GVU Center & Digital Media

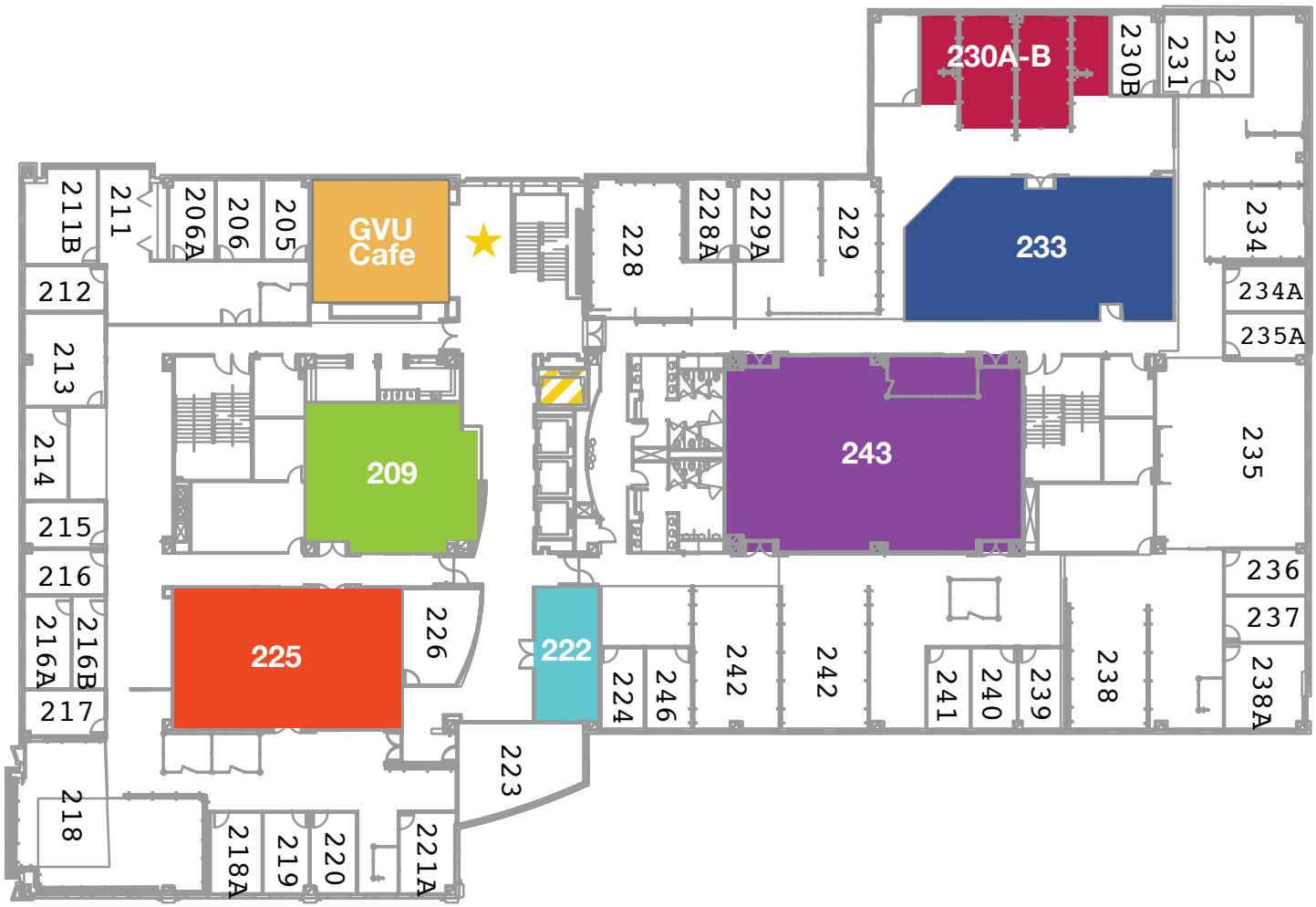
Research Showcase

Technology Square Research Building

4.15.2015

Georgia Tech

TSRB 2nd Floor



209	Synlab Design & Interaction Studio
222	Sonification Lab
230A-B	Graphics Lab
225	Design & Intelligence Lab (dilab)
233	Augmented Environments Lab
GVU Cafe	MS-HCI Project Lab Center for Music Technology
243	Contextual Computing Group Animal Interaction Lab

Basement Access

Registration

TSRB 3rd Floor

325	ADAM Lab Digital World and Image Group
309	Aware Home Research Initiative Interactive Media Technology Center
345	Comp.Social Lab
339	Computational Enterprise Science Lab
324	Contextualized Support for Learning
332	Electronic Learning Communities Everyday Computing Lab

322	Experimental Television Lab
342A	Information Interfaces Group
316	Participatory Publics Lab
333	GT RNOC
329	Ubiquitous Computing Group
323	Urban Transportation Information Lab Participatory Publics Lab

Basement Access

Demo Listing and Locations

Basement

GVU Prototyping Lab
GVU Prototyping Lab
Air Gestures in the Vehicle

2nd Floor

Animal Interaction Lab – Room 243
FIDO – Facilitating Interaction For Dogs With Occupation

Augmented Environments Lab - Room 233
ARToss : Networked Argon3 Game Demo
Auburn Avenue: Augmented Reality for Cultural Heritage
Interaction Techniques for Children's Augmented-Reality Education
Transmedia Storyscape: An Ecology of Transmedia Storytelling

Contextual Computing Group – Room 243
Captioning on Glass
CHAT – A Dolphin Interaction Wearable
CopyCat
Order Picking with Wearable Computers
Passive Haptic Learning
SmartSign

Design & Intelligence Laboratory – Room 223
Intelligent Biologically Inspired Design
Watson Goes Natural

Design and Social Interaction Studio –Room 209
Atlanta Beltline Exploration App
Particle in a Box (An Experiential Approach to Quantum Mechanics Education)
Sweet Auburn Digital Media Initiative

GT Center for Music Technology – GVU Café

Visual Policy Research Initiative Graphics Lab – Room 230A-B
Animating Human Dressing
From Animated Character to Real Robots

MS-HCI Project Lab –Room GVU Cafe
ColorSense: An Interactive Platform to Inform and Assist in the Selection of Color for Physical Spaces
CourseCover
Poster: Problem Solving in Video Games

Social Dynamics and Wellbeing Lab – Room 226
Discovering Links between Reports of Celebrity Suicides and Suicidal Ideation from Social Media
Insights into Psychological Wellbeing and Urban Crime Via Social Media
Instagram Content Moderation in Pro-Eating Disorder Communities
Observing Food Consumption Patterns through Instagram

Sonification Lab - Room 222
Advanced Auditory Menus
Air Gestures in the Vehicle
Audio Lemonade Stand Game
Auditory Graphs: Math and Science Education for Students with Vision Impairment
Bone Conduction Audio
Driving Georgia Tech: Creating a Driving Simulation of Georgia Tech's Campus
Enhanced In-Vehicle Technologies: Novel Interfaces and Advanced Auditory Cues to Decrease Driver Distraction
Mwangaza Project
Sonified Fantasy Sports

Synaesthethic Media Lab – Room 209
Mapping Place
Pathways Builder
ROSS: Responsive Objects, Surfaces, and Spaces
SciSketch
Sparse Tangibles
TASC: Tangibles for Augmenting Spatial Cognition
VPorter

Floor 3

ADAM Lab - Room 325
EarSketch
EarSketch Viz
PeerSketch: A Mobile Platform for Collaborative Coding and Remixing using EarSketch
Tangible Program Learning Table
Viewpoints AI: An Exploration of Human - AI Movement Improvisation

Aware Home Research Initiative - Room 309
Cue - Connecting U Everyday
RERC TechSAge: A Mobile Application to Measure Gait Speed
RERC TechSAge: SmartBathroom

Computational Enterprise Science Lab - Room 339
dotlink360: A Visual Business Analytics tool for Competitive Intelligence
Enterprise Genome: Visual Sequencing of Relationship Activities of Global Enterprises
Visualization Support for Early-Phase Complex Engineered System Design

Contextualized Support for Learning - Room 324
CSLearning4U: Creating Electronic Books for Teacher CS Learning

Digital World and Image Group - Room: 325
Digital Naturalism

Electronic Learning Communities - Room 332
Copyright Terms of Service: Reality vs Expectations

Everyday Computing Lab – Room 332
Creating Personalized Health Support to Improve Patient Centered Care
Digital Self Harm - Understanding Online Occurrences of Self-Injury

Designing an Mobile Adaptive Dashboard for Breast Cancer Journeys – Room 333
Motivational Glanceable Reminders - Designing a Better Medication Reminder App for Pediatric Asthma

Experimental Television Lab - Room 322
Infinite Programming Guide
InSync - Companion App for Live Sports
Universe United

