



Center of Excellence

WIRELESS AND INFORMATION TECHNOLOGY

AT STONY BROOK UNIVERSITY

NEWSLETTER

JULY 2016

The CEWIT2016 CEO Panel & Innovative
Tech Talks, Technology Frontiers:
Bioelectronic Medicine, CEWIT
Partnerships and Commercializing
Cleantech

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

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JULY COVERAGE: The CEWIT2016 CEO Panel & Innovative Tech Talks, Technology Frontiers: Bioelectronic Medicine, CEWIT Partnerships, Commercializing Cleantech

Summer Highlight: CEWIT2016 session and panel population. The CEWIT Team is now finalizing the Conference's technical and business tracks and are excited to roll out the full program in September! In this newsletter, a sneak peak of the leading talks on emerging technologies for a smarter world and the top-notch CEO panelists in the debut of the CEWIT2016 Panel Series.

Also, an overview of the **groundbreaking discipline of bioelectronic medicine and the CEWIT Industry Adviser pioneering the field.** Join other thought leaders and our partners at the New York Academy of Sciences and the Feinstein Institute for Medical Research in **advancing this innovative field at their upcoming key symposium.**

More from CEWIT Partners: Intelligent Product Solutions and Applied DNA Sciences team to foster the co-development of various products that broaden the means of authenticity assurance, **leveraging CEWIT's resources and fueling the transition of emerging technologies into high-value consumer and industrial products.**

The Clean Energy Business Incubator Program also strengthens business development with a suite of events designed to educate early-stage entrepreneurs and a **thriving Stony Brook University Incubator Without Walls Program that is welcoming four new cleantech innovators into its virtual fold.**



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The Next Big Thing:
CEWIT2016

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Stony Brook University

**NOVEMBER 2 & 3
MELVILLE, NY**

CEWIT2016

The 13th International Conference & Expo on Emerging Technologies for a Smarter World

November 2 & 3, 2016 | Melville Marriott Long Island | Melville, NY, USA

Gaining recognition as one of the leading IT conferences, CEWIT2016 is the premier international forum on the development and application of emerging technologies in infrastructure, healthcare and energy — three of the most critical components of a smarter global environment.

With more than 175 participating organizations and 500 attendees, CEWIT2016 is a destination for disseminating cutting-edge ideas in information technology and for driving the local, regional and global innovation economies.

Sessions: The Internet of Things, Cybersecurity, Health Technologies and Medical Devices, Big Data Analytics and Visualization, Smart Urban Systems, Smart Energy, IT and Society, The Entrepreneur's Toolkit, and International B2B.

Get the 2016 Advantage: For sponsor and exhibitor opportunities, contact Kathleen Ferrell at kathleen.ferrell@stonybrook.edu.

Connect with our international business culture, academic partners and R&D expertise.
For more information and to register:

 cewit.org/conference2016  conference@cewit.org  @CEWIT_SBU  +1 631-216-7000



An exclusive look at the strategic perspectives of those on the cutting-edge of technology leadership. The critical issue-relevant discussion with the visionaries, the facilitators that are positioning the industry for a smarter, more insightful global environment. **Learn more at www.cewit.org/conference2016.**

PANEL: The Digital Enterprise



TECHNOLOGY FRONTIERS: BIOELECTRONIC MEDICINE

THE EPICENTER OF THE FUTURE: WHERE HEALTHCARE, TECHNOLOGY & SCIENCE CONVERGE

Technology is changing the world and bioelectronic medicine is at the forefront of this technological revolution. The pharmaceutical industry's history is based on therapies that target molecular mechanisms, yet these therapies are expensive, difficult to administer, often toxic, and may be accompanied by lethal side effects. **Bioelectronic medicine — the convergence of molecular medicine; neuroscience and biology; and electronics and computing to develop cures — may change the future of therapies for a wide variety of diseases.** This groundbreaking discipline is aimed at interfacing electronics with nerves to specifically target the biological processes underlying disease. Bioelectronic medicine is now at the epicenter of where healthcare, technology, and science converge. A unique moment exists to characterize the challenges and opportunities facing the future of this scientific domain.

The term bioelectronic medicine may seem to be more science fiction than medical reality, but this field of science has recently made significant strides in translating research from the lab to the clinic with promising results. From implantable devices to treat autoimmune diseases without medication to microchips to help quadriplegics regain movement, bioelectronic medicine is quickly moving into the forefront of scientific applications.

The premise of bioelectronic medicine is that nearly all cells in the human body are in some way regulated via information communicated from electrical signals from the nervous system. Similar to how implantable artificial pacemakers emit electrical impulses to regulate a heartbeat, various technologies have been developed to block, stimulate, or regulate the body's neural signals to control the underlying molecular targets of many diseases.

