



Center of Excellence

WIRELESS AND INFORMATION TECHNOLOGY

AT STONY BROOK UNIVERSITY

NEWSLETTER

MARCH 2017

CEWIT Medical Technologies Symposium,
Hack@CEWIT: 43 Hours, 20 Student
Technologies, Incubator Companies
Taking Off, Smart Environment
Technologies

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



CEWIT Symposium

MEDICAL TECHNOLOGIES & HEALTHCARE INNOVATIONS

MARCH 28, 2017, CEWIT

CEWIT, The Center for Biotechnology and Henry Schein, Inc., join forces to host an expert symposium presenting cutting-edge advances in biomedical and clinical-related technologies, digital health, and smart medical devices.

For the full Symposium agenda, expert speaker profiles, and to register, visit www.cewit.org/events/healthtech.html.

Final days to register, limited seating.

CEWIT Medical Technologies and Healthcare Innovations Symposium features expert speakers on major advances in the healthtech domain

Chaired by Dr. Shmuel Einav, CEWIT Director of Medical Technologies, the Symposium is set to welcome thirteen expert speakers on advances in biomedical and clinical related technologies, digital health, and smart medical devices, including a keynote address from Dr. Bruce Lieberthal, Vice President and Chief Innovation Officer, Henry Schein, Inc.

A joint effort by CEWIT, The Center for Biotechnology, and Henry Schein, Inc., the Symposium will focus on the underlying the technology, as well as the industry, academic, and R&D partnerships that are integral to innovations in the healthtech domain.

Join the discussion on **March 28, 2017 from 9:30am-3:30pm** at the Center. For the full agenda, speaker profiles, and to register, visit www.cewit.org/events/healthtech.html. Admission is free and open to all interested parties. **As seating is limited, registration is required.**

CEWIT Chief Scientist, Director of the Center of Visual Computing (CVC), and Distinguished Professor of Computer Science and Radiology at Stony Brook University, Dr. Arie Kaufman shares the latest in Biomedical Imaging and Image Processing. Dr. Kaufman is internationally recognized for his over 40 years of research in visualization, graphics, virtual reality, user interfaces, multimedia, and their applications, especially in biomedicine.

Preeminent hand surgeon, healthcare executive, inventor, and entrepreneur, **Dr. Thomas Graham, the now Senior Vice-President & Chief of Strategic Alliances and Partnerships at Northwell Health** presents on the The Role of Northwell Health Ventures in Clinical and Healthcare Operations of Northwell Health Medical.

As **Softheon's Founder and CEO, Eugene Sayan** leads the company's vision and strategic direction to help achieve the goal of addressing ACA mandate challenges. He has developed and nurtured innovative healthcare solutions including Massachusetts Connector, the nation's first fully operational State Health Benefits Exchange and will present on how the latest IoT, Big Data, Machine Learning, and Microservices Technologies Are Redefining Healthcare Delivery.

CEWIT Director of Communications & Devices and recipient of the NSF's prestigious CAREER award, Dr. Fan Ye, shares his latest research project titled Aging in Place.

Symposium Chair, Dr. Shmuel Einav is the CEWIT Director of Medical Technologies and world-distinguished expert in the cardiovascular circulatory system and biomedical engineering. He is best known for his studies on blood flow through heart valves, coronary circulation, blood-tissue interaction, and turbulent characteristics in occluded arteries.

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,** of which he will present the fund's model of supporting early-stage companies in emerging technologies in Downstate New York.

Dr. Bruce Lieberthal, Vice President and Chief Innovation Officer, Henry Schein, Inc., will present the keynote address on Innovation Trends in Healthcare. For Henry Schein, Inc., an avid CEWIT industry partner, his leadership includes driving a culture of innovation globally and pursuing innovative opportunities for commercialization.

Assistant Director of Technology and Business Development at the Center for Biotechnology, Stony Brook University, Dr. Li Liu, talks the Long Island Bioscience Hub (LIBH), a joint program aimed to foster the development of therapeutics, preventatives, diagnostics, devices and research tools emerging from LIBH partner institutions. Led by the Center for Biotechnology, in collaboration with Stony Brook University, Cold Spring Harbor Laboratory, Brookhaven National Laboratory, and the Feinstein Institute for Medical Research, the program is supported by the NIH REACH initiative (Research Evaluation and Commercialization Hub).