Information Interfaces Group - Room 342A
GLO-STIX (Graph-Level Operations)
Mobile Information Visualization
SentenTree: visualizing large-scale social media text
SpaceSketch - Multitouch Exploration of Urban Public Safety Data

Interactive Media Technology Center (IMTC) - Room 309
eCoach: Avatar-Guided Decision Aid for Prostate Cancer
Food For Thought: Developing a Cognitive Training Game for Older Adults
Games for Assessment

HealthSmart: A Mobile Personal Health Record for Behavioral Health Homes
Order Up!: Mobile Gaming To Promote Healthier Diet Choices
Personalized Augmented Reality Lenses for STEM Education

Participatory Publics Lab – Room 316
Design for Mindfulness
Redesigning the Career Fair Experience

Research Network Operations Center (RNOC) - Room 333
Campus Tour
Convergence Innovation Competition
GT Art Crawl
GT Journey
GTMobile
Magic Window

Ubiquitous Computing Group – Room 329
Personal Taxi Meter
Using Visual Analytics to Explore Social and Communicative Behaviors

Urban Transportation Information Lab - Room 323
OneBusAway

Demos By Research Areas

Artificial Intelligence
CourseCover
Intelligent Biologically Inspired Design
Viewpoints AI: An Exploration of Human
Watson Goes Natural

Augmented Reality
ARToss : Networked Argon3 Game Demo
Auburn Avenue: Augmented Reality for Cultural Heritage
Campus Tour
GT Art Crawl
GT Journey
Interaction Techniques for Children's Augmented-Reality Education
Magic Window
Sweet Auburn Digital Media Initiative
Transmedia Storyscape: An Ecology Of Transmedia Storytelling

Civic Computing
Convergence Innovation Competition
DataToMusic Web API
eCoach: Avatar-Guided Decision Aid for Prostate Cancer
GT Journey
Sweet Auburn Digital Media Initiative
Visual Policy Research Initiative

Cognitive Science
Design for Mindfulness
TASC: Tangibles for Augmenting Spatial Cognition
Viewpoints AI: An Exploration of Human

Collaborative Work
Convergence Innovation Competition
Digital Naturalism
GVU Prototyping Lab
GT Journey
Magic Window
Pathways Builder
Vporter

Educational Technologies
Audio Lemonade Stand Game
Auditory Graphs: Math and Science Education for Students with Vision Impairment

Convergence Innovation Competition
CourseCover
CSLearning4U: Creating Electronic Books for Teacher CS Learning
EarSketch
EarSketch Viz
eCoach: Avatar-Guided Decision Aid for Prostate Cancer
Games for Assessment
GT Journey
Interaction Techniques for Children's Augmented-Reality Education
Mapping Place
Particle in a Box (An Experiential Approach to Quantum Mechanics Education)
Pathways Builder
PeerSketch: A Mobile Platform for Collaborative Coding and Remixing using EarSketch
SketchMaster
Tangible Program Learning Table
TASC: Tangibles for Augmenting Spatial Cognition

Gaming
ARToss: Networked Argon3 Game Demo
Audio Lemonade Stand Game
eCoach: Avatar-Guided Decision Aid for Prostate Cancer
Games for Assessment
Interaction Techniques for Children's Augmented-Reality Education
Particle in a Box (An Experiential Approach to Quantum Mechanics Education
Poster: Problem Solving in Video
SketchMaster
Sonified Fantasy Sports
Transmedia Storyscape: An Ecology of Transmedia Storytelling

Graphics and Animation
Animating Human Dressing
Driving Georgia Tech: Creating a Driving Simulation of Georgia Tech Campus
EarSketch Viz
From Animated Character to Real Robots
Tangible Program Learning Table

Health Informatics
Convergence Innovation Competition
Creating Adaptive Technology to Improve Patient Centered Care
Cue – Connecting U Everyday
Designing an Mobile Adaptive Dashboard for Breast Cancer Journeys
HealthSmart: A Mobile Personal Health Record for Behavioral Health Homes
RERC TechSAge: A Mobile Application to Measure Gait Speed
Using Visual Analytics to Explore Social and Communicative Behaviors

Human Computer Interaction
Advanced Auditory Menus
Air Gestures in the Vehicle
Audio Lemonade Stand Game
Auditory Graphs: Math and Science Education for Students with Vision Impairment
Campus Tour
ColorSense an interactive platform to inform and assist in the selection of color for physical spaces
Convergence Innovation Competition
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CSLearning4U: Creating Electronic Books for Teacher CS Learning
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Design for Mindfulness
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Enhanced In-Vehicle Technologies: Novel Interfaces and Advanced Auditory Cues to Decrease Driver Distraction
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Using Visual Analytics to Explore Social and Communicative Behaviors
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Information Visualization
Advanced Auditory Menus
Auditory Graphs: Math and Science Education for Students with Vision Impairment
Campus Tour
Convergence Innovation Competition

dotlink360: Visual Business Ecosystem Intelligence
Enterprise Genome: Visual Sequencing of Relationship Activities of Global Enterprises
GLO-STIX
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SentenTree: Visualizing Large-Scale Social Media Text
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Sweet Auburn Digital Media Initiative
Using Visual Analytics to Explore Social and Communicative Behaviors
Visual Policy Research Initiative
Visualization Support for Early-Phase Complex Engineered System Design

Mobile and Ubiquitous Computing
Advanced Auditory Menus
Air Gestures in the Vehicle
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HealthSmart: A Mobile Personal Health Record for Behavioral Health Homes
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RERC TechSAge: A Mobile Application to Measure Gait Speed
RERC TechSAge: SmartBathroom
ROSS: Responsive Objects, Surfaces and Spaces

Music Technology
DataToMusic Web API
EarSketch
EarSketch Viz
PeerSketch: A Mobile Platform for Colloborative Coding and Remixing using EarSketch
Tangible Program Learning Table

New Media
ARToss: Networked Argon3 Game Demo

Convergence Innovation Competition
CSLearning4U: Creating Electronic Books for Teacher CS Learning
InSync – Companion App for Live Sports
Magic Window
Mapping Place
SketchMaster – Educational Platform for Learning Sketching
Trans media Storyscape: An Ecology Of Transmedia Storytelling
Viewpoints AI: An Exploration of Human-AI Movement Improvisation

Online Communities
Convergence Innovation Competition
InSync – Companion App for Live Sports
Sonified Fantasy Sports

Perception
Auditory Graphs: Math and Science Education for Students with Vision Impairment
Bone Conduction Audio
Enhanced In-Vehicle Technologies: Novel Interfaces and Advanced Auditory Cues to Decrease Driver Distraction
Poster: Problem Solving in Video Games

Robotics
Digital Naturalism
From Animated Character to Real Robots
VPorter

Social Computing
Algorithmic Bypassing Censorship on Sina Weibo with Nondeterministic Homophone Substitutions
Digital Self Harm
Discovering Links between Reports of Celebrity Suicides and Suicidal Ideation from Social Media
GT Art Crawl
Insights into Psychological Wellbeing and Urban Crime Via Social Media
Instagram Content Moderation in Pro-Eating Disorder Communities
SentenTree: visualizing large-scale social media text

Virtual Reality
Campus Tour
Driving Georgia Tech: Creating a Driving Simulation of Georgia Tech's Campus

Wearable Computing
Bone Conduction Audio
Convergence Innovation Competition
Digital Naturalism

FIDO – Facilitating Interaction For Dogs With Occupation

GVU Prototyping Lab
Basement

Come see the tools that we use to create one-of-a-kind research prototypes. We have everything from laser cutters and 3D printers to table saws and soldering irons, and we use them to create many of the custom electronics, cases, and wearable prototypes you see in our demos. The Prototyping Lab is located in the basement of the building, so just look for signs by the elevators to go down there, or meet by the elevators on the 2nd floor every quarter hour on the quarter hour to get a tour.

Faculty: Scott Gilliland, Sean Brennan, Keith Edwards
Students: Derek Yeung, Lily Burkeen, David Howard

2nd Floor

Animal Interaction Lab – Room 243
Melody Jackson, Thad Starner, Clint Zeagler

FIDO - Facilitating Interactions for Dogs with Occupations

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 scenarios with five wearable sensors designed for dogs to activate.

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

Students: Giancarlo Valentin, Larry Freil, Ryan Kerwin, Ceara Byrne, Joelle Alcaidinho, Jay Zuerndorfer, Lily Burkeen, Zehua Guo

Augmented Environments Lab - Room 233
Blair MacIntyre, Jay Bolter

ARToss: Networked Argon3 Game Demo

ARToss is a multiplayer game built using Argon using a NodeJS web server with WebSockets.

