

PLATFORMS & TOOLS



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Bike Safer With Cycle Atlanta App

Researcher: Christopher Le Dantec

More cyclists are hitting the roads in Atlanta, so how can the city become more bike friendly? Researchers at Georgia Tech have created the Cycle Atlanta app, which gives cyclists the power to give City of Atlanta transportation planners the data they need to make Atlanta a better place to ride. The app uses your phone's GPS to record your routes in real-time, allowing the City of Atlanta to know which routes cyclists prefer. The app will also allow users to report problems along their route such as potholes, obstructed bike lanes, etc. The information collected by the app will be used by the City of Atlanta to make strategic improvements to bicycle infrastructure. This innovation will make cycling in Atlanta more pleasant, and encourage those who currently don't bike to give it a go. Development of the Cycle Atlanta app is an ongoing project being conducted by a team of researchers at Georgia Tech along with the City of Atlanta and the Atlanta Regional Commission.





Creating a Community Engagement Playbook

Researcher: Christopher Le Dantec

Communication between a city and its residents is vital in making key decision for the future. Researchers at Georgia Tech are working with the City of Atlanta, the Atlanta Housing Authority, and the Westside Future Fund to develop a community engagement playbook. The group has been working closely over the past year to implement a process for a more open-ended, narrative-based approach to engagement. The goal is to create a set of resources—a playbook—to help guide city departments, community organizations, and local residents on how to work together more effectively on planning and development projects around the city. The playbook provides a resource for more inclusive community engagement, helping to provide plenty of opportunities for citizens to directly help with the planning and implementation of projects that impact their lives.





GT Journey Puts Campus at Your Fingertips

Researchers: Russ Clark, Matt Sanders

The Georgia Tech community includes the people who inhabit our campus daily, students, faculty and staff, our alumni, and even future students and their families. Until recently, there was no single place for members of the Tech community to share their expertise and innovations to improve the campus experience. In response, the Institute for People and Technology and the Research Network Operations Center (RNOC) in the Office of Information Technology launched GT Journey. GT Journey is a three-year initiative to develop a platform for creating and sharing apps, experiences (like augmented reality campus tours), and other technological solutions for common daily challenges. The ecosystem of these applications and services, many leveraging data provided by Georgia Tech, will come together to support the GT “Journey” for members of our community before, during, and after their days as students, faculty and staff.

