventions for eating disorder communities on Reddit

Human-Computer Interaction, Online Communities, Social Computing

Munmun De Choudhury, Cheryl Cheong

THRIVE: Technology and Health Related Information to improve wellness

Health Informatics, Social Computing

Munmun De Choudhury, Sindhu Kiranmai Ernala

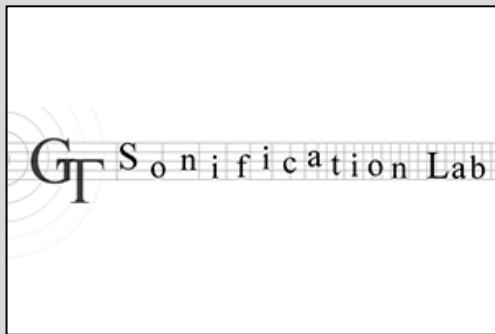
Computational Methods to Understand Online Deviant Mental Health Behaviors

Human-Computer Interaction, Online Communities, Social Computing

Munmun De Choudhury, Stevie Chancellor

Social media has changed how individuals cope with health challenges in good and bad ways. Especially for stigmatized mental health conditions like depression, groups and communities offer positive outcomes for those suffering from mental illness. However, in some mental health communities, individuals promote deliberate self-injury, disordered eating habits, and suicidal ideas as acceptable choices rather than dangerous actions.

Sonification Lab (222) *Mobile and Ubiquitous Computing, Perception*



The Georgia Tech Sonification Lab is an interdisciplinary research group based in the Schools of Psychology and Interactive Computing. The lab focuses on the development and evaluation of auditory and multimodal interfaces, and the cognitive, psychophysical and practical aspects of auditory displays, paying particular attention to sonification. Special consideration is paid to Human Factors in the display of information in "complex task environments." We often work with people who cannot look at, or see, traditional visual displays in



order to develop assistive technologies for the visually impaired. Our collaborative research projects often include empirical (lab) studies, software and hardware development, field studies, usability investigations, and focus group studies.

Faculty: Bruce N. Walker

Learn More at: <http://sonify.psych.gatech.edu>

Comparing Metric and Modality of Automation Uncertainty Displays

Human-Computer Interaction, Perception

Bruce N. Walker, Brittany E. Noah

In this project, we aim to develop and evaluate displays of automation uncertainty that aid in transition of control from automated to manual driving. Currently, we are focused on two manipulations of these displays. The first manipulation, metric, is manipulated by presenting system reliability information (Reliability) or the level of engagement necessary for the driver (Required Driver Engagement, RDE). The second manipulation, modality, is manipulated by presenting the information visually, auditorily, or with a combination of visual and auditory information (multimodal).

School Bus Information System

Bruce Walker, Alex Beall, Muchao Tang, Andy Jin

We are working with Atlanta Public Schools (APS) to design a school bus information system that streamlines communication between parents, school administrators, and APS. Parents are empowered with pertinent information like late buses and substitute drivers, so they can know when the bus is coming and when it has safely arrived at school. With relevant bus tracking information and the ability to send announcements, the tool helps schools manage their morning arrival and afternoon dismissal processes.

Solar System Sonification

Bruce Walker, Brianna Tomlinson, Mike Winters, Chris Latina, Smruthi Bhat, Milap Rane

Students in the Sonification Lab and Center for Music Technology designed Solar System Sonification, an auditory experience of the planets. Using non-speech audio to convey information, they built a musical model of the solar system. Planetariums typically rely on visuals with various levels of speech description, but have not explored using auditory cues to present information about space. Auditory displays, like the ones developed for Solar System Sonification, enable more immersive experiences and make information accessible to people with visual impairments.

Auditory Displays for PhET Interactive Simulations

Educational Technologies, Human-Computer Interaction, Information Visualization

Bruce Walker, Jonathan Schuett, Brianna Tomlinson, Jared Batterman, Jonathan Schuett, Brianna Tomlinson, Jared Batterman, Mike Winters, Zachary Kondak, Henry Wang, Prakriti Kaini, TJ Funso

The graphs and figures that are so prevalent in math and science education make those topics largely inaccessible to blind students. We are working on auditory graphs that can represent equations and data to those who cannot see a visual graph. A number of new areas we're starting research on is looking at teaching astronomy concepts through (like the Solar System) and the teaching and understanding of weather information through a combination of sonification and auditory description.

Understanding Technology Categorization

Human-Computer Interaction

Bruce Walker, Rachel Stuck

Accessible Fantasy Football Drafting System

Human-Computer Interaction

Bruce Walker, Rohan Katyal

Fantasy Sports allow users to compete against each other using statistics from real-world competitions. It's a fun and social online game which allows participants to assemble virtual teams of real world athletes of a professional sport. These teams compete based on the performance of their players in the real world. The team gains or loses points based on the real athletes' weekly performance. Fantasy players manage their teams based on real sports data.

TanDEm (GVU Café) *Human-Computer Interaction, International Development*



In the TanDEm lab, we focus on matters relating to the design, deployment, adoption, and use of technologies towards empowerment of underserved and under-represented communities in resource-constrained regions across the world.