Dr. Danny Bluestein, Professor of Biomedical Engineering, Stony Brook University, presents his cutting-edge research on Non-Coagulant, Implantable Medical Devices. Dr. Bluestein is the recipient of several major honors and awards including the Established Investigator Award from the American Heart Association and the Quantum award from the NIBIB. He was also elected as a Fellow of the American Institute of Medical and Biological Engineering for his leading research in biofluids and cardiovascular pathologies.



43 HOURS 20 STUDENT TECHNOLOGIES

Hack@CEWIT, CEWIT's inaugural, region-wide IoT and microservices hackathon, attracts over 130 students looking to disrupt the status quo

Hack@CEWIT welcomed over 130 students to Center's 43-hour internet of things and microservices hackathon over President's Day Weekend 2017. We teamed up with Major League Hacking and Hack@CEWIT sponsors to bring tech, education, art, and entrepreneurship together in the Center's 100,000 s.f., next-generation research and education facility – at Stony Brook University. Add talented, committed students and an incredible industry mentorship program, fuel with a ton of food and ongoing tech talks and deep dive workshops, and you'll get not only a non-stop collaborative workspace, but 20 cutting-edge student-built technologies that rival the products of weeks of work.

The Hack@CEWIT top-tier team, an upperclassman crew of Electrical Engineering and Computer Science Stony Brook University students, took home the \$2,000 prize for ToiletGo, a web application designed to locate available public restrooms with details including open stalls and route support for users.

Six additional \$500 prizes were awarded to the most innovative, most ambitious, most original, most health-conscious, and most industry-applicable internet of things and microservices hacks, with Hack@CEWIT sponsored prizes from 1010data for

the most significant use of data, Softheon for the best use of Softheon APIs, and Major League Hacking for the best domain name from domain.com, best use of Amazon web services, and #HackHarrassment, the best solution to help reduce the frequency and/or severity of online harassment.

How it Works: ToiletGo

Built by Arduino development board NanoMCU 1.0 (ESP8266), the hardware system works in combination with a PIR motion sensor and several ultrasonic sensors to detect if any toilet space is occupied.

The PIR motion sensor will first trigger when someone gets into the restroom, then awakes the ultrasonic sensors located in each stall and finds out if any of these are occupied. If there is any change in toilet occupancy, the system will send a signal to the server through WiFi. The signal will be translated into JSON format and update the online database. The web application will renew the information about the availability of toilet spots to users checking online. The team used Google Firebase as the online database deployed on Amazon EC2, which can construct real-time data communication.

The server is built based on RESTful API and Spring Framework, which the team learned completely from scratch over the weekend. The web page automatically renews spot availability in real-time and maps geographical position using Google Maps API to show the location of both the user and the nearest unoccupied toilet.

Most Innovative: Know Before You Go

The parking app for all Stony Brook University drivers, Know Before You Go was inspired by notoriously terrible parking on campus. The web application determines if there are available

parking spots around the campus in real-time, and can perform analysis on each spot to determine how long it has been currently open, as well as its parking trend over long periods of time.

The Stony Brook University student team used a python based algorithm and Photoshop to determine if specific pixels from a Raspberry Pi camera were being shown, and then performed pixel analysis between spots on the ground. The information captured is uploaded to a Raspberry Pi hosted server and then to the app's website.