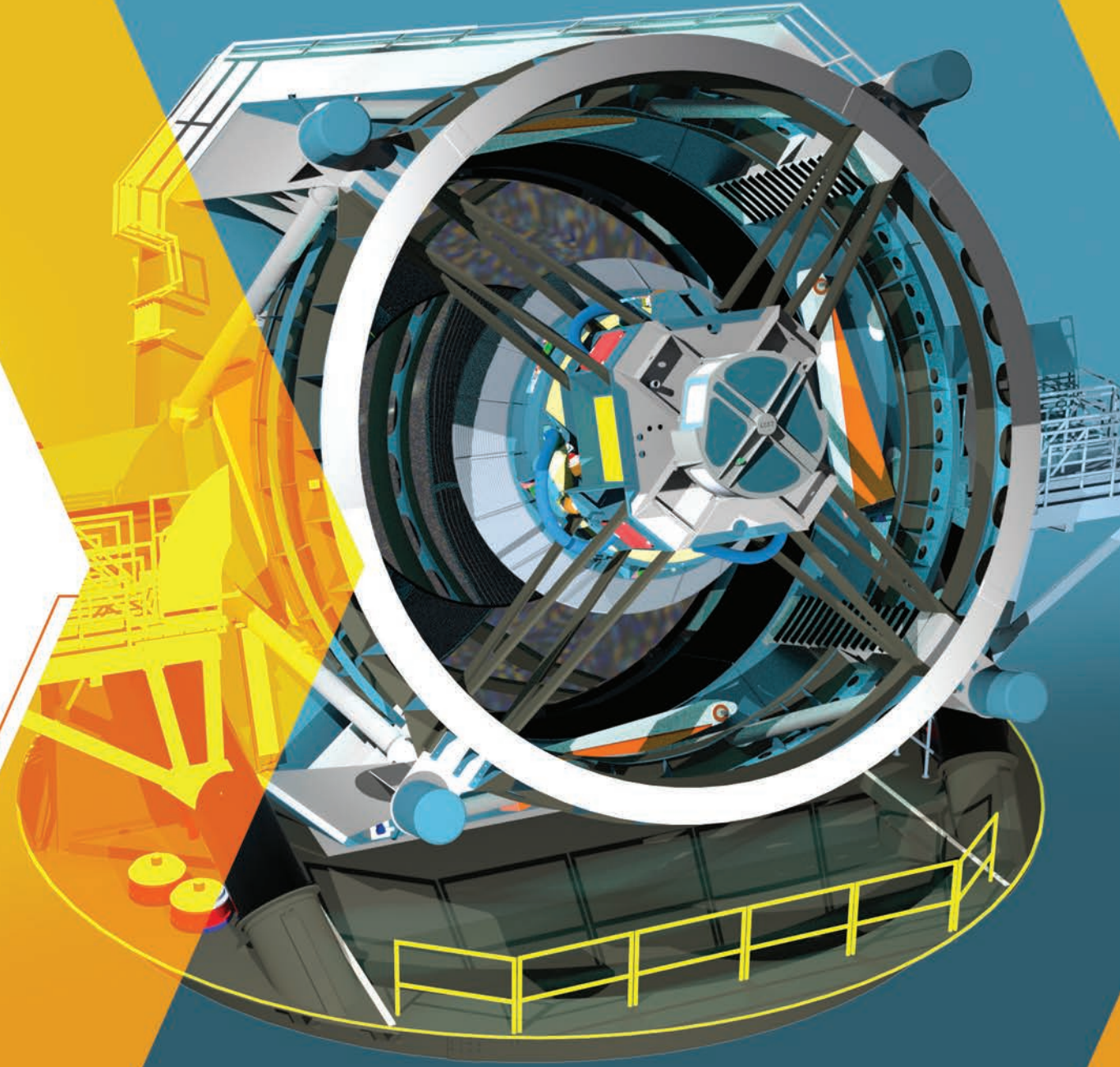




AtlanticWave/SDX - Improving Education Network Connectivity in the Americas

Researchers: Russ Clark, Sean Donovan

In 2020, a huge new American telescope, the Large Synoptic Survey Telescope (LSST), will see first light, and will produce a constant stream of data 1000 times larger than your home Internet connection every night for ten years. The AtlanticWave/SDX platform seeks to provide scientific network users, such as those operating the LSST, an easy to use way of moving their data between North and South America. It uses Software-Defined Networking (SDN), a new networking paradigm that centralizes network control to move data more efficiently, and through multiple networks easier.





Making an RPKI Cookbook to Improve the Safety of the Internet

Researchers: Russ Clark, Tito Nieves

In 2008, Pakistan took down YouTube from entire internet for nearly three hours by announcing to the world that YouTube was in Pakistan. They did this using BGP, the network address book protocol of the internet, to announce that they owned YouTube's IP address. In a BGP Announcement, there is no attestation as to who owns IP addresses. RPKI, the resource public key infrastructure, aims to fix this issue by providing proof that a particular entity owns the IP addresses that they are announcing. Unfortunately, implementing RPKI is not a trivial task, and Georgia Tech researchers are working on making a "cookbook" on how to properly deploy RPKI on university campus routers.



Detecting Crime Correlation from Large-Scale Atlanta Police Report Data

Researcher: Yao Xie

Researchers are developing an efficient algorithm that can detect the correlation between crime incidences using both structured (e.g. time, location) and unstructured (the so-called “free-text”) police report data. The team has been working on developing algorithms to extract information from “free-text,” which is used to estimate the correlation between incidences. A prototype of the algorithm developed by Georgia Tech has shown promising preliminary results on processing the test dataset hand-picked by the Atlanta Police Department, and on much larger scale data from the North Avenue Corridor.





GENI - The Global Environment for Network Innovation

Researchers: Russ Clark, Sean Donovan

One drawback of the success of the Internet is that people have become so dependent on it that we have few opportunities to experiment with new network designs without risking widespread disruption. The NSF funded GENI project has created a platform for researchers to design and test new ideas on a global scale without breaking the current Internet. Georgia Tech researchers have played a central role in the development of GENI and continue to bring new resources to experimenters such as the research Software Defined Exchange (SDX) at the Southern Crossroads (SoX) regional exchange.





Using FirstNet Technology to Assist Emergency First Responders

Researcher: Brad Fain

Researchers are studying how first responders can use FirstNet technologies to receive real-time information about the location and needs of people with disabilities in an emergency situation. FirstNet is an LTE-based emergency responder network that in addition to providing mission critical voice service, will enable location-based services and real-time information access. It is expected that FirstNet will be deployed with a variety of wearable technologies, including integrated helmet displays and other devices integrated into the gear worn by first responders. Prior to arriving on the scene of an emergency, first responders would receive information about the location of individuals and advise them about what special equipment might be needed.





