



# Center of Excellence

WIRELESS AND INFORMATION TECHNOLOGY

AT STONY BROOK UNIVERSITY

## NEWSLETTER

AUGUST 2017

CEWIT2017 Conference, November 7 & 8,  
2017, Optimizing Cloud Computing,  
Visioning Future Trends in IT, Smart  
Sensors for School Safety

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





Emerging Tech for a Smarter World

# CEWIT2017 CONFERENCE

**NOVEMBER 7 & 8, 2017 - CEWIT**

CEWIT2017 is the premier international forum on the applications of emerging technologies in infrastructure, healthcare, and energy — three of the most critical components of a smarter global environment.

Focusing on the Internet of Things, Big Data, and HealthTech, CEWIT2017 features a series of research and entrepreneurial-focused tech talks, workshops, and keynote plenaries at CEWIT's next generation research and educational facility at **Stony Brook University**.

Join us at CEWIT2017, a destination for researchers, innovators, and entrepreneurs to exchange ideas, build valuable partnerships and bring cutting-edge tech to the marketplace.

**Learn More: [www.cewit.org/conference2017](http://www.cewit.org/conference2017)**



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# OPTIMIZING CLOUD COMPUTING

**CEWIT, Stony Brook University researchers awarded \$449K through the National Science Foundation's NeTS program to tackle network performance challenges**

Even for the personal smartphone or home computer user there is no avoiding the use of cloud computing. Cloud computing is low in cost, easily available, and offers access to useful services that would otherwise be out of reach. Services such as Netflix, Amazon Fire, and Expedia are only some of the popular online services being hosted on the cloud. On the backend, dynamic applications in the cloud are more lucrative if their deployments grow through dynamic capacity provisioning. Software deployments must be carefully provisioned to meet their performance requirements without wasting resources.

Most resource provisioning solutions today employ predictions to estimate demand and provide resources, accordingly. At times, this process could be fraught with errors. **With the support of a National Science Foundation (NSF) Networking Technology and Systems (NeTS) award of \$449K, researchers Anshul Gandhi and Zhenhua Liu, seek to bridge the gap between predictors and provisioning solutions. The goal of their NeTS project, Demystifying the Role of Prediction Models: Bridging Prediction Algorithms and Resource Provisioning, is to develop and leverage error models to fully realize the potential of predictors. According to Gandhi, "Our research will allow businesses to maximize resource utilization despite prediction errors."**

As most resource provisioning solutions today employ predictions to estimate future demand and provision accordingly, they, however, naively employ predictions that can negate the overall benefits. For instance, provisioning resources based only on the predicted average can result in severe performance violations due to uncertainties in the predictor. On the other hand, while additionally resource provisioning can eliminate performance violations, it can substantially increase resource wastage. The goal of this project is to develop and leverage error models to fully realize the potential of predictors.

**The key intellectual contribution of the project is to bridge the gap between predictors and resource provisioning solutions by investigating the prediction error model.** This will be accomplished via three main thrusts: constructing models that capture the structure of prediction errors, including correlations and quality over time; developing an algorithmic framework to incorporate the prediction error models and account for switching costs and penalty functions; and designing systems to exploit the new prediction error-aware algorithms, including multi-resource provisioning and resource placement solutions. The solutions will be experimentally evaluated using available application traces.

The research will ultimately allow businesses to reduce resource wastage despite significant prediction errors. The results will be disseminated through technology transfer opportunities with industrial partners.

Given the nature of the work, **the project will advance interdisciplinary education and research opportunities, in particular, directly contribute to interdisciplinary courses taught at the Computer Science and Applied Mathematics and Statistics departments, which also will allow for joint advising of students.**

Joseph Mitchell, chair of the Department of Applied Mathematics and Statistics, said, "This is a compelling project that requires collective expertise from computer science, optimization, probability, and statistics, and represents an ideal collaboration between Computer Science and Applied Mathematics both in research and in educational impact."

All data produced as a result of this project, including traces, software, publications, and courseware, will be made publicly available on the project repository. The data will be made available for at least 10 years, and even longer if needed. Data will be maintained by local web servers and will also be replicated on external public Internet servers, such as those provided by github, which offer long-term durability and reliability.

The NSF identified this NeTS project as transformative research related to fundamental scientific and technological advances in networking as well as systems research. NSF funds projects such as these in the hope that it will lead to the development of future-generation, high-performance networks and future internet architectures.

In addition to finding the answer to network performance challenges, CEWIT-affiliated researchers, Gandhi and Liu, of the Departments of Computer Science and Applied Math respectively, exemplify the innovative, cross-cutting, research that is representative of CEWIT and Stony Brook University and large.

Adding to their success, the two researchers recently received an additional NSF award, titled Enhancing the Parasol Experimental Testbed for Sustainable Computing, as part of an infrastructure grant led by Rutgers University to study sustainable computing in datacenters.



