Center of Excellence
WIRELESS AND INFORMATION TECHNOLOGY
AT STONY BROOK UNIVERSITY

NEWSLETTER

APRIL 2017

Stony Brook University Incubator Showcase 2017, Rethinking Mobile Security, Business In-House, Partnering in Visual Analytics

CEWIT is an unparalleled resource, advancing the science and technology underlying the next epoch of the information revolution.

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Office of Economic Development

INCUBATOR SHOWCASE 2017

JUNE 8, 2017 · 9:00AM · CEWIT

Over 50 company exhibits and one-on-one networking with Stony Brook University's scope of biotechnology, energy, and information technology entrepreneurs.

Find out what hundreds of companies have already discovered — **Stony Brook University is the place to help your business grow.**

Come discover for yourself, RSVP today.

Economic Development

AT STONY BROOK UNIVERSITY

The Office of Economic Development 2017 Incubator Showcase is a joint effort by the Centers of Excellence, Centers for Advanced Technology, and Business Incubators to showcase the innovations of Stony Brook University member entrepreneurs. This will be the second annual Incubator Showcase celebrating the entrepreneurial culture built here at Stony Brook University and the individual success of each company at every phase.

Kicking off on Thursday, June 8, 2017 at 9:00am, the Incubator Showcase will feature over 50 company exhibits and displays at the Center of Excellence in Wireless and Information Technology (CEWIT) in Stony Brook University's Research and Development Park, providing ample time for key networking and one-on-one conversations with our scope of biotechnology, energy, and IT companies, including CEWIT's leading members.

Buncee: Web-based Digital Design and Presentation Tool
Buncee is a web-based digital design and presentation tool that leverages the capabilities of online tools and iOS devices to provide an easy-to-use platform for producing and sharing multimedia content. Buncee's education-specific platform is designed to enhance classroom experience and student technology skills, now with over 100K users.

Charmtech Labs, LLC: Screen-Reading Technology App
Charmtech Labs is developing is Capti –a universally accessible, award-winning web browsing application enabling intuitive and usable web access for people with and without vision impairments on a variety of desktop and mobile platforms.

Code Dx, Inc.: Software Vulnerability Management Products
Code Dx provides easy and affordable software vulnerability management products that enable software developers, testers, and security analysts to find and manage vulnerabilities in software.

FlightPartner Tech: SaaS Provider of Intelligent Air Charter Scheduling
FlightPartner is an air charter travel commerce platform providing distribution, technology, payment and other solutions for the jet charter travel industry.

Intelibs, Inc.: Hybrid DAS Solutions and Intelligent in-Building Solutions
Complete 4G in-building wireless solutions along with a 3G network that enables service providers, enterprise users, and universities to build a solution for broadband wireless access.

Private Machines, Inc.: Hype-free Security for Infrastructure and Cloud
Private Machines' unique patent-pending technology protects cloud and data center workloads to create an ultra-secure extension of enterprises. Their mission is to create and bring to users technology that is secure and easy to use.

Softheon, Inc.: Data Analytics and Business Intelligence Software for Health Plans
Empowering the nation's first state health benefit exchange since 2008, Softheon's vision & strategic direction address healthcare payer, provider, & government agencies' goal of meeting Affordable Care Act (ACA) & exchange milestones.

STS Global, Inc.: Dynamic Satellite Communications + Telecommunications
STS Global is a dynamic satellite communications + telecommunications company where great engineering minds and outstanding experience intersect to deliver end-to-end solutions.