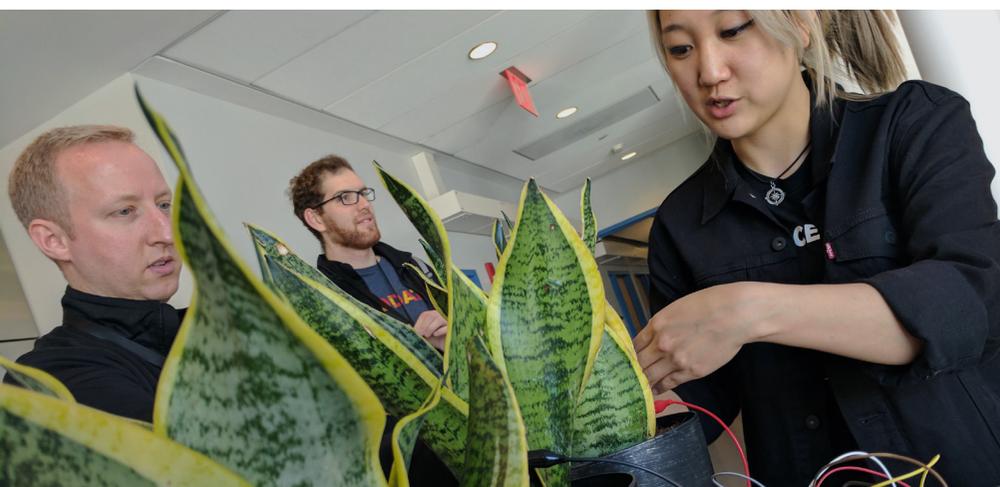
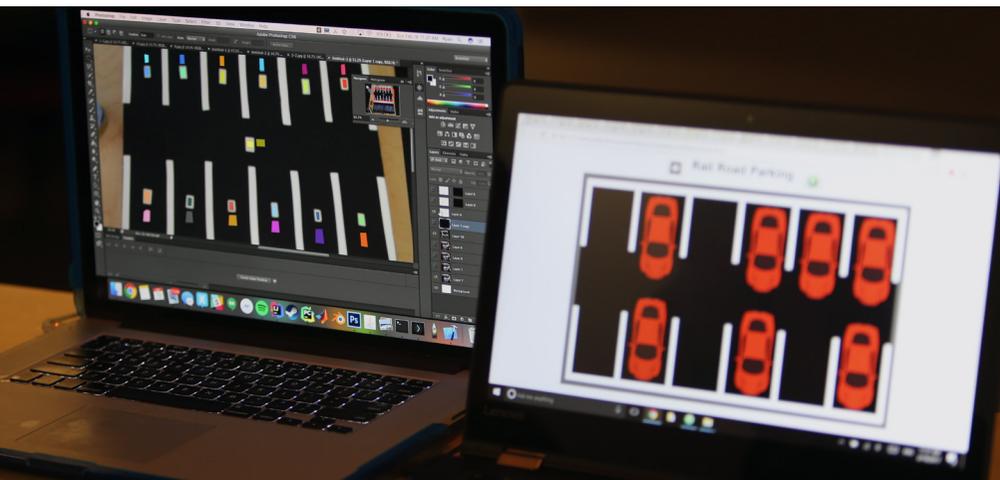
Most Original: Alexa Fitness Pal

The first Alexa fitness app that uses sensors to track your progress as you workout, Alexa Fitness Pal creates a seamless workout experience with the Amazon Alexa for people who want to workout in the comfort of their own homes. Integrated with hardware sensors and a camera, Alexa can analyze your workout and make sure you actually follow through.

The app utilizes two Raspberry Pi's for data collection, one secured to the user to collect acceleration data and the other, placed in front of the user to record workout progression and to check to form. The devices asynchronously send the data to Alexa which, through the application of machine learning and visualization algorithms, can give feedback to the user through the app.

Most Ambitious: WiFire

WiFire is a threat detection system for schools designed to solve an important and challenging task for administrators - keeping their students safe. The IoT detector is able to detect smoke, combustible gas leaks, flames, and monitors changes in temperature and sound. The data is sent to a secure cloud



and the app alerts administrators of any potential danger in their locations using their personal mobile phone, allowing them to monitor their school in the palm of their hand.

Entrepreneur's Choice: Billiard Guru

Based on wearables, this automatic billiard shooting stroke trainer is inspired by the powerful sensing capabilities of wearable devices. As billiard stroke shooting is highly technical and requires smooth, swift and accurate motions, the Stony Brook University team designed a smart-watch based sensing system to help users improve billiard playing skills. Android Wear collects sensor data from the motions of the wrist which is then analyzed to provide training suggestions through a mobile user interface.