Bioelectronic medicine would not have emerged as a viable therapeutic field without the work of Kevin J. Tracey, MD, President and CEO of The Feinstein Institute for Medical Research and CEWIT Industrial Advisory Board Member. At the time of discovery in May of 1988, it was believed that there was no communication between the nervous system and the immune system, but Tracey devised an experiment to test his own hypothesis on a link between the two systems.

Dr. Tracey predicted that stimulation of the vagus nerve with electrical impulses would reduce production of tumor necrosis factor (TNF), a cell signaling protein linked to inflammation. Electrical impulses were delivered to an exposed vagus nerve in a rat and after the cut was closed, Tracey administered endotoxin to trigger inflammation. Seventy-five percent of TNF production was blocked, through activation of what Tracey coined as "the inflammatory reflex." Since these research findings were published in *Nature* in 2000, Tracey has co-founded SetPoint Medical to develop an implantable device to stimulate the vagus nerve as a treatment for rheumatoid arthritis (RA) that is intended to last for 10 years. **Results from a pilot study reported that patients with this implant experienced symptom improvements comparable to those taking medications for RA and a long-term study is currently underway.**

Chad Bouton, also from The Feinstein Institute for Medical Research, was recently the lead author in a landmark study appearing in *Nature* on a **neuroprosthetic device that, for the first time in a 24-year-old man with quadriplegia, allowed a paralyzed man to move his hand using only his brain.** First, functional magnetic resonance imaging (fMRI) scans of Ian Burkhardt's brain were taken while he attempted to complete a range of hand movements; once Bouton and his team identified from the fMRI the areas of the motor cortex associated with the movement attempts, a chip was implanted in Burkhardt's brain. This chip is designed to note the electrical activity from the motor cortex that is linked to movement and to transmit this information to a computer, which eventually translates these signals and sends them to a flexible sleeve on Burkhardt's arm. **The result? Burkhardt's muscles were stimulated, and over time with training he has been able to make isolated finger movements and complete six different wrist and hand motions.** There are limitations to the technology, as it can currently only be used in a laboratory for a limited amount of time and requires recalibration before each use.

Regardless, Burkhardt sees great value in bioelectronic medicine. "Even if it's something that I can never take home in my lifetime, I'm glad I've had the opportunity to take part in this study. I've had lots of fun with it."



I know that I've done a lot of work to help other people as well," Burkhart told Nature.

Hear more about bioelectronic medicine from Kevin J. Tracey, MD, Chad Bouton, and other thought leaders at the **13th Key Symposium 2016: Bioelectronic Medicine: Technology Targeting Molecular Mechanisms** from September 21-23, 2016 held and organized by

our partners at the New York Academy of Sciences and the Feinstein Institute for Medical Research. **Register and contribute to the advancement of this innovative field: Abstract Submission through July 29, 2016.**

Watch: The Nature Video: The Nerve Bypass; Dr. Tracey's TEDMED 2016 Talk: How Electricity Could Replace Your Medications.

NYAS, THE FEINSTEIN INSTITUTE · JUN 2016

CEWIT PARTNERS PARTNERING INNOVATIVE PRODUCT DESIGN EXPERTISE FOR DNA-BASED SECURITY SOLUTIONS: INTELLIGENT PRODUCT SOLUTIONS AND APPLIED DNA SCIENCES

In our last newsletter you read about the launch of Applied DNA Sciences' SigNature T DNA system in textiles and Intelligent Product Solutions' insight on the Internet of Things in both design and business challenges.

The two CEWIT industry partners have teamed to foster the co-development of various products that broaden the means of authenticity assurance for Applied DNA Sciences' clients and their customers, including a reader of its SigNature(R) DNA mark optical features for use in inspection applications throughout the supply chain. IPS' design and engineering concept results in increased quality control and field validation for those products at risk of forgery.



The partnership furthermore leverages the technological resources available at Stony Brook University through CEWIT, as well as the neighboring New York State Centers for Advanced Technology in Biotechnology and Advanced Sensors Systems, contributing a unique range of both intellectual and material assets.

Using biotechnology as a forensic foundation, Applied DNA Sciences delivers unique DNA-based security solutions addressing the challenge of counterfeiting, diversion and theft in modern commerce. Together with IPS' innovative model for product development that integrates the full spectrum of design and engineering disciplines as a single source solution, the partnership fuels the 'productization' of emerging technologies into high-value consumer and industrial products and applications — a critical advantage to the transition from the lab to the marketplace.

COMMERCIALIZING CLEANTECH

THE CLEAN ENERGY BUSINESS INCUBATOR PROGRAM WELCOMES FOUR NEW CLEANTECH INNOVATORS, SUPPLIES THE RIGHT PROGRAMS FOR ENTREPRENEURS

The Clean Energy Business Incubator Program is now wrapping up a months-long vetting process that will welcome four new members its virtual fold.