RETHINKING MOBILE SECURITY

Stony Brook University research teams lead innovative efforts to tackle the underlying security systems of today's mobile devices and services

Long Lu, assistant professor in the Department of Computer Science **lands his second NSF CAREER award to develop solutions in mobile security. This is his fourth NSF award and eighth research grant, securing him over $3 million dollars to support his goal in rethinking mobile security in today's app-as-a-platform environment.**

"The NSF CAREER award is one of the highest honors an 'early career' faculty member can achieve nationally, and directly impacts the advancement of promising research in the STEM fields at work here at Stony Brook," said Stony Brook University President Samuel L. Stanley Jr. "Long Lu's work in mobile security is not only highly relevant, it's critical to a bold new future." Lu says the timing of this research is in fact significant because we are currently in an ecosystem that treats users as the products. Because users don't pay for many of the services they use, they unknowingly share their data to support those services.

"There have been reports where companies very stealthily collect users' private data, such as their contacts and locations, without notification," Lu said. "That's a very aggressive privacy intrusion and, **as security researchers we need to make that transparent and manageable to the users so that they can make more informed decisions about how to proceed."**

Over the next five years, Lu aims to achieve three different research goals organized into what he calls "dimensions." The first dimension will identify current mobile security problems in operating systems. The second will evaluate extending security coverage into the cloud, and the third dimension of the research will look at building the necessary security mechanisms to support the ongoing emergence of the Internet of Things (IoT).

"It's basically a fundamental redesign of the underlying system that we have for today's mobile devices and services," Lu said. "We are trying to think ahead and identify the security issues facing mobile users and device manufacturers alike, to introduce new designs and technologies to the operating system."

Affiliated with CEWIT and the National Security Institute at Stony Brook University, Long Lu conducts the majority of his research in the University's Research in Software and Systems Security (RiS3 Lab). In addition to the NSF CAREER funding, he works with grad and PhD students on projects for the Office of Naval Research and Air Force Office of Scientific Research aimed at securing software and systems against critical threats.

Colleagues **Professors Aruna and Niranjan Balasubramanian are too making strides in protecting mobile users with the development of their new private digital assistance app, PrIA, a local private intelligence assistance framework** which collects user data and builds a profile about the user and provides recommendations, all on the user's personal device.

Digital personal assistants have the ability to gear the content of an app or service to your specific likes and dislikes, such as Google News. As personalized services are increasingly becoming an integral part of our digital lives, the problem is that they extract a steep cost in terms of privacy, requiring a lot of sensitive user data to be at all effective. The service providers collect and analyze user's personal data to provide the service, but can infer sensitive information about the user in the process.

The team, along with former graduate students Shashank Jain (Microsoft) and Vivek Tiwari (LinkedIn), developed the app to deliver personalized recommendations for news articles without collecting and sending sensitive user data to a cloud service.

The app maintains user privacy by organizing a personal user profile locally, on your smartphone and laptop, as opposed to on remote servers. This ensures that personal information is kept private.

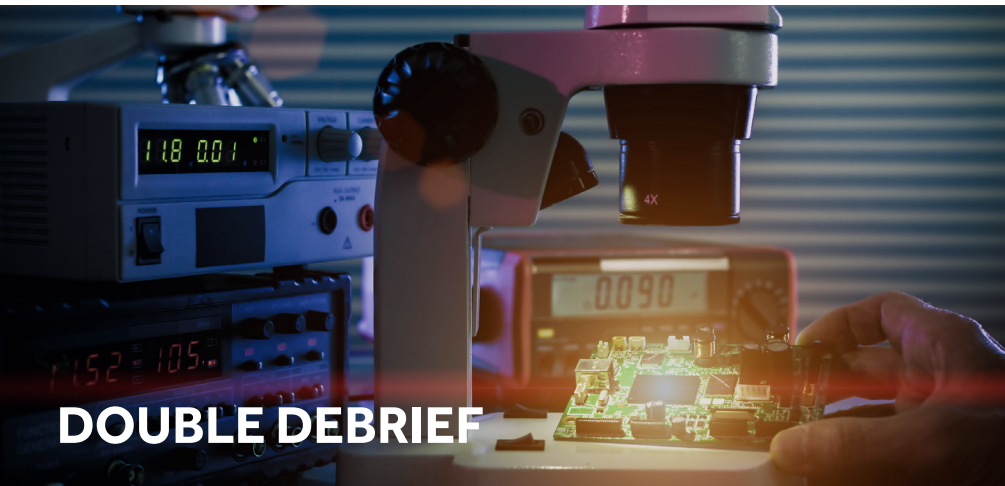
The research team conducted a ten-day study of their application and found that **Google News, which uses private user data and is a comparable cloud-based service, was only 14% better at suggesting news articles to its users.** According to Niranjan Balasubramanian, for privacy-minded users this may be a worthy trade-off. PrIA downloads stories from Google News, but does so without signing into a Google account or sending user's information elsewhere.

