Center of Excellence
WIRELESS AND INFORMATION TECHNOLOGY
AT STONY BROOK UNIVERSITY

NEWSLETTER
NOVEMBER 2016

CEWIT Business Insights: Technology Entrepreneurship, Portable Assistive Technologies, What is Hack@CEWIT?, Interdisciplinary Tech Talks

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

NOVEMBER COVERAGE:

CEWIT BUSINESS INSIGHTS: TECH ENTREPRENEURSHIP, WHAT IS HACK@CEWIT?, PORTABLE ASSISTIVE TECHNOLOGIES, INTERDISCIPLINARY TECH TALKS

CEWIT Business Insights: Missed the November 2, 2016, Technology Entrepreneurship Symposium? We've summarized the business insights of our presenting experts. From advantaging intrapreneurship and R&D tax credits to avoiding early, very costly valuation mistakes and specific colors in your business plan, the **Technology Entrepreneurship Symposium provided entrepreneurs the most up-to-date and actionable business management strategies at work in Long Island's innovation economy.**

What is Hack@CEWIT?: Hack@CEWIT is CEWIT's inaugural, region-wide, interdisciplinary student hackathon, focusing on **industry-relevant internet of things (IoT) and microservices challenges to advance enterprising, student-powered software solutions** over Presidents' Day Weekend, February 2017.

Technology Frontiers: CEWIT researchers and member entrepreneurs land back-to-back research grants to continue the advanced development of improved methods for reading and hearing on-screen text for people with visual impairments. **Aiming to make existing assistive technologies portable to any device, their work will dramatically improve web accessibility** as well as allow access to completely new avenues of graphical information.

Interdisciplinary Tech Talks: CEWIT hosts Stony Brook University's Cyber Day, **an interdisciplinary dialogue on security and privacy in our digital lives.** Additional distinguished talks on audio compression, medical image computing, and the use of DNS to study internet abuse in store.

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The Next Big Thing:
Hack@CEWIT

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CEWIT BUSINESS INSIGHTS: TECH ENTREPRENEURSHIP

OUR EXPERTS SHARE LEADING BUSINESS MANAGEMENT STRATEGIES AT WORK IN LONG ISLAND'S INNOVATION ECONOMY

Keynote speaker, Leo Guthart, Senior Adviser, Topspin Partners, highlights the importance of entrepreneurship on Long Island at the CEWIT hosted, **November 2, 2016, Stony Brook University Office of the Vice President for Economic Development Technology Entrepreneurship Symposium.**

In his address, he highlights three main contributors to the development of the region's innovation environment from its prime position as the as "the Silicon Valley of the Aircraft Industry," including Northwell Health and Cold Spring Harbor Lab's collaboration to fuel advanced drug development, which represented a major change in the way the institutions attack the world by helping each other to build a transformational drug development relationship.

Additionally, the rise of the Hofstra Northwell School of Medicine has, with Stony Brook University, provided the region with not only one, but two top-tier medical schools. Thirdly, the growth of regional incubators has secured the concept of intrapreneurial growth across industries, universities, and research centers, and has built a culture of working together to fuel innovation. The bottom line, **creative new ideas and businesses within these relationships are at the center of advancing a robust innovation ecosystem on Long Island.**

Alon Kapen, Partner, Emerging Companies and Venture Capital at Farrell Fritz, on Protecting the Startup Against Founder Departures, shares valuable advice for tech entrepreneurs, encouraging them to adapt early on precautionary measures to prevent disaster. **Starting up is hard, failing because of not taking precautionary measures is in itself, another story.** Backing him up, Facebook's Mark Zuckerberg on **early, very costly mistakes**.

Stony Brook University Harriman College of Business Assistant Professor, Richard Chan, sheds light on how How Kickstarter Investors Make Their Decisions, with a presentation on his research focusing on the ways company characteristics such as phonetic (pronunciation) and linguistic fluency, as well as the use of images and colors in company collateral ultimately impact fundability. **As many investor decisions are made on altruistic processes**, these types of both business and marketing tactics do in fact significantly affect a company's fate in the funding environment and also, its overall success. More on his findings: Avoid This Color in Your Business Plan.

"In Israel, 1000 new innovative startups are formed each year, that's a new breakthrough every 8 hours," shares Inon Elroy, Israel Economic Minister to North America, kicking off his talk on bilateral International Partnership Opportunities for Long Island and Israeli entrepreneurs.

At the forefront, the Americas Operations at the Israel Innovation Authority was established three years ago to explore, promote, and facilitate these multisector R&D&I collaborations, with the Long Island and the New York regions being key areas for development. Providing global enterprises a risk sharing platform to facilitate their investment in Israel's innovation ecosystem through both scouting and funding, the Israel Innovation Authority welcomes US-based enterprises to benefit, fueling win-win partnerships, **with CEWIT and Stony Brook University serving as two major New York State implementation partners.**

CEWIT industry partner Ron Goldman, CEO, AccuVein, Inc. offers entrepreneurs insight into the best business practice following investments. As new medical technologies have a 15 year adoption curve to be implemented into hospitals, **entrepreneurs must be cautious to understand the time horizons of their investors as well as secure the right amount of capital from the start.** He advises that as this mismatch in time horizon perspectives is a major factor the entrepreneur/investor relationship, entrepreneurs really sell investors on their on their longer visions and secure their support for the road ahead.