Auburn Avenue: Augmented Reality for Cultural Heritage

We are developing a suite of media experiences to introduce visitors to the rich cultural and economic history of Auburn Avenue. From about 1900 to 1960, Auburn Avenue was the center of African-American cultural and economic life in the city. The street also played a key role in the civil rights movement. From the 1960s on, the street suffered decline, and the local community disintegrated because of a range of social, economic, and urban planning factors. In recent years, however, the community has been the focus of revival efforts with attractive apartments and homes at its eastern end and increased economic activity along its more blighted corridor. In 2014 or 2015, a new streetcar line promises to bring even more tourists to its main attractions: the Martin Luther King Visitors Center, King's birth home, the Ebenezer Baptist Church, and the King Memorial. Sweet Auburn was designated a National Historic Landmark in 1976. We are working in collaboration with Central Atlanta Progress and the History Preservation Division of the Dept of Natural Resources of the State of Georgia to bring this history to thousands of visitors and residents through an integrated integrated media strategy. Our media strategy centers on a prototype of a mobile app using the Argon browser. This will be supported by web applications that can run on other mobile devices as well as a web site.

The content types and features that we will explore include:
a. audio, images and text delivered on location at places of interest along the avenue.
b. panoramas and historical photographs to depict the visual history of Sweet Auburn.
c. informative texts to replace or complete existing physical signage;
d. forms of interaction that trigger the delivery of these images, audio, and text: for example, when users walk down the street, GPS tracking can tell the phone when to play certain audio or show certain images.
e. links to social media so that visitors can record their experience of the tour of the avenue for friends or for their own later use.

Our ultimate goal is to ensure the broadest possible class of visitors and web users to have a satisfying and informative experience of Auburn Avenue and make sure that the digital media application is a successful and sustainable informational companion that supports the preservation and revitalization efforts in this area.

Faculty: Jay Bolter, Nassim JafariNaimi
Students: Colin Freeman, Cleberson Forte, Deepak Gopinath

Interaction Techniques for Children's Augmented-Reality Education

Augmented-reality is a technology that can revolutionize children's education and entertainment. In studies of adolescents and adults, it has been shown to have measurable benefits for advancing STEM education through situated 3D simulations, providing entertainment through whole-body interaction, and enhancing physical & cognitive rehabilitation through motivational engagement.

We are interested in bringing such experiences into the hands of elementary-school children. In this project we are studying young children's ability to effectively use various types of handheld-AR interfaces. Handheld-AR interfaces are different from more traditional interfaces, by being small portable windows into physical spaces augmented with digital content, and their use may require more complex motor and cognitive skills than compared to traditional interfaces. Due to the novelty of handheld-AR technology, there are no standard interaction techniques for handheld AR, and little is known about children's ability to use these interfaces.

Through this research we are generating guidelines for technology designers, answering questions such as: What kinds of handheld-AR interaction techniques are suitable for young children? To what degree does age influence children's ability to interact with handheld-AR interfaces? What are best practices for designing handheld-AR interfaces for children?

Faculty: Blair MacIntyre
Students: Iulian Radu, Sahithi Bonala, Andrea Lau

Transmedia Storyscape: An Ecology of Transmedia Storytelling

TRANSMEDIA STORYSCAPE
The story of The Ghost Club is bigger than just a feature film – it inhabits a complex world with a deep history and mythology that engages its audience members, inviting them into the Ghost Club storyscape.
The concept of the Club, its team members, and the reality and rules of this world are introduced through a variety of non-traditional media channels – web series, social networks, online games, augmented reality mobile applications, and more.

The Ghost Club transmedia storyscape generates a cohesive alternate reality that engages fans, encouraging them to discover, explore, and even participate in the world of ghosts and hunters.
Storyscape components include:

THE GHOST CLUB WEBISODES introduce viewers to the team and the show, and highlight story elements only hinted at in the feature film – including Noreen being a reporter who is secretly investigating the Club.
TEAM FACEBOOK PROFILES & TWITTER FEEDS are where The Ghost Club team members post and tweet about the other investigations taking place during their final season. This establishes the rules of the show, the personalities of the investigators, and expands on team member relationships only hinted at during the feature film – such as Austin and Caitlin's flirtations.
THE GHOST CLUB WEBSITE serves as the "official" site for The Ghost Club, including the club genealogy, current team member bios, findings from past investigations, ghost tech diagrams, investigative techniques, and how-to tips.
GHOST-PEDIA is a wiki allowing fans and amateur investigators to enter information about hauntings, ghosts, and investigation techniques.
THE GHOST CLUB AUGMENTED REALITY APP: GHOST vs. CLUB is a mobile game that allows our viewers to either become ghost hunters and search for geo-tagged spirits or to become spiritualists who summon ghosts for the hunters to find.
THE GHOST CLUB FLASH GAMES are a variety of online games that let fans try their hand at investigating ghosts. The flash games introduce the different techniques and equipment of ghost hunting.

Faculty: Jay Bolter
Students: Hank Blumenthal, Yan Xu, Richard Shemaka

Contextual Computing Group – Room 243
Thad Starner

Captioning on Glass

Captioning on Glass is an on-going project creating an app for Google Glass with a companion Android phone app to assist the hard-of-hearing in everyday conversations. We are also working on another version of this app, “Translation on Glass”, which will add the ability to translate between English and another language.
Faculty: Thad Starner
Students: Jay Zuerndorfer

CHAT - A Dolphin Interaction Wearable

CHAT (Cetacean Hearing Augmentation & Telemetry) is a wearable underwater computer system, engineered to assist researchers in establishing two-way communication with dolphins. The project seeks to facilitate the study of marine mammal cognition by providing a waterproof mobile computing platform. An underwater speaker and keyboard enables the researchers to generate whistles. The system is equipped with a two channel hydrophone array used for localization and recognition of specific responses that are translated into audio feedback. The current system is the result of multiple field tests, guided by the researchers feedback and the environmental constraints.
Faculty: Thad Starner, Peter Presti, Scott Gilliland
Students: Daniel Kohlsdorf , Celeste Mason

CopyCat

This project involves the design and evaluation of an interactive computer game that allows deaf children to practice their American Sign Language skills. The game includes an automatic sign language recognition component utilizing computer vision and wireless accelerometers. The project is a collaboration with Dr. Harley Hamilton at the Atlanta Area School for the Deaf.
Faculty: Thad Starner, Peter Presti
Students: Kareem Hemanshu, Zahoor Zafrulla

Order Picking with Wearable Computers

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, including: • Pick-By-Paper list • Pick-By-Light • Pick-By-Tablet • Pick-By-HUD (Heads-Up Display).
Faculty: Thad Starner
Students: Shashank Raghu, Saad Ismail, Joseph Simoneau, Anhong Guo, Xiaohui Luo, Xuwen Xie

Passive Haptic Learning

Passive Haptic Learning (PHL) is the acquisition of sensorimotor skills without active attention to learning. Vibrations are used to passively 'teach' the motor skill and are typically delivered by a wearable, tactile interface. Our group has previously demonstrated Passive Haptic Learning of piano melodies and of typing skills for text entry on a unique 10-key keyboard. We now investigate whether Passive Haptic instruction facilitated by wearable computers may be a feasible method of teaching Braille typing.
Faculty: Thad Starner
Students: Caitlyn Seim

SmartSign

This project involves the development and evaluation of a mobile content delivery system. Using small, unplanned moments throughout the day, we endeavor to increase the ability of hearing parents with deaf children to recognize and produce American Sign Language vocabulary.
Faculty: Thad Starner
Students: Kimberly Weaver

Design & Intelligence Laboratory – Room 223
Ashok Goel

Design Study Library: Aiding Biologically Inspired Design

Biologically inspired design (also known as biomimicry and biomimetics) espouses the use of biological systems as analogues for inspiring the design of technological systems. However, biologically inspired design is cognitively challenging because it entails cross-domain analogies from nature to design and most designers are not experts in biology. This raises the question about how can we support interactive learning of the processes of biologically inspired design? The Design Study Library (DSL) is a digital library that provides on-demand access to eighty three case studies of biologically inspired design. A small exploratory study with DSL indicates that its use enhances novice designers' understanding of biologically inspired design understanding. We are now introducing DSL as a cyberlearning tool that complements and supplements classroom learning about biologically inspired design.

Faculty: Ashok Goel, Maithilee Kunda, Spencer Rugaber
Students: Tesca Fitzgerald, David Joyner, Rochelle Lobo, Bryan Wiltgen, Gongbo Zhang

Watson Goes Natural

Design and Social Interaction Studio – Room 209
Nassim Jafarinaimi

Atlanta Beltline Exploration App

A collection of projects that explore the convergence of entertainment formats and computation, with focus on HCI design and research methods.

Sanat Rath: Giggles, an application to help viewers relive moments from their favorite sitcoms.
Sruthi Padala: A second screen application for the popular TV show 'The Voice'.
Vipul Thakur: Talkista, an application that serves as your information resource, companion in conferences, meetups and classrooms.
Amrutha Krishnan: Newspad, design of a second screen application for news that enables viewers to understand the news better by providing them the required context as well as supplementary information.