A Stony Brook University's Incubator Without Walls Program, providing assistance and resources for developers of disruptive renewable and clean-energy technologies, will now boast thirteen member companies, maintaining a healthy mix of older, more self-sufficient clients and younger, needier ones. With longtime CEBIP client ThermoLift lurching closer to commercialization and established clients like Sulcrete and Brimes Energy working out technological bugs and finalizing investor pitches, a new crop of innovative startups is strategically jumping in.

The four members include a spinoff of an existing Long Island company working to commercialize a Stony Brook University-based nanotechnology in the fuel-cell industry as well as two groups of entrepreneurs – one from Pacific Northwest National Laboratory, one from Italy – developing flow-battery technologies, in which batteries are recharged via ion exchanges and dissolved electroactive elements.

The fourth newbie – a company creating unique interface solutions to help energy-storage entities and renewable-energy providers work together – is “a little different for us,” CEBIP Executive Director, David Hamilton, notes. As the majority of CEBIP companies are manufacturing-based, the newcomer differentially offers an IT platform that integrates existing technologies.

Additionally, the New York State Energy Research and Development Authority-funded, CEBIP, schedules about nine workshops and seminars each year for program participants. “Incubation is really about programs, not space,” Hamilton notes. “We’re a program without a physical space, but it’s still our job as an incubation system to teach our clients.”

Whatever the subject, the member-only events also provide key networking opportunities for CEBIP participants, an important factor at “a virtual incubator where we don’t always get that benefit,” Hamilton noted. Such networking benefits clients on all CEBIP levels.

“I look at where ThermoLift is now, and look back at them in April 2012, when they first joined the program,” Hamilton said. “It was Paul Schwartz with an idea and a very basic technology that was validated, kind of.” Now ThermoLift’s natural gas-driven heat pump and air conditioning unit is being field tested at Oak Ridge National Laboratory in Tennessee and is poised to redefine the heating and cooling industries – a similar path CEBIP hopes to usher for its four newcomers.



CEWIT2016 CONFERENCE: TECH TALKS

LEADING RESEARCHERS AND INDUSTRY EXPERTS ON EMERGING TECHNOLOGIES FOR A SMARTER GLOBAL WORLD

The CEWIT2016 Conference continues its tradition of providing the premier international forum for presentations of original research results as well as the exchange and transfer of innovative applications of emerging technologies in infrastructure, healthcare, and energy – three of the most critical components of a smarter global environment. This year's conference will feature multiple parallel sessions on major vanguard themes including the Internet of Things; Cybersecurity; Big Data Analytics and Visualization; Health Technologies and Medical Devices; Smart Energy; Smart Urban Systems; and Information Technology and Society, with a focus on the concept of the Internet of Everything as a means to drive the intellectual discussion and to explore new capabilities, richer experiences, and unprecedented economic opportunities that exemplify the qualities of a smarter global environment. Learn more at www.cejit.org/conference2016.



Dr. Anita D'Amico
Chief Executive Officer, Code Dx
The State of Application Security



Dr. Rakesh Kushwaha
Head, Internet of Things Business
Unit, Nokia Networks
Streamlining Interoperability



Dr. Scott Smolka
Professor, Stony Brook University
CyberCardia: An NSF CPS
Frontier Project on the Formal
Modeling, Analysis and Safety
Verification of Medical Devices



Dr. Radu Sion
Director, National Security Institute; CEO, Private Machines Inc.
Exploring the Frontiers of
Cybersecurity Research for the
21st Century



Bruce Lieberthal
Vice President & Chief Innovation
Officer, Henry Schein, Inc.
The Internet of Things in the
Healthcare Sphere



Dr. Peter Beling
Associate Professor, University
of Virginia
Cost and Machine Learning: An
Application to Feature Selection
for Hidden Markov Models

UPCOMING EVENTS:

August 14-17, 2016 • New York Scientific Data Summit (NYSDS)

August 25, 2016 • SBDC: If You Have a Dream to Start a Business

August 30, 2016 • Tech Together Happy Hour

September 16, 2016 • Stony Brook University Computer Science Tech Day: Student and Start-up Focus

September 16, 2016 • Long Island Capital Alliance Technology Capital Forum

September 21-23, 2016 • NYAS Bioelectronic Medicine Symposium

October 29, 2016 • NYAS From Scientist to CSO: Experiencing the Scientific Method as your Guide to Career Success

November 2 & 3, 2016 • CEWIT2016 Conference

November 14, 2016 • Journey through Science Day: Poster Application Deadline, August 1st

June 8, 2017: Save the Date: Stony Brook University 2017 Incubator Company Showcase

OUR COMMUNITY:

The Advanced Energy Center

The 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 Center for Dynamic Data Analytics (CDDA)

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 Forum for Technology (LIFT)

Long Island High Technology Incubator

Long Island Software and Technology Network (LISTnet)

The New York Academy of Sciences

Small Business Development Center at Stony Brook University



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