Best Use of Softheon API's: Budgetize

Advantaging Softheon's Payment and Enterprise APIs, the e-commerce website manages user budgets to combat overspending. Users are able to view a list of purchase history, providing analytics on how they can better improve future spending.

Most Health-Conscious: Medical Imaging with Scope

Scope uses a pattern recognition technique to pinpoint key parts of an image in an effort modernize routine scoliosis exams. Using simple regression to detect the slope of the spine from points in the image, the data is cross-referenced with the slope of a perfect spine. The difference would identify if scoliosis was a potential diagnosis. The project was built with Java, OpenCV, and Swing for its GUI. Not limited to medical imaging, Scope's technology can be used for home security and various other imaging applications.

In the News

Softheon, Newsday Long Island, The Statesman, IPS



FlightPartner welcomes former FlightAware COO to the team, introduces new widget that will bring air-charter reservation services to virtually any website

FlightPartner Technologies Inc. welcomes FlightAware's former Chief Operating Officer and Founding Partner, Shawn Sullivan to the team as the company's Chief Operating Officer. Shawn, an ATP-rated pilot, is credited for growing FlightAware from a beta-concept to a multi-million-dollar aviation flight tracking company and data services platform. Prior to FlightAware, Shawn worked in high-yield capital markets for 20 years, at firms including Deutsche Bank, Bankers Trust, Alex Brown, and Drexel Burnham.

FlightPartner CEO Doug Schmohl states, "As CEO of FlightPartner, my primary responsibility is to bring on team members that refine and execute upon our unique vision. I am thrilled to have Shawn join our growing company. Shawn's strength in building and scaling early-stage companies will underpin our operations, strategies and policies, and assist in propelling FlightPartner forward as a technological leader in B2B marketplace solutions for air charter."

Shawn is equally thrilled to join the team. He states, "Our platform provides both brokers and operators with a highly efficient digital marketplace, reducing costs and allowing for greater utilization and fleet management."

FlightPartner's newest widget, "Quote and Booking" was also released this month, allowing visitors to research and reserve super-fancy private-jet flights from virtually any third-party webpage.

FlightPartner is a virtual middleman between aircraft owner/operators and brokers who arrange private flights for professional athletes, C-suite executives and other high-net-worth clients. Incorporated in 2015 by founder and CEO Doug Schmohl, the cloud-based SaaS provider – a resident of Stony Brook University's Center of Excellence in Wireless and Information Technology – incorporates a global database of more than 100 operators and 1,000 aircraft, making everything from twin-engine turboprops to tricked-out Boeing jumbo jets available to subscribing brokers.

The new widget promises to turn any website into an air charter-booking platform in minutes, with Schmohl noting "just two lines of code" to make it happen. "It's basically a button that appears on your site," he told Innovate LI. "We supply the code and you can drop it anywhere you want."

Although the latest version of the "Quotes and Booking" app has only been available for about a week, several third parties have already incorporated it.

"Our business model is to empower the air-charter marketplace," he added. "We really want to be that pipeline between the demand side, the clients looking to charter an aircraft, and the supply side, the aircraft operators."

INNOVATE LI · MAR 2017

STS Global selected by major satellite service provider for its innovative Ka-Band infrastructure