Faculty: Janet Murray
Students: Sanat Rath, Sruthi Padala, Vipul Thakur

Particle in a Box

(An Experiential Approach to Quantum Mechanics Education)

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. How can we advance experience-based learning of abstract concepts such as QM so students develop the in-depth understanding needed to further advance these theories by generating and testing new hypotheses? This research project addresses this question through a series experimen-

tations with digital media (e.g., by designing interactive games based on the rules of QM) engaging whether and how digital media could serve as the basis for an experiential understanding of QM concepts.

Faculty: Nassim Jafarinaimi (DM); Azad Naeemi (ECE)
Students: Rose Peng, Mithila Tople, Shaziya Tambawala, Ridhima Gupta, Auzita Irani, Aditya Anupam, Bill Dorn, Baishen Huang

Sweet Auburn Digital Media Initiative

Can locative media (Augmented and Mixed Reality, web applications, and social networking) serve as a platform for preservation of cultural heritage, informal education, and civic engagement?

This is the question at the heart of the Auburn Avenue Research Project, a project that brings together researchers from variety of disciplines – including media theory, design studies, and human-computer interaction – to engage the above question in theory and practice. Through the creation of a tiered media strategy, the Auburn Avenue Research Project takes advantage of real world development project (e.g., new physical signage, street car) and potentials of digital technology to raise awareness of Auburn Avenue's history an future trajectory, to increase the number of visitors to the neighborhood, and to support community preservation and revitalization efforts. Project objectives include:

To explore the usage of locative media forms for their potential to increase civic engagement among visitors and residents.

To make the rich cultural heritage and history of Auburn accessible to people by integrating new and old representational media.

Faculty: Jay David Bolter, Nassim Jafarinaimi
Students: Colin Freeman

Visual Policy Research Initiative

The Visual Policy Initiative aims to transform complex policy issues into easy to understand data visualizations using empirically-derived evidence. The Visual Policy team is comprised of a group of researchers from both public policy and digital media. Through this collaborative effort, we aim to transform complex policy issues into easy to under-

stand data visualizations using empirically-derived evidence. In our current endeavor, our team is focused on showing the economic and societal costs of autism spectrum disorder (ASD), and how those costs vary depending on age of diagnosis and age of intervention.

Autism prevalence rates in the United States have more than doubled since 2000 (from 1 in 150 to 1 in 68 children being identified). Despite this trend as the nation's fastest growing developmental disability, many insurance providers, including Medicaid, do not cover autism services or early intervention services for Autism Spectrum Disorders (ASD). Our research project draws on policy research and human-centered design research to build communication tools and strategies ("digital boundary objects") that aid the public and legislators in understanding the negative economic impact of late intervention and present the existing evidence that justifies the passage and implementation of early intervention services in ASD. The first set of these communication tools is aimed at policymakers to improve the continuum of care and interagency system of supports for children with autism. We foresee variations of the developed communication strategies to be used by the public for raising awareness and enabling collective action.

Faculty: Nassim Jafarinaimi, Kim Isett
Students: Binjie Sun, Brighton Vino Jegarajan, and Loren Crawford (Project Manager, Public Policy MS 2014)

Graphics Lab – Room 230A-B
Greg Turk, Karen Liu, Jarek Rossignac

Animating Human Dressing

Dressing is one of the most common activities in human society. Perfecting the skill of dressing can take an average child three to four years of daily practice. The challenge is primarily due to the combined difficulty of coordinating different body parts and manipulating soft and deformable objects (clothes). We present a technique to synthesize human dressing by controlling a human character to put on an article of simulated clothing. We identify a set of primitive actions which account for the vast majority of motions observed in human dressing. These primitive actions can be assembled into a variety of motion sequences for dressing different garments with different styles.

Faculty: Karen Liu, Greg Turk
Students: Alex Clegg, Jie Tan

From Animated Character to Real Robots

Faculty: Karen Liu, Greg Turk
Students: Jie Tan

MS-HCI Project Lab –Room GVU Café
Young-Mi Choi

ColorSense an Interactive Platform to Inform and

Assist in the Selection of Color for Physical Spaces

ColorSense is an interactive platform to inform and assist the Do-It-Yourself consumer about color paint selections for interior architectural space.

Faculty: Young-Mi Choi
Students: Patrcia Joe

CourseCover

CourseCover is an interactive course recommendation system for graduate students in Georgia Tech.

Students: Shan Li

Poster: Problem Solving in Video Games

The purpose of this study is to evaluate the effect of brief peripheral imagery on problem solving in video games.

Faculty: Bruce N. Walker
Students: Jordan Ashworth

Social Dynamics and Wellbeing Lab Room – 223
Munmun De Choudhury

Discovering Links between Reports of Celebrity Suicides and Suicidal Ideation from Social Media

Faculty: Munmun De Choudhury
Students: Mrinal Kumar

Insights into Psychological Wellbeing and Urban Crime Via Social Media

This ongoing study investigates the effect that proximate criminal activity has on emotional expression in social media. Proximity to crime and well constant fear of crime can have great negative psychological effects on individuals. Social media currently being one of the most popular means of publicly expressing personal opinions and emotions, we expect to find an effect of temporal and spatial proximity to crime on social media mood expression and other patters of online communication. Moreover, we expect that the use of certain terms related to crime will have different emotional connotations that correlate with the baseline criminal level of activity in the area.

Faculty: Munmun De Choudhury
Students: Jose Delgado

Instagram Content Moderation in Pro-Eating Disorder Communities

The existence of pro-eating disorder (pro-ED) communities has challenged many social media platforms, such as Instagram. These communities promote the adoption and progression of eating disorders, which are known to have negative impacts on health. Instagram has reacted by banning searches on several pro-ED tags as well as issuing content advisories on others. In response, the pro-ED community has adopted non-standard lexical variations of these moderated tags to circumvent restrictions. This research investigates the impacts of Instagram banning tags on the community. Our work analyzes how the pro-ED community changes what tags it uses to avoid detection, what topics are discussed before and after banning, and what intervention and design strategies can be taken to assist these populations.

Faculty: Munmun De Choudhury
Students: Stevie Chancellor

Sonification Lab - Room 222
Bruce Walker

Advanced Auditory Menus

Many electronic devices, from desktop computers to mobile phones to DVD players, can be thought of as a menu of functions. These functions can be accessible to a blind user if the menus are spoken aloud. However, this is extremely inefficient, so we have been enhancing auditory menus with sophisticated text-to-speech, spearcons, spindex, and other audio extensions. These can also be applied in many different languages and research is ongoing to look at more language applications, including tonal types.

Faculty: Bruce Walker
Students: Thomas Gable, Brianna Tomlinson, Stanely Cantrell

Air Gestures in the Vehicle

Modern sensor technology is beginning to allow for cost-effective deployment of air gesture interfaces in the vehicle. Unlike the current standard of direct touch, air gesture interfaces do not require that the driver takes their eyes off the road, especially when coupled with properly applied auditory or tactile feedback.

While emerging systems like Apple Carplay and Android Auto support limited speech commands, the majority of tasks still require visually targeted touch interaction, which poses a safety hazard to drivers.

Research in the Sonification Lab centers on developing guidelines for automotive interface designers on how to create air gesture interfaces which provide minimal cognitive, motor and visual demand to drivers. We combine user-centered HCI design with comprehensive engineering psychology evaluation using eye tracking, physiological measures, performance measures and subjective measures to take a data-driven approach to air gesture systems in the vehicle.

Faculty: Bruce Walker
Students: Keenan May, Thomas Gable, Shawn Wu, Ruta Sardesai

Audio Lemonade Stand Game

This project helps teach STEM concepts with an audio-enabled version of the Lemonade Stand Game, in which visually impaired players (or any player that wants to experience a game that is sound dependent) need to manage their own stand while factoring in weather, local events, advertisement, and pricing in order to maximize profit for their business.

Faculty: Bruce Walker
Students: Jonathan Schuett, Renee Blair

Auditory Graphs: Math and Science Education for Students with Vision Impairment

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 new area we're starting research on is looking at teaching astronomy concepts through (like the Solar System) through a combination of sonification and auditory description. Additionally we are working on making statistical output accessible for blind users to assist with higher level mathematics applications. We have a whole ecosystem of software and hardware solutions, both desktop and mobile, to help in this space. This project is in collaboration with the Georgia Academy for the Blind and the Center for the Visually Impaired of Atlanta.