Examining Medicaid Costs for Children

Researchers: Nicoleta Serban, Julie Swann

Most people probably associate 3M with Post-it Notes, but the company has also developed advanced health analytics and health information systems that Georgia Tech researchers are using to analyze Medicaid claims. Nicoleta Serban and Julie Swann of the School of Industrial & Systems Engineering (ISyE) are analyzing claims for 38 million children on Medicaid across the U.S. to compare the differences in cost for patients based on their level of health and income. They will share the results with state agencies with the goal of reducing costs, improving health outcomes for patients, and gaining a better understanding of the Medicaid system in general, which varies from state to state. Children's Healthcare of Atlanta, ISyE and the Institute for People and Technology are providing support for this project.





Understanding Patient Care Through Visual Analytics

Researchers: Rahul Basole, Mark Braunstein, Hyunwoo Park, Duen Horng Chau, Mayank Gupta, Michael Thompson

Healthcare providers are facing greater pressure to deliver high-quality care at lower costs. As a result, the ability to understand disparities in care delivery and related outcomes and accordingly is critically important. Researchers from Georgia Tech and Children's Healthcare of Atlanta have developed a visualization system that helps identify and analyze care processes and how they conform to existing care guidelines. They used the system to analyze data from nearly 5,800 asthma-related pediatric emergency department visits over a 13-month period. Initial results and evaluation show that visualizations provide important insights into the underlying pediatric asthma care processes in the emergency department.



Unlocking Valuable Data in Electronic Health Records

Researchers: Jimeng Sun, Bradley Malin, Joshua Denny, Joydeep Ghosh, Abel Kho

As more healthcare providers adopt electronic healthcare records (EHRs), data in the records is evolving. EHRs now contain everything from diagnoses, medications and lab results, to molecular sequences, unstructured clinical progress notes and social network information. Although EHRs are a valuable resource for clinical research, the data is often difficult to leverage. Georgia Tech researchers are working to address these challenges by developing a general computational framework for transforming EHR data into concise and meaningful concepts, or phenotypes. The proposed framework is expected to have a major impact on translational clinical research including clinical trial design, predictive modeling, epidemiology studies and clinical decision support.





Georgia Tech, UCB Harness the Power of Predictive Analytics in Epilepsy Care

Researcher: Margaret Wagner Dahl

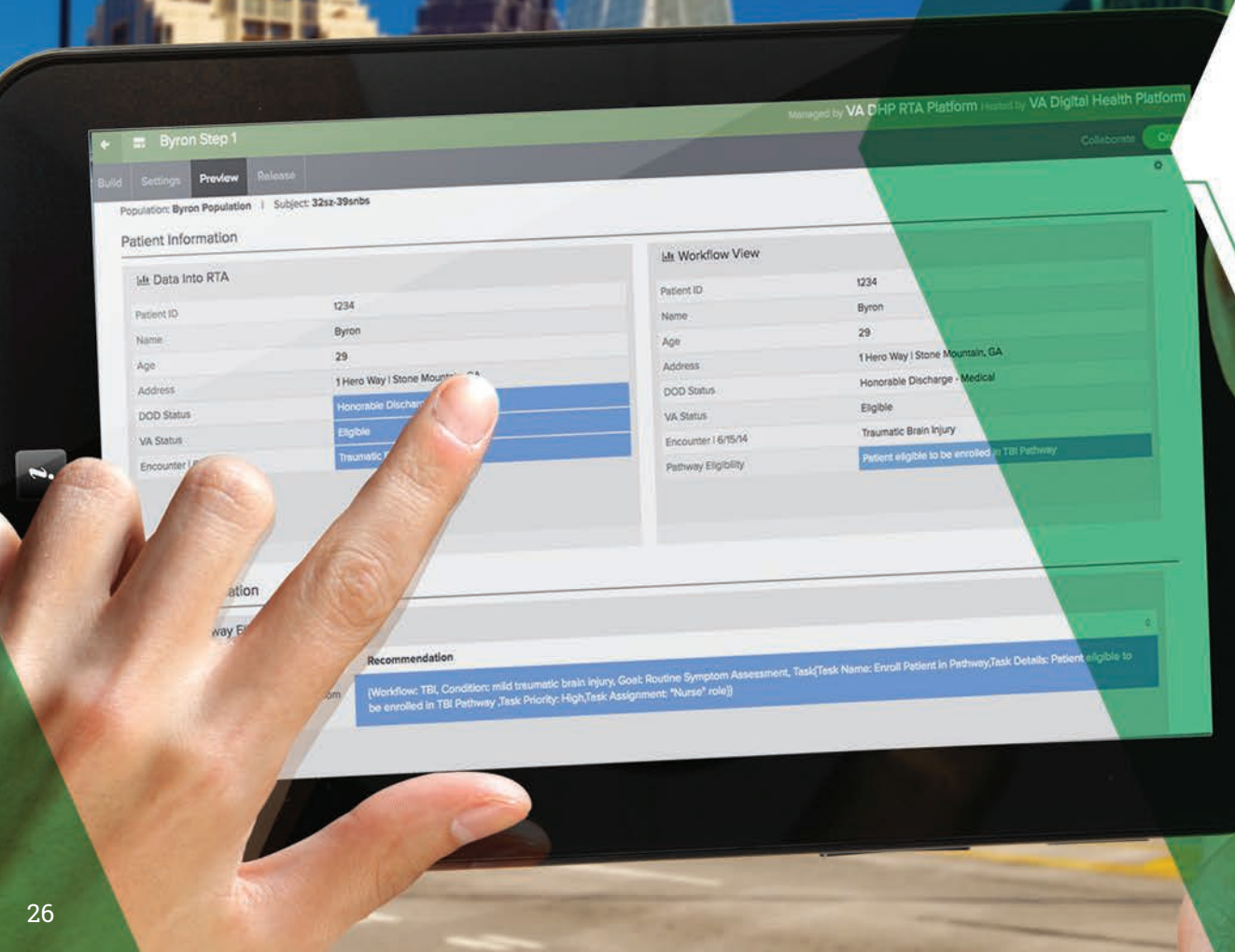
Epilepsy is one of the most common diseases of the central nervous system, affecting approximately 65 million people worldwide. Georgia Tech's Interoperability and Integration Innovation Lab (I3L) and UCB, a global biopharmaceutical company, are exploring how predictive analytics can help inform treatment decisions for people living with epilepsy. Using UCB's access to large sets of epilepsy data and I3L's extensive collection of health IT resources and collaborators, the goal of the partnership is to develop an interactive system that can convert large amounts of anonymous patient data into real-time insights for healthcare providers. Their approach uses computer models to improve epilepsy treatment selections, which could lead to better patient outcomes and lower healthcare costs.