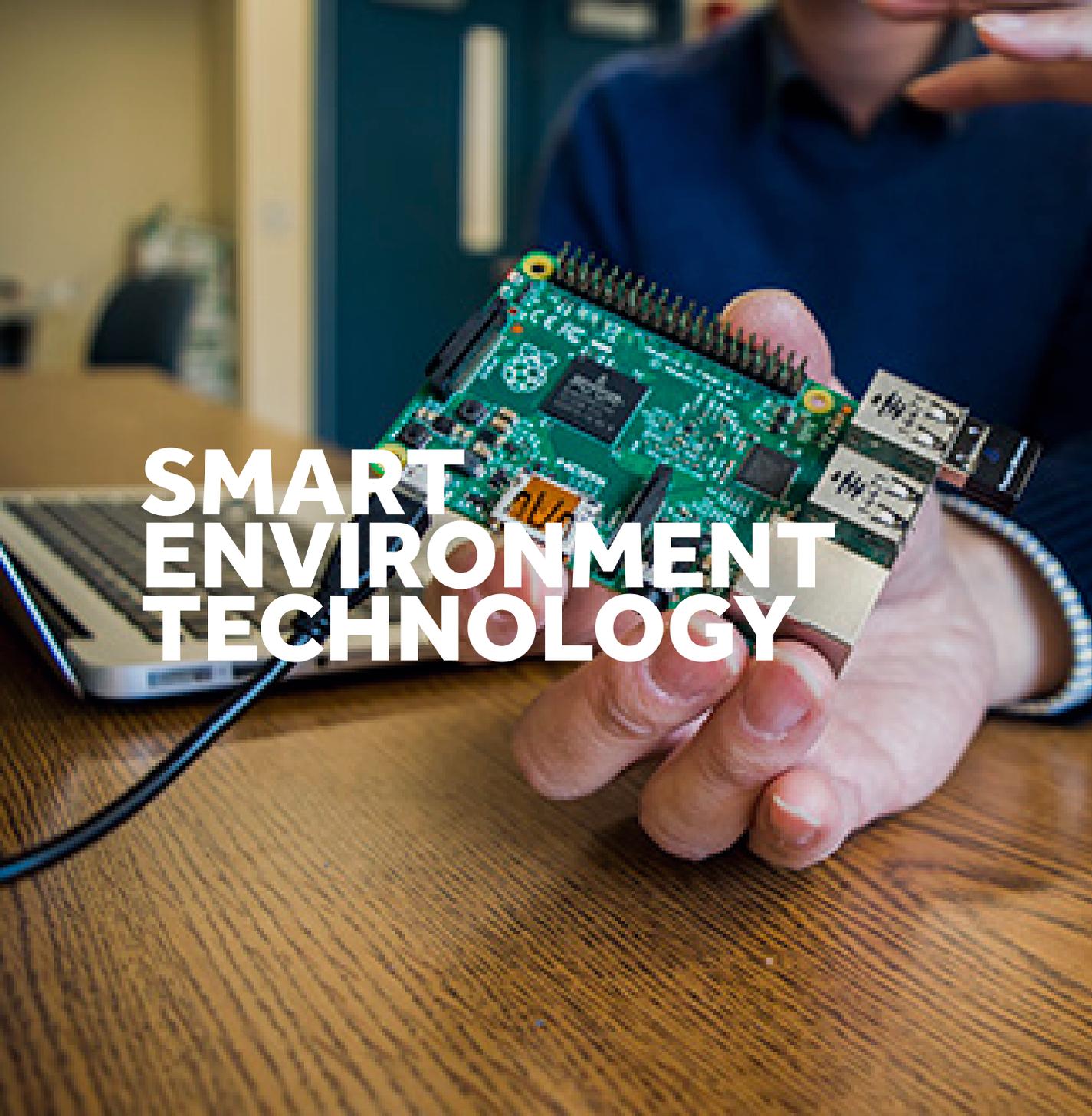


At the beginning of 2017, CEWIT member company STS Global, Inc., was selected by a major satellite service provider to supply multiple Ka-band earth stations in the United States.

Under this contract, STS Global is responsible to design, integrate and test four 6.3-meter Ka-band earth stations within an 8 month time frame. STS Global's systems will include the latest equipment technology available on the market, insuring the seamlessly delivery of voice, video, and data over a High Throughput Satellite Network (HTS).

"We are pleased to be able to work with this well-known satellite provider," commented David Hershberg, STS Global CEO. "This sizeable Ka-Band project not only demonstrates our engineering ability but also our capacity to delivers multiple complex systems in a short time frame."

STS GLOBAL · MAR 2017

A person in a blue shirt is holding a green Raspberry Pi 4B board. A USB-C to Ethernet adapter is plugged into the board. The background is a blurred office setting with a laptop on a wooden desk.