Faculty: Bruce Walker
Students: Jared Batterman, Yee Chieh Chew, Ashley Henry, Vincent Martin, Jonathan Schuett, Brianna Tomlinson, Michelle Johnson, Eric Flynn, Heather Roberts

Bone Conduction Audio

Most sound comes through our ears. However, it is also possible to pass vibrations through the bones of the head, and bypass much of the normal hearing pathway. This is called bone conduction audio, and can be used in situations where the ears need to be plugged, or where you need to leave the ears open to hear ambient sounds. We are studying the psychoacoustics as well as the applied aspects of bone conduction audio.

Faculty: Bruce Walker
Students: Jared Batterman, Jonathan Schuett, Thomas Gable

Driving Georgia Tech: Creating a Driving Simulation of Georgia Tech's Campus

Applying driving simulators for in-vehicle research allows for a wide range of studies to be performed particularly when investigating cognitive demand and distraction caused by devices in the car. By using simulations, researchers can investigate driving behaviors in high-risk situations without putting participants or others in harmful way. Currently being conducted within the School of Psychology at Georgia Tech, in-vehicle research could provide more insight into behavior and increase in applicability if participants were able to drive in areas that they are familiar with. Specifically, research being done in coordination with the Atlanta Shepherd Center investigating the use of in-vehicle technologies to assist individuals who have had a Traumatic Brain Injury could benefit largely through these real location maps. The Georgia Tech School of Architecture coincidentally has already developed a 3D model of the Georgia Tech campus and some of the surrounding areas including the Peachtree corridor (26 miles along Peachtree Street). However, in order to make this model usable within the simulator, it must be optimized and converted in a compatible format. Researchers in the School of Architecture and School of Psychology will be working on creating methods and conversion processes that will allow any 3D model to be integrated into the simulator. Development of this process of conversion will allow Georgia Tech to offer documentation and map-creation services to other researchers around the world assisting in increasing the applicability of in-vehicle research.

Faculty: Bruce Walker
Students: Racel Williams, Thomas Gable, Keenan May

Enhanced In-Vehicle Technologies: Novel Interfaces and Advanced Auditory Cues to Decrease Driver Distraction

In-vehicle technologies such as modern radios, GPS devices, and smartphones require users to interact with multiple types of visual-based menus and lists while driving. Modern technologies require users to navigate these screens using physical buttons and touch screens, although recent advances have included the use of steering wheel buttons, turn wheels, Head Up Displays (HUDs) and others. Through design and prototyping of novel menu system interfaces through innovative visual display methods, interaction techniques, and the application of advanced auditory cues to old designs and these novel interfaces, we can attempt to decrease driver distraction, therefore allowing for

better driving performance, while also improving search times and decreasing cognitive load on the driver.

Faculty: Bruce Walker
Students: Thomas Gable, Keenan May, Siddharth Raja, Dean Samuels, Bhargav Rajendra, Fang He, Nayef Ahmar, Yuanzhe Fan

Mwangaza Project

The Mwangaza Project is a collaboration among the Sonification Lab, inAble, and Kenyatta University to develop and deploy accessible STEM educational resources to schools for the blind throughout Kenya. Projects that we are working on include accessible weather and climate education, math software for accessing graphing and number lines, and renewable energy as a component of STEM education and support for educational technologies.

Faculty: Bruce Walker
Students: Dr. Carrie Bruce, Brianna Tomlinson, and other lab members.

Sonified Fantasy Sports

The Sonified Fantasy Sports project has been exploring various ways to add sounds to online (web or mobile apps) fantasy sports in an attempt to make a more immersive user experience while also adding to the accessibility of fantasy sports for visually impaired or print disabled users. After identifying information needs and various strategies employed by users (who ranged from beginners to power users) we were able to identify a hierarchy in which to present information about 'my team' and 'players' using sound. Ongoing investigation is exploring additional ways to employ optimal soundscapes that will result in the most seamlessly integrated audio-visual experience while offering as much accessibility as possible

Faculty: Bruce Walker
Students: Jonathan Schuett, Jared Batterman, Scott Wise, Manasvini Sethuraman, Oriana Ott, Palash Shastri

Synaesthethic Media Lab – Room 209
Ali Mazalek

Mapping Place

As part of the exhibit, Mapping Place: Africa Beyond Paper, which contrasts western concepts of mapping (i.e. Cartesian plots of locations) with other traditional practices, Synlab students created an interactive tabletop installation that lets participants tell their own stories by creating a digital Lukasa, a mnemonic device used by the Luba people of central Africa to record genealogy and history. The exhibition was at the Robert C. Williams Paper Museum from February 27 to June 6, 2014.

Faculty: Ali Mazalek, Ken Knoespel, Teri Williams
Students: Paul Clifton, Jean Ho Chu, Daniel Harley, Yuan Yuan Lin, Jordanna Pavo, Jessica Crabb

Pathways Builder

Pathways Builder aims to support learning and discovery in systems biology by allowing users to construct and manipulate bio-chemical reaction network simulations using active tangibles on an interactive tabletop display surface. Researchers in systems biology currently run simulation programs that model different experimental parameters such as concentrations inside cells and reaction speeds. Parameters are adjusted algorithmically or by entering numbers into equations. The simulation results are then plotted as graphs in order to discover hidden patterns in the network. Using tangible and tabletop interaction techniques, we provide a direct hands-on way for researchers to construct and manipulate models in order to gain a better understanding of the systems they are studying.

Faculty: Ali Mazalek, Sanjay Chandrasekharan, Nancy Nersessian
Students: Meghna Mehta, Ahmed Arif, Apurva Gupta

ROSS: Responsive Objects, Surfaces, and Spaces

The Responsive Objects, Surfaces, and Spaces (ROSS) API is a way for tangible applications to operate seamlessly across a variety of tangible input devices and platforms. It allows applications to exchange information about the devices they are running on and obtain real-time data about tangible and touch interactions from other devices. In a ROSS world, you can use your mobile phone as a controller to play games on the digital coffee table in your living room; and your guests can join in with their phones too.

Faculty: Ali Mazalek
Students: Ahmed Arif, Aneesh Tarun, Andrea Bellucci, KJ Chabra

SciSketch

Sketching plays an important role in learning in the sciences. The process of sketching can help students think about and better understand scientific concepts. By sketching collaboratively, students can also compare their mental models with each other and share them with instructors in order to further enhance their understanding. What if these sketches could come to life so that students could experimentally test out and iteratively refine their models of natural phenomena and systems? We are designing SciSketch, a tabletop tool for sketch-based problem-driven collaborative learning in the sciences. The system tracks multiple pen inputs on a tabletop display surface and can transmit sketch data to a remote computer. The first prototype provides basic functionality of digital sketching tools, such as copy, paste, and playback. We study how such a tool could be incorporated into the classroom environment for undergraduate courses in biomedical engineering.

Faculty: Ali Mazalek, mazalek@gatech.edu; Joe LeDoux, joe.ledoux@bme.gatech.edu
Students: Brien East, Jamie Kwan, Carly Villeneuve, Hariish Nanthakumar, Zafar Sayed

Sparse Tangibles

Sparse Tangibles investigates the use of novel tangible and gestural interactions for making sense of large biological datasets. Our current prototype employs active tangibles in combination with a large multi-touch tabletop displays to navigate and visualize gene regulatory network data from the BioGrid database.

Faculty: Ali Mazalek, Matt Kyan
Students: Ahmed Arif, Roozbeh Manshaei, Gordon Walker, Kelly Stinton

TASC: Tangibles for Augmenting Spatial Cognition

Spatial ability has been shown to be significantly correlated with interest and success in STEM fields. It also has been linked to embodiment in different ways. Tangible and embodied interfaces have been shown to support embodiment, including linking embodiment to changes in spatial ability. However, little research has linked the interaction design elements of tangible and embodied interfaces to specific effects on spatial

cognition. Our research aims to gain a deeper understanding of the effects of tangible and embodied interfaces on spatial cognition and to develop interface protocols that enhance spatial ability training. Our current prototype employs tangible interaction with physical/digital blocks in a virtual reality environment to support perspective-taking spatial abilities.

Faculty: Ali Mazalek, Michael Nitsche, Tim Welsh
Students: Paul Clifton, Thomas Martin, Joshua Gonsalves, Georgina Yeboah, Alex Vella, Esty Shulman

VPorter

Face-to-face video communication technologies have grown tremendously in recent years, however they are not designed to provide a persistent sense of remote presence. More recently, telepresence robots give single users the ability to have a remote and mobile physical presence in another space. Combining telepresence robotics with persistent large-scale displays and multiple viewports, VPorter creates a telepresence ecology to support team collaboration across remote but connected lab spaces.

Faculty: Ali Mazalek
Students: Aneesh Tarun, Apurva Gupta, Daniel Harley, Carlos Wong, Shane Morris, Jiao Xue

3rd Floor

ADAM Lab - Room 325
Brian Magerko

EarSketch

Computational remixing of hip hop (i.e. using code to control loops and beats to compose music) can be used as a tool for the cultural engagement in computing of underrepresented populations. EarSketch is a digital audio workstation environment, with an accompanying curriculum, that will allow high school and summer workshop students to create their own computational remixes through learning computing principles.