"The important thing is, only your phone and your laptop have this information," said Aruna Balasubramanian.

The team continues to improve their service by tinkering with their algorithms and by looking at a wider range of data about you—e-mail, for instance—while keeping it all on users' reach.

BUSINESS IN-HOUSE

CEWIT SYMPOSIUM



DOUBLE DEBRIEF

CEWIT companies eye investors, edge out veteran rivals
In addition to the launch of its Quote and Booking widget, FlightPartner Technologies brings rival CEO aboard as its new chief operating officer, turning the team's strategic focus to targeting key investors. Capti Voice, a universally accessible literacy platform from Charmtech Labs, wins EdTech Digest's Award for Best Special Needs Solution of 2017, beating out several Edtech competitors, including veteran Kurzweil.

CEWIT HealthTech Symposium leads the discussion
Expert talks from Henry Schein, Northwell Health Ventures, CEWIT, and Stony Brook University engaged a full house in a critical discussion on the opportunities and barriers to wider adoption of healthcare technologies last month. Their shared goals for the road ahead include strategic investments in new tech, advancing industry innovation partnerships, mobilizing knowledge bases, increasing basic research, and actively commercializing emerging health technologies. More on CEWIT's healthtech research and initiatives at the CEWIT2017 Conference, November 7 & 8, 2017 at CEWIT.

Two CEWIT partners talk Long Island's commercialization and manufacturing futures with Innovate LI
In parallel to his role as the Director of Technology Commercialization at Stony Brook University, Peter Donnelly is the Managing Director of the Accelerate NY Seed Fund, an all new endowment designed to supporting early-stage, emerging technology companies in Downstate New York and improve overall performance in the commercialization of regional research though more fluid collaboration between Long Island and NYC. Composite Prototyping Center Executive Director, Lenny Poveromo, sees a bright future for high-end manufacturing including launching the first nationally certified composite training program in the Northeast through Stony Brook University's Manufacturing and Technology Resource Consortium.

PARTNERSHIPS IN VISUAL ANALYTICS

Stony Brook University and Brookhaven National Lab collaboration pursues visual analytics, bridging advanced computational capabilities with human knowledge and judgment, for the big data era

Humans are visual creatures: our brain processes images 60,000 times faster than text, and 90 percent of information sent to the brain is visual. Visualization is becoming increasingly useful in the era of big data, in which we are generating so much data at such high rates that we cannot keep up with making sense of it all. In particular, visual analytics—a research discipline that combines automated data analysis with interactive visualizations—has emerged as a promising approach to dealing with this information overload.

"Visual analytics provides a bridge between advanced computational capabilities and human knowledge and judgment," said Wei Xu, a research assistant professor in the Department of Computer Science at Stony Brook University and a computer scientist in the Computational Science Initiative (CSI) at the U.S. Department of Energy's (DOE) Brookhaven National Laboratory.

"The interactive visual representations and interfaces enable users to efficiently explore and gain insights from massive datasets." At Brookhaven, Xu has been leading the development of several visual analytics tools to facilitate the scientific decision-making and discovery process. She works closely with Brookhaven scientists, particularly those at the National Synchrotron

Light Source II (NSLS-II) and the Center for Functional Nanomaterials (CFN)—both DOE Office of Science User Facilities. By talking to researchers early on, Xu learns about their data analysis challenges and requirements. She continues the conversation throughout the development process, demoing initial prototypes and making refinements based on their feedback. She also does her own research and proposes innovative visual analytics methods to the scientists.