He further elaborates that **as a company founder, one should never stop selling,** to investors, customers, and to most significantly, potential employees, adding that, "Success is most determined by the team you bring in."

Karen O'Connor, Corporate Tax Director, Marcum, LLP **wants tech entrepreneurs to advantage R&D tax credits and incentives** — $1 for $1 reduction on taxes owed or paid, applied back 1 year and forward 20. Now with the R&D credit recently expanded, **tech startups with frequently little to no income,** have the opportunity to tap credits by taking it off of their payroll taxes, one the newly introduced ways by Congress to utilize R&D tax benefits.

In her talk, Tax Issues Entrepreneurs Must Face, she further encourages entrepreneurs to **choose the most fitting legal entity as well as seek a tax adviser at that juncture** for optimal feedback and professional support in handling company tax issues, as even an hour's time will make a significant difference when you're again, low on cash.

Well-traveled investor David Calone, Founder of the Long Island Emerging Technologies Fund, shares his insider's perspective on Building Enterprise Valuation highlighting that one of the four major assets in having valuation is that the technology (or product, followed by market, team, and traction) behind the enterprise **solves a real world problem and has a significant impact on the global society.**

In his experience, in order to secure this promise of innovation and impact of new technologies, entrepreneurs and investors need to work together, as nothing hurts valuation more than over promising.

Moreover, it is also crucial for established companies to collaborate with startup entrepreneurs, helping to increase startup revenue and valuation as well as serve as business mentors for their initial growth.

This secondary education and mentorship component can be further played out on regional campuses and in research centers, **as is CEWIT's initiative, to encourage students and academic entrepreneurs to move away from a culture of money toward a culture of building.**

Brian Kiel, Managing Director of the New York State Innovation Venture Capital Fund as part of Empire State Development, helps to sustain the brand of New York State as a place for innovation, as well as the notion that **great ideas are born in the state's universities, incubators, and labs.**

To assist in bringing these ideas to fruition, his direction on the Innovation Venture Captial Fund leads core programs focused on providing seed and early-stage venture funding to high growth startups, filling gaps in critical funding and creating a valuable resource geared specifically toward the academic tech entrepreneurs on campuses and in research labs, accelerators, and incubators.

His advice to entrepreneurs: As there is resistance to change in clients and consumers, **what you are doing must be compelling and convincing to adaptation.**

CEWIT DEFINES:

WHAT IS A HACKATHON?

A hackathon is a design sprint-like event in which people come together to collaboratively utilize technology to transform ideas into reality. A venue for creativity and exploratory programming, a hackathon's goal is to create usable software specific to its overlying focus with can include a programming language, operating system, application, or API.

WHAT IS HACK@CEWIT?

Hack@CEWIT is the **Center of Excellence in Wireless and Information Technology (CEWIT)'s** inaugural, region-wide, interdisciplinary student hackathon, focusing on industry-relevant internet of things (IoT) and microservices challenges to advance enterprising, student-powered software solutions in the Center's 100,000 s.f., next-generation research and education facility **at Stony Brook University, Presidents' Day Weekend, February 2017.**

HACK

SPONSOR

TECH FRONTIERS: PORTABLE, ASSISTIVE TECHNOLOGIES

CEWIT RESEARCHERS ADVANCE THE PORTABILITY OF ASSISTIVE TECHNOLOGIES TO REMOVE CRITICAL BARRIERS FOR COMPUTER USERS WITH VISUAL IMPAIRMENTS

Landing two back-to-back research grants from the National Institutes of Health (NIH) and the National Institute on Disability, Independent Living and Rehabilitation Research (NIDILRR), CEWIT researchers are in prime position to continue the advanced development of improved methods for reading and hearing on-screen text for people with visual impairments. Their research aims **to make existing assistive technologies portable to any device, as well as work well on remote or cloud computing systems, removing critical barriers to education and employment for computer users with visual impairments.**

The large, nearly one million, R01 grant from the NIH, awarded to CEWIT and the Department of Computer Science researchers at Stony Brook University, Donald E. Porter (PI), I.V. Ramakrishnan (Co-PI), and Yevgen Borodin (Co-PI), support the project entitled, Semantics-Preserving Virtualization: A Computing System Framework to Run Any Screen Reader on Any Device with Easy Customization, which is scheduled to take place over the course of three years, with an estimated completion date in 2019. The life-changing research will generate tools that can make screen readers and other assistive technologies portable across OSes, as well as interoperate more efficiently for remote desktop systems.

For people with visual impairments that use assistive technologies (AT), consistency in their AT across devices is critically important. Unfortunately, today's ATs only work on the single platform they were designed for, such as Windows or MacOS. With the widespread implementation of technology in many aspects of modern life, the visually impaired face an increasingly more difficult problem when they need to switch between various devices with different available AT.