Faculty: Brian Magerko, Jason Freeman
Students: Regis Verdin, Anand Mahadevan, Chris Latina, Tulika Saraf, Tanisha Wagh, Alex Duncan, Ziwen Fan, Tom Jordan, Elise Livingston, Michael Madaio, Scott McCoid, Erica Richards

EarSketch Viz

EarSketch plus visualization and real-time interactivity.

Faculty: Brian Magerko
Students: Ashley Jennings, AJ Kolenc, Devin Wilson

PeerSketch: A Mobile Platform For Collaborative

Coding and Remixing Using EarSketch

Faculty: Dr. Brian Magerko
Students: David Hendon, Pedro Silva, Michael Madaio

Tangible Program Learning Table

This project is a responsive tabletop application with a tangible user interface. The intention is to teach basic computer programming concepts to middle school-aged to high school-aged children (9-15 years old) using physical blocks that work as snippets

of code. Each block has a unique design on the bottom that when placed on the acrylic surface of the table is identified by the software using cameras mounted underneath the acrylic surface of the table. When the arrangement of blocks is recognized, the application outputs musical and visual feedback. Users compose short songs by building chains of blocks that represent code.

Faculty: Brian Magerko
Students: Marc Huet, Jessica Anderson, Travis Gasque

Viewpoints AI: An Exploration of Human - AI Movement Improvisation

Viewpoints AI is an interactive art installation that explores the improvisation of pro-to-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 from directly interacting with people. It analyses the movement using the Viewpoints framework from theatre and dance.

Faculty: Brian Magerko
Students: Mikhail Jacob, Tory Anderson, Allen Tsai, Margaret Hu

Aware Home Research Initiative – Room 309
Brian Jones

Cue - Connecting U Everyday

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. Many families turn to monitoring when they discover such hazards, but this can result in their loved one feeling a loss of independence. We feel there is an opportunity before monitoring to use technology to provide gentle reminders or cues that empower the resident to determine for themselves when such appliances should be turn off.

Introducing *cue*. The system would consist of several ambient and/or wearable reminder products that would integrate with existing connected home systems and provide those

gentle reminders both at and away from the primary hazard. We have designed, a couple of example reminder concepts, mainly for the stove, oven, iron, or heater to address this need. The latest consists of a device in proximity of the stove that provides a larger/brighter light than most stovetops with an integrated proximity sensing capability and a smartwatch with ability to vibrate and alert through sound and visuals. If motion is no longer detected in the kitchen, the watch would alert the user of the potential hazard. The user may also choose to snooze the reminder.

While we focused on hazardous appliances, this same system may support cues related to medication taking, water leaks, door lock status, smoke detector battery level, feeding or walking the do, or similar needs.

Faculty: Brian Jones, MSEE
Students: Shiva Pandey, M.ID.; Steven Strouble, MS HCI; Varsha Jagdale, MS HCI; Yasmin Hazrat, MEE; Grace Cha, M.ID., Connor McNally, BS.ME

RERC TechSAge: A Mobile

Application to Measure Gait Speed

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. The purpose of this project is to develop a reliable, simple, and cost-effective mobile app to measure gait speed and demonstrate the feasibility of this measure as a predictive tool to identify risk of functional decline and activity limitation in frail elders who are aging with ambulatory disability.

Faculty: Brian Jones
Students: David Byrd; Priyanka Sadandanda

RERC TechSAge: SmartBathroom

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.

Faculty: Jon A. Sanford, M.Arch.; Brian Jones, MSEE; Brad Fain, PhD

Computational Enterprise Science Lab –Room 339
Rahul C. Basole

dotlink360: A Visual Business Analytics

Tool for Competitive Intelligence

Business ecosystems are characterized by large, complex, and global networks of firms, often from many different market segments, all collaborating, partnering, and competing to create and deliver new products and services. Given the rapidly increasing scale, complexity, and rate of change of business ecosystems, as well as economic and competitive pressures, analysts are faced with the formidable task of quickly understanding the fundamental characteristics of these interfirm networks. Existing tools, however, are predominantly query- or list-centric with limited interactive, exploratory capabilities. We have designed and implemented dotlink360, a web-based interactive visualization system that provides capabilities to gain systemic insight into the compositional, temporal, and connective characteristics of business ecosystems. dotlink360 consists of novel, multiple connected views enabling the analyst to explore, discover, and understand interfirm networks for a focal firm, specific market segments or countries, and the entire business ecosystem.

Faculty: Rahul C. Basole, John Stasko
Students: Arjun Srinivasan

Enterprise Genome: Visual Sequencing of

Relationship Activities of Global Enterprises

In an increasingly global and competitive business landscape, firms must collaborate and partner with other firms to ensure survival, growth, and innovation. Understanding the evolutionary composition of a firm's relationship portfolio and the underlying formation strategy is a difficult task given the multidimensional, temporal nature of the data. In collaboration with senior executives, we have designed and implemented an interactive visualization system that enables decision makers to gain both systemic (macro)

and detailed (micro) insights into a firm's relationship activities and discover patterns of multidimensional relationship formation. Our system provides sequential/temporal representation modes, a rich set of additive crosslinked filters, the ability to stack multiple enterprise genomes, and a dynamically updated Markov model visualization to inform decision makers of past and likely future strategy moves.

Faculty: Rahul Basole
Students: Timothy Major, Arjun Srinivasan

Visualization Support for Early-Phase

Complex Engineered System Design

The design and production of complex engineered systems (CES) requires analysis of massive amounts of detailed information, including data on products and materials, engineering designs, manufacturing specifications, supply chain and delivery data, and changing customer needs. Visual analytics promises to offer tools and methods that will help stakeholders interactively explore, discover, and make sense of the underlying data. Our work focuses on the early design phase during which a large design space is explored, inconsistencies are identified, poor alternatives are pruned, and valuable alternatives are considered further. We demonstrate our ideas through an example of a two-degree-of-freedom robot and look at opportunities for future work for visualization in manufacturing design.

Faculty: Rahul C. Basole
Students: Timothy Major

Contextualized Support for Learning - Room 324
Mark Guzdial

CSLearning4U: Creating Electronic Books for Teacher CS Learning

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 educa-

tional psychology. In-service high school teachers are particularly time-constrained (and thus need efficiency) and they are more metacognitively aware than other students (and thus able to better inform the project design). The new medium will combine multiple modalities, worked examples, and structure based on cognitive models of designers' knowledge. The research questions are that (1) the teachers will learn CS knowledge in the on-line setting, (2) the teachers will be more efficient at programming tasks, and (3) the teachers will find the materials useful and satisfying. Because of its focus on teachers, the project can potentially have broad impact, in particular on the strategies for training the 10,000 teachers envisioned in the CS 10K Project. The project will establish models and design guidelines that can be used for the creation of other learning materials, including materials for students in, for example, the proposed new CS Principles AP course.

Students: Briana Morrison, Miranda Parker, Barbara Ericson, Stephen Moore

Digital World and Image Group – Room 325
Michael Nitsche

Digital Naturalism

Digital Naturalism investigates the role that **Digital Media** can play for **Biological Field Work**. It looks to uphold the naturalistic values of wilderness exploration, while investigating the new abilities offered by digital technology. Digital Naturalism unites biologists, designers, engineers, and artists to build and analyze new devices. It focuses on crafting DIY technology and interacting with animals in new ways.In particular, Digital Naturalism looks at how digital media can be used to explore animal behaviors situated in their natural context. Most recently, this research has been carried out directly in the field in the form of Hiking Hackathons.This research originally comes from Andrew Quitmeyer's PhD research at Georgia Institute of Technology. It now forms a lifelong project and multiple cross-disciplinary collaborations all pursuing the many aspects of Digital Naturalism.

Faculty: Michael Nitsche
Students: Andrew Quitmeyer

Electronic Learning Communities - Room 332
Amy Bruckman

Copyright Terms of Service: Reality vs Expectations

Every day, ordinary Internet users engage with complex copyright laws. Particularly in the context of creative work and appropriation, they are making decisions related to legal areas that are notoriously gray. Where legal knowledge is imperfect, social norms and ethical intuitions fill in the gaps. This research attempts to understand how these decisions are made, how norms and knowledge differ in different creative communities, and what lessons can be derived for online community management and design.

Faculty: Amy Bruckman
Students: Casey Fiesler, Jessica Feuston

Everyday Computing Lab – Room 332
Beth Mynatt

Creating Personalized Health Support

to Improve Patient Centered Care

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. Our technology needs to anticipate and recognize barriers to care that occur at various points in a cancer journey, adapt with the patient as they navigate these barriers, and successfully provide patients with the tools and resources they need to manage and mitigate such barriers. The goal of our work is to improve patient health outcomes by supporting patients' outside of the clinic by helping them to learn about, engage with, and manage their disease alongside the demands of daily life.