Digital Platform for the Department of Veteran Affairs

Researcher: Steve Rushing

The future path for providing next-generation healthcare to millions of the nation's veterans is here. Researchers at Georgia Tech are collaborating with officials at the U.S. Department of Veterans Affairs and Veterans Health Administration to develop a working and scalable proof-of-concept digital health platform to support the department's long-term vision. For example, the capability to obtain patient data from disparate military and commercial electronic records systems, and accept information from a broad range of ancillary services and consumer medical devices. The open-source project demonstrates both proven and emerging technologies for interoperability and advanced functionality innovations from both the public and private sectors.





Ambient Alerting for Older Adults

Researcher: Brian D. Jones

Students: Reema Upadhyaya, Akhil Oswal, William Gao, Youssef Asaad, Alex Kim, Jayanth Krihsna

No matter our age, we have likely forgotten to turn off the stove or oven, iron, heater or even water. Forgetfulness can become more common as we age and may lead to costly home damage, injury or death. Through in-home interviews and prototype design and evaluation, Aware home researchers are creating a home system that understands older adults' needs for notifications and preferences for alerts, whether visual, wearable or ambient. They're also studying the location of the alerts, both in proximity of the hazard and elsewhere in the home environment.

Flex: Connected Home Integration and Data Intelligence

Researcher: Brian D. Jones

Technology manufacturer Flex recently demonstrated and tested integration of the Wink Hub —a do-it-yourself solution for the connected home—at Georgia Tech's 3-story, 5,000 square foot Aware Home, which facilitates research in an authentic home environment. More recently, the company has established a platform for data intelligence, enabling clients to capture data from their connected devices and providing data analytics. With this new capability, Flex is working with Georgia Tech to install and test data collection from a sensor-rich environment in the Aware Home.

RERC TechSage: SmartBathroom

Researcher: Brian D. Jones

The needs and abilities of aging adults with progressive chronic conditions such as multiple sclerosis, Parkinson's disease, ALS and arthritis, fluctuate from day to day. Yet, even when they have assistive technology like grab bars to compensate for functional limitations, those features are only able to support some abilities, some of the time. The SmartBathroom is an environment capable of assessing an individual's abilities at any point in time and spontaneously adjusting supportive environmental features to accommodate those abilities. The SmartBathroom prototype in the Aware Home will help the team assess the constraints of a home bathroom environment, which may play a significant role in the performance of transfers from the toilet and shower/bath with and without a caregiver.