Recently, Xu has been collaborating with the Visual Analytics and Imaging (VAI) Lab at Stony Brook University—her alma mater, where she completed doctoral work in computed tomography with graphics processing unit (GPU)-accelerated computing.

"I realized how important visualization is to the big data era," Xu said. "The visualization domain, especially information visualization, is flourishing, and I knew there would be lots of research directions to pursue because **we are dealing with an unsolved problem: how can we most efficiently and effectively understand the data? That is a quite interesting problem not only in the scientific world but also in general.**"

In 2015 Xu was awarded a grant for a visualization project proposal she submitted to DOE's Laboratory Directed Research and Development program, which funds innovative and creative research in areas of importance to the nation's energy security. At the same time, Klaus Mueller—Xu's PhD advisor at Stony Brook and director of the VAI Lab—was seeking to extend his research to a broader domain. Xu thought it would be a great opportunity to collaborate: she would present the visualization problem that originated from scientific experiments and potential approaches to solve it, and, in turn, doctoral students in Mueller's lab would work with her and their professor to come up with cutting-edge solutions.

This Brookhaven-Stony Brook collaboration first led to the development of an automated method for mapping data involving multiple variables to color. Variables with a similar distribution of data points have similar colors. Users can manipulate the color maps, for example, enhancing the contrast to view the data in more detail. According to Xu, these maps would be helpful for any image dataset involving multiple variables.

"Different imaging modalities—such as fluorescence, differential phase contrasts, x-ray scattering, and tomography—would benefit from this technique, especially when integrating the results of these modalities," she said. "Even subtle differences that are hard to identify in separate image displays, such as differences in elemental ratios, can be picked up with our tool—a capability essential for new scientific discovery."

The team is also developing a multilevel display for exploring large image sets. When scientists scan a sample, they generate one scattering image at each point within the sample, known as the raw image level. They can zoom in on this image to check the individual pixel values. For each raw image, scientific analysis tools are used to generate a series of attributes that represent the analyzed properties of the sample (the attribute level), with a scatterplot showing a pseudo-color map of any user-chosen attribute from the series—for example, the sample's temperature or density. In the past, scientists had to hop between multiple plots to view these different levels. The interactive display under development will enable scientists to see all of these levels in a single view, making it easier to identify how the raw data are related and to analyze data across the entire scanned sample. Users will be able to zoom in and out on different levels of interest, similar to how Google Maps works.

OUR COMMUNITY

The Advanced Energy Center

Center for Advanced Technology in Diagnostic Tools and Sensor Systems (Sensor CAT)

The Center for Biotechnology

The Center for Corporate Education and Training at Stony Brook University

The Clean Energy Business Incubator Program (CEBIP)

The College of Business at Stony Brook University

The College of Engineering and Applied Sciences at Stony Brook University

Empire State Development: NYSTAR

IEEE Long Island Section

Long Island High Technology Incubator

The Manufacturing and Technology Research Consortium (MTRC)

The New York Academy of Sciences

Small Business Development Center at Stony Brook University

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UPCOMING EVENTS

May 3, 2017 · Engineering-Driven Medicine Distinguished Lecture: Alexis Kaushansky, Assistant Professor, Center for Infectious Disease Research

May 5, 2017 · Advanced Energy Center Symposium Series: Offshore Wind

May 2017 · LI Web Meetups: Social Media Marketing & SEO + Sprint Night

June 5, 2017 · Brookhaven National Lab: GPU Hackathon 2017

June 8, 2017 · Office of Economic Development 2017 Incubator Company Showcase, Stony Brook University

November 7 & 8, 2017 · CEWIT2017 Conference & Expo on Emerging Technologies for a Smarter World