Faculty: Beth Mynatt, James Clawson
Students: Maia Jacobs, Florian Foerster

Digital Self Harm - Understanding

Online Occurrences of Self-Injury

This project aims to define the concpet 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 operatlonalized defintion 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 technologie sfor self-harm prevention, mitigation, and treatment.

Faculty: Elizabeth Mynatt
Students: Jessica Pater

Designing an Mobile Adaptive

Dashboard for Breast Cancer Journeys

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. Our technology needs to anticipate and recognize barriers to care that occur at various points in a cancer journey, adapt with the patient as they navigate these barriers, and successfully provide patients with the tools and resources they need to manage and mitigate such barriers. The goal of our work is to improve patient health outcomes by supporting patients' outside of the clinic by helping them to learn about, engage with, and manage their disease alongside the demands of daily life.

Faculty: Beth Mynatt, James Clawson
Students: Maia Jacobs, Florian Foerster

Motivational Glanceable Reminders - Designing

A Better Medication Reminder App for Pediatric Asthma

This research aims to explore the use of glanceable reminders with a motivational component to support medication adherence. The healthcare industry has begun to focus on mobile health (mHealth) to improve medication adherence through the use of medication reminders. To date, mHealth apps have provided reminders that are text-based and purely informational in nature. The goal of using motivational glanceable reminders is to provide reminders that appeal to the emotional side of a person's decision making process and can be interpreted at a glance without the need to read, or even be literate.

The research focuses on the pediatric asthma population. This research uncovers insights that can inform the design of future medication reminder mHealth apps that seek to integrate motivational glanceable reminders.

Faculty: James Clawson, Mark Braunstein
Students: Shane Owens

Experimental Television Lab – Room 322
Janet Murray

Infinite Programming Guide

Faculty: Janet Murray
Students: Jesse Shedd, Chong Guo, Michael Lefco

InSync - Companion App for Live Sports

Exploring experiences for a real-time companion device application to enhance live sports-watching experiences. The application facilitates for active social engagement typically of sports and assists in understanding the dynamics of the match more efficiently.

Faculty: Dr. Janet H. Murray
Students: Brighton Vino Jegarajan

Universe United

Universe United is a second screen experience designed to bring transparency to transmedia storytelling, focused on connections between storytelling conventions such as items, characters, events, and locations. With this approach, we hope to enlighten both newcomers and veterans of a particular cinematic and/or television universe.

Faculty: Janet Murray
Students: Dillian Eversman, Lauren Schaffer, Mithila Tople, Timothy Major

Information Interfaces Group – Room 342A
John Stasko

GLO-STIX (Graph-Level Operations)

Graph-Level Operations (GLOs) are a holistic vocabulary of encapsulated manipulations of graph visualization elements. GLOs allow analysts to explore their network data in new and interesting ways, freeing them from being restricted to predefined graph visualization techniques. GLOs also provide software engineers with an alternative, extensible means of writing extensible graph visualization applications. Finally, GLOs provide an elegant method for generating animated transitions between graph visualization techniques. GLO-STIX is a user-centered application for exploring a network using GLOs.

Faculty: Polo Chau, John Stasko
Students: Chad Stolper, Brian Kahng

Mobile Information Visualization

Visualization has an important role in science and technology. People rely on visualizations to better understand problems they have to solve. Information visualization has recently increased its domain, from being used for representations of business data, to more political and social uses via groups like visualizing.org and infosthetics.com. In parallel with this growth we have seen the widespread acceptance of mobile technology by masses. Mobile phones, today, are being used for everything from email to ticketing and web browsing to watching videos. As society becomes more mobile, it is important to consider the application of information visualization on mobile and other touch based devices. The aim of this project is to understand if and how traditional information visualization techniques like line charts, bar graphs, and treemaps can be useful in a mobile environment and what the best style of interaction with those charts should be.

Faculty: John Stasko
Students: Ramik Sadana

SentenTree: Visualizing Large-Scale Social Media Text

The growing popularity of social media makes it increasingly difficult to keep up with the huge volumes of information they produce. We present SentenTree, a novel visualization technique that helps people gain a quick understanding of the key concepts and opinions expressed in a given social media text set. SentenTree can be used by both casual social media users and professional analysts.

Faculty: John Stasko
Students: Mengdie Hu

SpaceSketch - Multitouch Exploration of

Urban Public Safety Data

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 Perceptive Pixel Interface.

Faculty: John Stasko
Students: Alex Godwin

Interactive Media Technology Center (IMTC) – Room 309
Maribeth Gandy

eCoach: Avatar-Guided Decision Aid for Prostate Cancer

This study employs gaming technologies and techniques to create an intelligent encapsulated conversational agent (ECA) to act as a virtual coach who will lower the cognitive effort required by prostate cancer patients to understand key aspects of decision-making, provide more appropriate reference points from which patients more accurately interpret personal risk, and frame information to optimize the patient's chances of applying his own preferences and values to the decision at hand. A stylized, animated ECA will have a brief, focused conversation with a patient in order to explain, in layman's terms, the various treatment options and their risks and benefits and ask questions to assess the patient's medical literacy and values preferences, for example, the patient may val-

ue interventions with lower risk of side effects over being cancer-free.

The eCoach ECA is being developed with the Unity3D game engine and uses gaming AI tools such as behavior trees to model a dialog and ECA behavior. The patient will respond to each ECA question by selecting from among several predetermined answers and the history of patient answers will determine how the conversation unfolds. For example, if the ECA determines that the patient is not sure about the risks and benefits of the various treatment options, it will spend more time explaining what these are as well as ask questions to assess knowledge of them afterward.

This study represents a multidisciplinary collaboration between Emory University's School of Medicine, the College of Computing and the Interactive Media Technology Center (IMTC) at the Georgia Institute of Technology.

Faculty: Mark Riedl, Scott Robertson, Rob Solomon
Students: Amelia Lambeth

Food For Thought: Developing a Cognitive Training Game for Older Adults

Over the past 2 years, we have performed experiments to understand what activities within a video game context result in cognitive gains (and which do not). From these findings, we have developed a custom cognitive game called "Food for Thought."

The specific goals of this research program are to: understand how video games can contribute to improvements in cognition, what properties of the gaming environment (novelty, active attention, and/or social interaction) are critical for cognitive improvement, create an older adult specific game that leverages the critical properties identified empirically, and test the efficacy of this theoretically designed game to produce the largest gains in the cognitive performance of older adults.

Faculty: Maribeth Gandy, Laura Levy, Rob Solomon, Ben Thompson
Students: Nathan Bailey, Daniel Branton, Amelia Lambeth, Ben Thompson, Lisa Xia

Games for Assessment

We have a multi-year project exploring how game performance and player behavior can be used to perform scientifically valid cognitive, personality, skill, and behavioral measures. This project involves hypothesizing about how game mechanics, levels,

situations etc. could assess aspects of player that are currently measured via validated traditional tests/activities/interviews, designing games around these hypotheses, and running user studies. Another aspect of this work is exploring how theming, feedback, game type influence the assessment validity and the players' desire to play the game.

Faculty: Maribeth Gandy, Mark Riedl, Rob Solomon, Laura Levy, Amy Lambeth
Students: Chris Tansey

HealthSmart: A Mobile Personal Health Record for Behavioral Health Homes

Poor quality of medical care is a major contributor to excess medical morbidity and premature mortality in persons with serious mental illnesses (SMI). To address this problem, community mental health providers are increasingly partnering with safety net medical providers to develop behavioral health homes, integrated clinics in which persons with SMI receive coordinated medical and mental health care. However, behavioral health homes have faced logistical and privacy challenges in integrating electronic medical records across organizations.

This application proposes to develop and test a mobile Personal Health Record (mPHR) to overcome this problem while more fully engaging patients in their health care. The mPHR will have the capability to access medical and mental health medication and lab data in real time; to help clients set and maintain health and lifestyle goals; to provide medication and appointment prompts and reminders; and to facilitate communication with providers via asynchronous communication with the EHRs.

This project is a collaboration with Emory University's Center for Behavioral Health Policy Studies.

Faculty: Jeremy Johnson, Scott Robertson, Jeff Wilson
Students: Robert McIndoe

Order Up!: Mobile Gaming To Promote Healthier Diet Choices

OrderUp! takes health-related gaming in a new direction and seeks to educate players about how to make healthy eating choices in situations nearly everyone encounters regularly in their lives. By casting players as virtual restaurant servers, OrderUp! forces

players to make healthy—and fast—menu decisions for a group of demanding, impatient customers. OrderUp! was originally developed as a simple, casual game on Nokia N95 mobile phones. We are building on research findings from testing this first version of the game to develop a new version with higher fidelity graphics and more sophisticated game play. This new version will run on modern, Android smart phones and will incorporate features intended to promote cognitive flow, an increased level of engagement and fun with the game, such as progressive increases in game play difficulty and better performance and scoring feedback. The revised OrderUp! game will be tested with a population of largely African Americans who are being treated for mental health issues. As such, OrderUp! is designed with contextually relevant motifs and with relevant data and personas.