FIDO: Making Man's Best Friend More Understandable

Researcher: Melody Moore-Jackson

The communication between a service dog and the human they help is fundamental for living. The FIDO project, or Facilitating Interactions for Dogs with Occupations, is an ongoing research project at Georgia Tech's Animal Computer Interaction Lab. The original idea was to create vests for dogs, outfitted with lightweight computers and sensors that can be operated by tugging, biting or pulling, which would then activate an alert message. Melody Moore Jackson and her team are also teaching dogs to use touchscreen computers. This work has included canines serving as guide, hearing, service, skilled companion, search & rescue (SAR), and police dogs.





Jill Watson: The Virtual Teaching Assistant

Researchers: Ashok Goel

With everything seemingly going virtual these days, why not teacher assistants? Georgia Tech is beginning its third semester using virtual teaching assistants (TAs) in an online course about artificial intelligence (AI). The new term comes one year after Jill Watson was introduced during Knowledge Based Artificial Intelligence. Jill, which is implemented on IBM's Watson platform, was first used during the spring 2016 semester to successfully answer particular types of frequently asked questions without the help of humans. The students weren't told her identity until the final day of the class. Virtual teaching assistants as illustrated by Jill were recently recognized as one of the most transformative technologies to impact college within the past 50 years by the Chronicle of Higher Education.





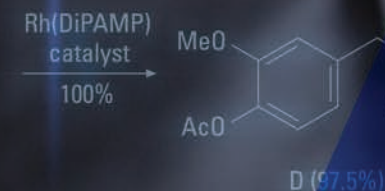
Ecoxight Gives Systemic Insight to Business Ecosystems

Researcher: Rahul Basole

Business ecosystems are characterized by large, complex, and global networks of firms from many different market segments, all collaborating, partnering, and competing to create and deliver new products and services. Given the rapidly increasing scale, complexity, analysts are faced with the task of quickly understanding the fundamental characteristics of these interfirm networks. Georgia Tech researchers have designed and implemented ecoxight, a web-based interactive visualization system that provides capabilities to gain systemic insight into the compositional, temporal, and connective characteristics of business ecosystems. ecoxight 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.

The image shows a hand pointing at a digital interface. The interface includes several icons: a group of people, a camera, a globe, a house, and a shopping cart. There are also chemical structures and text labels: 'internet', 'DiPAMP', 'MeO', 'COOH', 'NHAc', 'Me = CH₃', 'Ac = CH₃CO', and 'Rh(DiPAMP) catalyst 100%'. The background is a blue gradient with binary code and the word 'WORLD'.

CONNECTION





VACCINE Turns Massive Data Into Life Changing Analytics

Researcher: John Stasko

How first-responders perform their jobs could mean the difference between life and death. Georgia Tech researchers are taking part in a new Department of Homeland Security Center of Excellence in Command, Control, and Interoperability, called VACCINE. The Center's goal is to help this nation's 2.3 million extended homeland security personnel, including first-responders, perform their jobs more effectively by turning massive amounts of data into manageable information through innovative visual analytic techniques. In VACCINE, researchers strive to create innovative and effective integrated data and visual analytic environments—frameworks, methods, and software—that advance the start-of-the-art in analyzing massive, heterogeneous, incomplete, temporally evolving homeland security data for anticipating, detecting, and responding to DHS mission needs.





The Dolphin Whisperer

Researcher: Thad Starner

Scientists have struggled to understand dolphin vocalizations, but new computer tools to both track dolphins and decode their complex vocalizations are now emerging. Georgia Tech researcher Thad Starner is partnering with Denise Herzing, who has been studying Atlantic spotted dolphins, *Stenella frontalis*, in the Bahamas for over three decades. Herzing's video and acoustic database encompasses a myriad of complex vocalizations and dolphin behavior. Starner works on mining this dataset and decoding dolphin sounds, and has created a wearable underwater computer, CHAT (Cetacean Hearing and Telemetry), to help establish a bridge for communication between humans and dolphins.



Argon Brings Augmented Reality Web Browsing To Reality

Researcher: Blair MacIntyre

The line between our physical world and the digital world is continually blurring. While virtual reality completely immerses you in a computer-generated environment, augmented reality (AR)—overlaying virtual information on the real world—has shown more potential. Georgia Tech is making it possible for people to create augmented reality experiences using web technologies. Georgia Tech researcher Blair MacIntyre started working on Argon in 2009 and recently release the latest version. The goal of the project is to make AR accessible to the widest possible group of developers and users through a web-centric platform.