SMART ENVIRONMENT TECHNOLOGY

CEWIT Communications and Devices Director, Fan Ye, receives NSF CAREER award to develop architectures for smart environments

In the next decade, 20-50 billion IoT devices are expected to transform our homes, offices, neighborhoods, and communities into smart environments, providing novel functions and services and creating potential economic impacts in the multi-billions. However, the recent boom in IoT standards largely adopts existing embedded system software and hardware, with little scrutiny of whether they are the right match to the unique needs of smart environments.

“Many smart home products provide black-white access: either you have full control or you have almost nothing,” says CEWIT Director of Communications and Devices and Electrical Computing and Engineering Professor at Stony Brook University, Dr. Fan Ye.

“What’s needed is flexible and fine grained access control in not just what, but how.” Only allowed access operations and permitted

parameters of objects should become "visible" and invocable to the user. For example, upon approaching a home, a garage door icon with an "open" button should pop up in the device of a UPS driver. Pushing the button lifts the door one foot for 10 seconds, so he or she can slip in a package. Then the door shuts and the icon completely disappears.

Fan is the recipient of the **National Science Foundation's prestigious Early Career Development (CAREER) Award, including \$450,000 over five years to develop software and hardware architectures and systems** that provide flexible and fine grained access, formal assurances of command execution, and enterprise scale management urgently demanded in smart environments.

This research studies what is the appropriate software/hardware architecture matching unique requirements and characteristics of smart environments. It promotes smart object command operations as first class citizens, embedding constraints in commands to enforce the restrictions on time, extent, and form of access.

For a large enterprise environment, such as a university campus, IT administrators face a future with tens of thousands of smart objects. "Scalable configuration, monitoring and maintenance of large numbers of smart objects is a must," says Ye, "so the administrator can easily set seasonal lighting schedules for thousands of bulbs without tweaking them one by one."

Ye is collaborating with **Stony Brook's Center of Excellence in Wireless and Information Technologies (CEWIT) and University Police** for pilot studies of **Secure and Fine-Grained Door Lock Access Control**, a system that decides not just who has what access, but also when and to what extent.

As smart door locks are important in future smart homes and offices, current door lock access control relies on solely physical badges with any changes to access requiring a potentially lengthy process. The secure and fine grained door lock access control system would streamline the process and determine the forms and degrees of access based on user identity and secure digital tokens.

Ye's background working at IBM Watson Research Center provides a unique angle to research and develop the future of smart environments.

"I truly believe that 20 years from now we'll have the technology to control and interact with all these 'smart' objects around us, and they will produce not only data but also novel services and functions to make our lives very convenient," Ye said.

Prior to winning the CAREER award, Ye published over 70 peer reviewed papers and filed 21 U.S. and international patents. His research spans mobile sensing platforms, systems and applications, pervasive edge computing, Internet of Things, location based services, wireless and sensor networks, and energy efficiency. He comments that he finds the research gratifying, having the opportunity to make a positive impact on people's lives.

"Fan's futuristic research in smart environments is an excellent example of how our faculty are conducting research that makes science fiction come to life," said Fotis Sotiropoulos, Dean of the College of Engineering and Applied Sciences. "I could not be more proud of Fan as he joins the long and ever-growing list of CAREER award winners in our College."

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

UPCOMING EVENTS

March 28, 2017 · CEWIT Medical
Technologies and Healthcare
Innovations Symposium

March 29, 2017 · Women in Com-
puter Science (WiCS) Talk: Kristie
D'Ambrosio-Correll, Founder,
MarryMap

March 2017 · Stony Brook
Entrepreneurs Challenge 2017

April 2017 · LI Web Meetups

April 20, 2017 · Engineering-
Driven Medicine Distinguished
Lecture: Subra Suresh President,
Carnegie Mellon University

April 26, 2017 · Institute for
Advanced Computational Science
Research Day 2017

June 8, 2017 · Stony Brook Uni-
versity 2017 Incubator Company
Showcase

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

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