Faculty: Scott Robertson, Rob Solomon
Students: Amelia Lambeth

Personalized Augmented Reality

Lenses for STEM Education

Augmented reality (AR) has long been explored as a tool for education, from textbooks that come to life, to plant identification training via the augmentation of actual flora, and a tangible molecular modeling tool. The power of AR (overlaying virtual content on the physical world) is that it can be used to show the “unseen” and the “hidden” information in the world. While this can involve showing representations of occluded objects (such as pipes underneath the ground), it can also be used to visually represent data or properties of the physical world that you would not normally see (such as the forces acting on an object). There is considerable research in this area of situated visualization, defined as “the visual representation of data presented in its spatial and semantic context”. This technique addresses the need in certain contexts to convey to the user the relationships between physical objects and virtual data.

We are demoing our initial prototypes that explore how to use AR and the concept of situated visualization to create a combination physical and virtual “exploration kit” for students that allows them to construct simple static and dynamic systems with physical building components. AR will allow the students to see virtual visualizations of the physics properties and concepts (e.g. velocity, acceleration, forces, friction, elasticity), which control the system, in real-time and overlaid on the real objects.

Funded by the Verizon Foundation

Faculty: Maribeth Gandy, Robert Solomon, Chris Moore, Josh Moore, Ben Thompson

Participatory Publics Lab – Room 323
Christopher Le Dantec

Design for Mindfulness

We are living in a multitasking society. We are experiencing an unprecedented level of sensory and cognitive overload, in which we have too many things going on at once, making us more likely to be absentminded. How to involve technology in promoting mindfulness and making it part of the process of achieving it is the question we need to answer in this project.

Faculty: Christopher Le Dantec
Students: Meijie (Jeremy) Xia, Omid Elliyoun

Redesigning the Career Fair Experience

As students, many of us regard career fairs as vital events for securing job and internship opportunities. However, there are several frustrating aspects of career fairs, which can make the experience less enjoyable and less efficient. We aim to improve the overall experience of career fairs while considering the perspectives of multiple stakeholders, through service design.

Faculty: Chris LeDantec
Students: Yan (Vicky) Gao, Megan Hamilton, Varsha Jagdale

Research Network Operations Center (RNOC) – Room 333
Matt Sanders, Russ Clark, Brian Davidson

Campus Tour

Campus Tour is an augmented reality experience of Georgia Tech's campus. Once the channel is loaded in Argon, a standards-based Augmented Reality (AR) web browser

developed by the Augmented Environments Lab. The tour gives information to users through text, pictures and videos. Stops on the tour are panoramic images. Within the panoramas are points of interests that once clicked reveal more information about their topic. Campus Tour allows users to remotely enjoy the beauty of campus or to learn more about Tech while on campus. Campus Tour also lets you build your own expierences and tours. Using our own custom web based editor you can choose which curated elements to use and build off of adding your own custom elements to create your own unique experiences.

Convergence Innovation Competition

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. CIC Competitors are supported by GT-RNOC research assistants who provide technical support and shepherd teams through the competition process. The overarching goal of the CIC is to create innovative and viable products and experiences including a strong user experience and a business case. Winning entries will include a working end-to-end prototype which operates on converged services, media, networks, services, and platforms. CIC winners go on to commercialization, other competitions, as well as internship and job opportunities strengthened by their competition experience.

GT Art Crawl

The annual Clough Commons Art Crawl serves as a unique opportunity for Georgia Tech students to close their books, catch their breath, and enjoy the therapeutic effects of art. The blank walls of the Clough Commons will once again be transformed into a make-shift gallery, all centered around the artistic work of Georgia Tech students.

The RNOC has built the companion app for the Art Crawl utilizing Augmented Reality technologies and the RNOC’s Dev Hub platform

GT Journey

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.

Faculty: Matt Sanders, Russ Clark, Siva Jayaraman, Brian Davidson

GTMobile

GTMobile is a web portal, built and maintained by the GT-RNOC, for the deployment of web applications. GTMobile is meant to be a resource that benefits the Georgia Tech community by providing a place where any student, staff, alumni & faculty can host their application or service.
GTMobile features capabilities such as integration with Campus authentication and authorization to ensure applications and services can be differentiated and offered to the active GT community or the public.
GTMobile is also the showcase for the winning entries of Georgia Tech's Fall Convergence Innovation Competition (cic.gatech.edu).
GTMobile is open to the entire GT community and all are encouraged to host their applications on this portal and ensure that GTMobile is the continued singular web point of presence for GT based services.

Magic Window

Magic Window supports immersive augmented video experiences allowing viewers to change perspective, as if they are looking through a real window.
A rich set of collaborative interactions with live and pre-recorded media content as well as connected devices are possible through gesture-based controls.

Faculty: Russ Clark, Matt Sanders, Brian Davidson, Siva Jayaraman

Ubiquitous Computing Group – Room 329
Gregory Abowd

Personal Taxi Meter

For many American households, transportation is the second highest expense -- behind housing and ahead of food and medical. The average American spends between $9122 (sedan) and $11,599 (SUV) per year to own and operate each vehicle. However, tracking and understanding the personal cost of driving is elusive for the individual. We may know how much we spend on gasoline (per week), car payments (per month), and insurance (twice a year), but few of us know how much we spend driving to work, school, or the grocery store.

We have developed the Personal Taxi Meter, a system that allows you to track the total cost of driving per trip. (This includes not just fuel, but also depreciation, insurance and maintenance.) The motivation for this system is to increase awareness of the transportation costs that are invisible to most of us, so that we can be better-informed about how, when, and where we choose to move around.

Faculty: Gregory D. Abowd
Students: Caleb Southern

Using Visual Analytics to Explore

Social and Communicative Behaviors

Psychology researchers use basic statistical visualizations such as bar charts, line charts, and box plots to explore their datasets. These charts are useful for visualizing one- or two-dimensional data but too simple to capture more complex data such as social and communicative behaviors. To more deeply explore temporal behavioral patterns, especially among a large group of subjects, psychologists could use better visualization tools.

We developed visual analytics tools to help psychology researchers explore social and communicative behaviors captured by new sensing technologies. Based on our conversations with developmental psychologists, we learned that they need tools to find groups of children that exhibit commonalities in their behaviors.

Our sample dataset consists of dyadic social interactions between a child and an examiner. Twenty behaviors from four modes of communication: gaze, speech, gesture and

vocal affect from the children were coded by human annotators and visualized. Two versions of the tool are presented above. One explicitly group children by their behaviors and the other implicitly suggests groups of children with commonalities in their behaviors.

Faculty: Agata Rozga, John Stasko, Gregory D. Abowd
Students: Yi Han

Urban Transportation Information Lab - Room 323
Kari Watkins

OneBusAway

The OneBusAway transit traveler information system gives users information about transit vehicle arrival times including real-time arrivals and schedule information. It is comprised of multiple interfaces to access information, including a website, a mobile-optimized website, and native applications for iPhone, Android and Windows platforms (see http://onebusaway.org). OneBusAway was developed under multiple federal grants as an open-source system allowing other transit agencies to adapt the code for their own systems. The initial development took place at the University of Washington and the Seattle instance still serves over 100,000 unique weekly users. The platform is also now used in Tampa and Washington DC and as the backbone of MTA New York's BusTime.

Here in Atlanta, the Urban Transportation Information Lab (UTIL) has worked to create a local version of OneBusAway using funding from Georgia Tech's GVU Center, the Institute for People and Technology (IPAT) and the National Center for Transportation Systems Productivity and Management (NCTSPM). We have integrated all of MARTA's train and bus real-time information, Georgia Tech's trolley and shuttle real-time information and schedule data from multiple area agencies (see http://atlanta.onebusaway.org). Additional transit services are being added over time. We are using the platform to conduct an evaluation of its impacts on transit riders, specifically using smartcard data to quantify the increase in trips. Previous studies of real-time transit information have demonstrated a number of user benefits, including decreases in perceived and actual waiting times, as well as increases in frequency of travel and customer satisfaction.

Faculty: Kari Watkins, Russ Clark
Students: Candace Brakewood, Tushar Humbe, Landon Reed, Harshath JR

Notes

About GVU Center at Georgia Tech

We've created an unique environment where some of the most progressive work in academic research is being done. Our program has gained international prominence and has become a hotspot for faculty and students committed to developing people-focused, creative, socially relevant technologies.

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