Faculty: *Neha Kumar*

Learn More at: <http://tandem.gatech.edu/>

Roots

International Development

Examining Cultural Representation in Emoji

Human-Computer Interaction, New Media, Social Computing

Philippe Kimura-Thollander

Refuge Tech

Human-Computer Interaction

Neha Kumar, Azalea Irani

Understanding Approaches to Adolescent Health Education

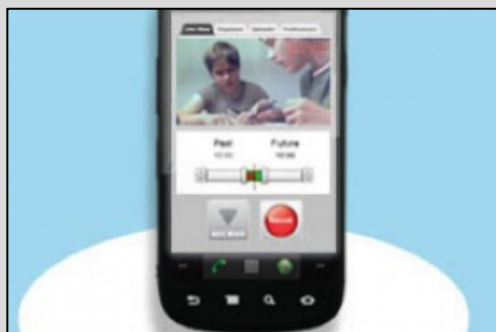
Collaborative Work, Human-Computer Interaction, International Development

Neha Kumar, Shruti Dalvi

Cultural taboos and inflexible social norms make it challenging to teach and communicate about menstrual health education in India. We present an investigation of current approaches used to educate adolescents about menstruation, examining the perspectives of parents, teachers, social workers, and health professionals for identifying design opportunities and potential for impact. There is also a palpable difference in attitudes regarding who must be taught, how, where, and when. We articulate factors that could shape access and receptivity to this knowledge.

Ubiquitous Computing Group (235)

Mobile and Ubiquitous Computing, Information Visualization



We are interested in ubiquitous computing and the research issues involved in building and evaluating ubicomp applications and services that impact our lives. Much of our work is situated in settings of everyday activity, such as the classroom, the office and the home. Our research focuses on several topics including, automated capture and access to live experiences, context-aware computing, applications and services in the home, natural interaction, software architecture, technology policy, security and privacy issues, and



technology for individuals with special needs.

Faculty: *Gregory Abowd*

Learn More at: <http://ubicomp.cc.gatech.edu>

Novel Interactions with Wearable Devices

Human-Computer Interaction, Mobile and Ubiquitous Computing, Wearable Computing

A series of demonstrations of novel interactions with wearable devices, from smartwatches to head-mounted displays.

EarBit: Using Wearable Sensors to Detect Eating Episodes

Human-Computer Interaction, Mobile and Ubiquitous Computing, Wearable Computing

We demonstrate a wearable system that detects eating instances in real time.

Trigger Hunter, 2.0

Augmented Reality, Health Informatics, Mobile and Ubiquitous Computing

Rosa Arriaga, Komal Hirani, Krish Dholakia, Cal Stephens, Conor Fitzpatrick

Trigger Hunter, 2.0 is an iOS augmented-reality game that was designed in Spring 2017 and developed in Fall 2017. The objective for this application is to teach children about their own asthma and how to manage it in a fun and engaging experience. We decided to teach children specifically about the environmental triggers that can cause asthma and can be found in a common household. With the recent development of mobile augmented reality APKs such as ARKit, we decided to integrate this new technology within our game.

COSMOS: COmputational Skins for Multi-functional Objects and Systems

Artificial Intelligence, Human-Computer Interaction, Mobile and Ubiquitous Computing

Gregory Abowd, Alan Dingtian Zhang, Nivedita Arora, Felix Tener, Eui Min Jung

COSMOS (COmputational Skins for Multi-functional Objects and Systems) is an interdisciplinary collaborative project to design, manufacture, fabricate, and apply "computational skins". COSMOS consist of dense, high-performance, seamlessly-networked, ambiently-powered computational nodes in the form of 2D flexible surfaces that can process, store, and communicate sensor data. Achieving this vision will redefine the basis of human-environment interactions by creating a world in which everyday objects and information technology become inextricably entangled.

CampusLife

Human-Computer Interaction, Mobile and Ubiquitous Computing, Social Computing

Gregory Abowd, Munmun De Choudhury, Lauren Wilcox, Kaya De Barbaro

College students encounter many challenges in the pursuit of their educational goals. When these challenges are prolonged, they can have drastic consequences on health and on personal, social, and academic life. Our multi-institution project, called CampusLife, conceptualizes the student body as a quantified community to quantify, assess, infer, and understand factors that impact well-being.

Collective Sensing: Building Better Human Networks

Human-Computer Interaction, Mobile and Ubiquitous Computing, Social Computing

Gregory Abowd, Rosa Arriaga, Jung Wook Park, Hayley Evans

Collective sensing is a novel mobile technology which aims to build better human networks. It uses multiple informants to collect information regarding an individual in a variety of contexts with the goal of creating a more holistic story.