## CEWIT2017 CTO PANEL

### Visioning the Future Trends in Information Technology

The CEWIT2017 CTO Panel will feature an exchange on IT's transformative trends, operational models, and its critical intersections with business, society, economics, health, and media. CEWIT hosts this issue-relevant discussion with the strategic leaders that are positioning the industry to rapidly adapt and capitalize on emerging technology trends. Panelists include CA Technologies CTO, Otto Berkes; Northwell Health CTO, Dr. Purna Prasad, Chief Innovation Officer of Henry Schein, Bruce Lieberthal, and Kamal Bherwani, CTO of Inversora Agroindustrial Global, moderated by entrepreneurial leader Richard Bravman, Chief Strategy Officer of Affinity Solutions. **Learn more about our CTO panelists and extraordinary scope of the CEWIT2017 program.**



## CIEES WORKSHOP

### Energy Business Opportunities in New York State

The Center for Integrated Electrical Energy Systems (CIEES) at Stony Brook University host a one-day workshop on energy business opportunities in NYS at CEWIT. The workshop is designed to enable the NYS energy businesses to learn how to leverage the Center's resources to boost their economic growth and will feature series of panel discussions on grid technologies, energy policies, and market opportunities. **Join them on October 5, 2017, register now.**



## HACK@CEWIT 2018

### Back at the Brook: Hack@CEWIT Returns February 2018

We're kicking off our second Hack@CEWIT, February 16-18, 2018, after a hugely successful 2017 event that brought over 150 regional hackers, \$40K in industry commitments, and over 25 hands-on tech talks and workshops together for a 2-day challenge awarding \$5K in prizes to the most innovative IoT projects — at Stony Brook University. In partnership with Major League Hacking (MLH), the 2018's IoT theme will focus on digital and physical security and the challenge will incorporate elements of both technical prototyping and Capture the Flag. **Learn more about the 2018 hack.**

# SENSOR SMARTS



## **CEWIT industry partner Digital Fly launches Fly Sense, the latest in their line of school-safety IoT products, equipped with an intelligent sensor array to detect both bullying and vaping situations**

Digital Fly, the Long Island-based high-tech manufacturing startup and spin-off of product-design experts, Intelligent Product Solutions, has launched their next-level sensor system that can remotely detect bullying situations in school bathrooms, classrooms, and lunch rooms and alert officials in real time.

Fly Sense is a cloud-based, IoT system, designed literally to be a fly on the wall, equipped with a forward edge-detection sensor and a back-end logic-processing server that allows each unit to work independently or in concert with other units. The system detects vaping through moisture content and decibel level anomalies in the air that are caused by bullying or chemicals from vaping. Creating an auditory baseline, Fly Sense then compares the baseline to real-time acoustic changes – shouts, for instance, or other sounds associated with fighting.

"We actually normalize the sound in a given location, such as a bathroom, over time," Derek Peterson, Digital Fly's CEO told Innovate LI. "We learn the fingerprint of a particular space's sound levels and categorize it, and then measure live sound against what the bathroom should sound like."

Fly Sense lands just days after New York State adopted legislation outlawing vaping and the use of e-cigarettes on public and private school property. According to both a recent U.S. Surgeon General's report and a survey from the New York State Department of Health, e-cigarette use by high school students is rapidly rising.

OSC World, a Digital Fly marketing partner and primary reseller, is particularly emboldened by the product's commercial debut coming on the heels of New York's freshly minted anti-vaping laws.

**"Fly Sense is a unique product and approach which creates effective ways for schools to protect and ensure the safety of students,"** Mike Richez, Executive Vice President of OSC World, said in a statement.

"We believe this product is a game changer for schools and falls directly in-line with the new law recently signed by Gov. Andrew Cuomo which bans vaping and e-cigarettes in schools in New York State."

The revolutionary product is one of many in the suite of school-safety solutions from Digital Fly, who is best known for its anti-bullying tools — arguably more technologically impressive and functionally significant. Glue Board, a bullying prevention tool that pairs a smart, cloud-based incident management system with a mobile bullying app for students, parents, and teachers, provides a traceability management solution for each reported bullying case.

The mobile reporting app empowers students to safely report bullying, turning bystanders into upstanders and creating a powerful deterrent effect that prevents future incidents.

By helping schools capture all incidents, Glue Board assists administrators in resolving situations before they escalate.

Also in the suite are Fly Swatter, a social media help line for schools; Fly Zapper, a smart IoT notification button; and Fly Access, a turnkey IoT visitor access safety platform.

Launched in 2015 as an online threat detector solution, primarily by monitoring social media channels for signs of impending school attacks, the two-year-old startup now offers an extensive line of high-tech school-safety products. **The noble combination of school safety and social awareness, multiplied by a high-tech foundation, is giving Digital Fly "a strong business forecast,"** Peterson said.

"Expanding on our extensive line of high tech school safety products allows us to make a real impact on issues relating to bullying, fighting, and using vaping devices and e-cigarettes in schools. Fly Sense is designed specifically for the education market."

"Business is starting to ramp up strongly. It took a year to build the name and build the brand. Now, the brand is out there and schools are recognizing it."

"We're trying to manage our expectations," Peterson added. "But we're very excited about where we are."

The team at Digital Fly has taken their decades of experience to deliver the most comprehensive school safety product on the market. Digital Fly has created a platform and a network designed to help millions of teachers, administrators, and students across the nation have a safe and productive day. **Learn more about Digital Fly and working with their team.**

# 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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**Stony Brook University**

## UPCOMING EVENTS

October 5, 2017 · CIEES Workshop: Energy Business Opportunities in New York State

October 17, 2017 · NYAS: Second Annual Summit on Science Enablement for the Sustainable Development Goals

November 1 & 2, 2017 · Life Sciences Summit 2017

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

February 16-18, 2018 · Hack@CEWIT 2018, IoT & Security

March 26-28, 2018 · Advanced Energy Conference 2018

## OPPORTUNITIES

CEWIT Content Development and Program Support Intern

Zebra Technologies @ CEWIT: Mechanical Engineering Intern