Exploring 3-dimensional interactions on wearable devices

Human-Computer Interaction, Wearable Computing

Gregory Abowd, Ruichen Meng

Understanding Interruptibility for Self-Reports

Cognitive Science, Human-Computer Interaction, Mobile and Ubiquitous Computing

Gregory Abowd, Thomas Ploetz, Vedant Das Swain

The intention is to understand in which contexts you feel motivated to report about your personal state. A typical GT student has a very busy life and it becomes challenging for researchers to obtain self-reported information from them in a natural setting. Using the sensors on your phone it is possible to learn the best time to interrupt students for information. Predicting moments when participants of in-the-wild studies feel motivated to report data can potentially improve the quality of such data.

Birthday Candles

Educational Technologies, Human-Computer Interaction, Mobile and Ubiquitous Computing

Rosa Arriaga, Nikita Rajput

A social media application that aims to bridge the gaps between those with asthma and caregivers, family, and friends. Users create, share, and send virtual birthday cakes which other members of the community can contribute candles to. This application is educational and is made in collaboration with the CHEST society.

Amazing Me: Milestone tracking via an interactive e-book

Health Informatics, Mobile and Ubiquitous Computing

Rosa Arriaga, Yiran Ma

Early development of children is a critical issue for young parents. However, symptoms of abnormality may occur in a subtle manner, and parents often fail to recognize them or seek for help at an early stage. This is often because they lack certain knowledge or professional guidance. CDC distributed brochures to promote knowledge of children early development. However, this form of publication contains large volume of information and is hard to popularize. Furthermore, even though parents' role in solving this problem is significant, they could not do it alone.

HandWhich - Detecting Handedness on mobile devices

Human-Computer Interaction, Mobile and Ubiquitous Computing

Thomas Ploetz, Carrie Bruce, Kriti Nelavelli

Before the introduction of phablets, foot scale devices and other mobile devices larger than 4 inches, mobile devices were more conducive to one handed usage. Mobile touchscreens were accessible using the thumb when being held with four fingers. The thumb could be used to operate the device. At this size, most parts of the touchscreen were still reachable. The current trend in increasing screen sizes has created a gap in the one-handed usability of mobile devices.

Visual Analytics Lab (334) *Information Visualization*

VA.lab

Our goal is to help people make sense of data. We research and develop interactive visualizations that couple machine learning with visual interfaces of data for exploration and sensemaking.



Faculty: **Alex Endert**

Learn More at: <http://va.gatech.edu/>

Warning, Bias May Occur: Detecting Cognitive Bias in Visual Analytics

Cognitive Science, Human-Computer Interaction, Information Visualization

Alex Endert, Emily Wall

Visual analytic tools provide interactive interfaces to help people gain insights and understanding about data. Such tools show visualizations depicting the output of analytic models. People can explore different views, change model parameters, and control aspects of the system through user interaction that allow them to ask questions of the data and see responses visually.

Podium: Ranking Data Using Mixed-Initiative Visual Analytics

Human-Computer Interaction, Information Visualization

Alex Endert, Emily Wall, Subhajit Das, Ravish Chawla

People often rank and order data items as a vital part of making decisions. Multi-attribute ranking systems are a common tool used to make such data-driven decisions. These systems are often table-based tools that can produce rankings based on numerical weights that a user assigns to each attribute, where the weight represents how important the user believes an attribute is to their decision. These systems assume that users are able to quantify their conceptual understanding of how important particular attributes are; however, this is not always the case.

MLB Statistics InfoVis

Human-Computer Interaction, Information Visualization

Alex Endert, Steve Jones

Work2Play (GVU Cafe) *Health Informatics, HCI, Int'l Development*



Computing affects our lives, shaping not just how we work, but also how we play. It potentially allows individuals to blur the boundaries by letting us conduct domestic routines while in the office, or working from a cafe in an urban centre. Researchers in the Work2Play lab are interested in using a variety of empirical techniques to advance the state of the knowledge in how computing affects our lives from work to play. Following Human-Centered and Human-Computing we conduct field studies, develop insights, deploy ICTs and evaluate impact. Past



research has laid the foundation for the Work2Play lab by examining communication and coordination in both work and recreational settings.

Faculty: *Rebecca (Beki) E. Grinter*

Learn More at: <http://www.cc.gatech.edu/~beki/wpl/Work2Play.html>

Let's Talk About Race: Identity, Chatbots, and AI

Artificial Intelligence, Human-Computer Interaction, Social Computing

Ari Schlesinger

Why is it so hard for chatbots to talk about race? This work explores how the biased contents of databases, the syntactic focus of natural language processing, and the opaque nature of deep learning algorithms cause chatbots difficulty in handling race-talk. In each of these areas, the tensions between race and chatbots create new opportunities for people and machines. By making the abstract and disparate qualities of this problem space tangible, we can develop chatbots that are more capable of handling race-talk in its many forms.



Thank You

for being a part of IPaT Industry Innovation Day and the GVV Center & Digital Media Research Showcase at Georgia Tech.

We look forward to learning more about your needs and interests. To learn more about our industry partner programs through IPaT or the GVV Center please contact us.

Siva Jayaraman | Manager - Strategic Partnerships
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Keith Edwards | Director
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How Do We Shape the Future?

The Possibilities Are Unlimited

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