The researchers are working to **decouple ATs from a specific OS and create a generic intermediate representation (IR) that can be easily transferred and used on a device with a different operating system.** Being able to keep a familiar "look and feel" when users have to switch operating systems will significantly improve the experience of many people with visual impairments who must read text on various screens.
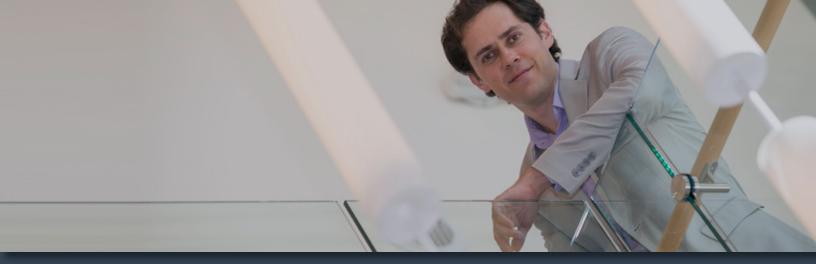
Furthering the joint research, the additionally awarded $600,000 NIDILRR grant to Drs. Borodin and Ramakrishnan will support the specific development of haptic gloves, continuing to empower visually impaired populations with the ability to interact directly with their computer devices via an audio-tactile interface. The research, Haptic Gloves for Audio-Tactile Web Accessibility, seeks to enable blind users to connect the haptic gloves to any computer device and then feel out and listen to the content of the screen by moving the gloved hands on any flat surface such as the desk.

Heavy dependency on screen-based text in today's society can be overwhelming, as the project points out, though while we are all vulnerable to "information overload" to some degree, the visually impaired are at a particular disadvantage when it comes to reviewing and processing digital information.

"In our experiments, we found that, compared to sighted people, blind computer users often take 10 times longer to do simple tasks on the computer, just because they have to listen through reams of text before they can tell if it is relevant to the task at hand," said Borodin.

By investigating and developing algorithms capable of running haptic gloves, the researchers will ultimately produce design specifications and prototypes, evaluate with end users, and explore the tactile behaviors naturally utilized by blind people to further optimize the performance of these novel gloves.

An also three-year project, the research serves as another critical gain in the field of computer and web accessibility for it will not only **dramatically improve accessibility for the visually impaired, but also allow access to completely new avenues of graphical information, perhaps increasing their capacity for education and employability.**

Dr. Yevgen Borodin, 2015 MIT Technology Review Innovator Under 35, is an avid CEWIT researcher focusing on web accessibility, information retrieval, web content analysis, and data mining. A successful entrepreneurial extension of his Center-based innovations, Dr. Borodin serves as CEO of CEWIT-based startup Charmtech Labs, **an education and productivity software development company whose award-winning flagship product, Capti Narrator** — a universally accessible web browsing application enabling intuitive and usable web access for people with and without vision impairments on a variety of desktop and mobile platforms — **is revolutionizing the way people consume digital content.**

More on the team's latest paper: Tactile Accessibility: Does Anyone Need a Haptic Glove?

STONY BROOK UNIVERSITY · NOV 2016

INTERDISCIPLINARY TECH TALKS
SECURITY AND PRIVACY IN OUR DIGITAL LIVES: CYBER DAY

CEWIT hosts Stony Brook University Cyber Day on December 12, 2016, bringing together experts in cybersecurity with the greater Stony Brook academic community for **an interdisciplinary dialogue on security and privacy in our digital lives**.

In partnership with the College of Engineering and Applied Science, the National Security Institute's Cyber Day aims to explore and understand shared academic strengths and build synergy across different campus groups with institutional partners such as Brookhaven National Laboratory (BNL) to both develop leading cybersecurity strategy and form teams to address key sector challenges. **More information and to register: nationalsecurityinstitute.org/cyberday.**

The National Security Institute (NSI) at Stony Brook University is part of a bold new initiative, undertaken as part of the New York SUNY 2020 vision plan, to hire more than 250 faculty members at Stony Brook to **expand teaching and research in emerging fields of study that cut across traditional boundaries of academic disciplines**. During the next few years, NSI will recruit a total of six new faculty members whose research interests span a wide spectrum of areas,

including Computing Hardware Security, Cloud Computing and Distributed Systems Security, Health Technologies Security, Security and Privacy in Online Social Networks, Big Data Security and Privacy, and Regulatory Compliance and Policy among others.

The NSI vision and core mission are bold: to secure our homeland by researching and developing technologies and insights for secure, trustworthy, and available communications and computing platforms. **NSI's goal is to become a world leader in research, the education of professionals, security technology, business and policy, and raising awareness.**

NSI spans multiple disciplines and establishes public-private partnerships to develop new holistic socio-technological solutions for securing our highly-digital societies; it engages not only in research but also in the education of professionals in defense, national and cyber-security, assurance, healthcare, and policy. A comprehensive assurance education program trains not only Stony Brook students but also the broader corporate and academic community. NSI leverages the team's strengths to spawn a steady stream of successful security-centric technology startups.

OPTIMAL WAVELET BASES FOR AUDIO COMPRESSION

Alexander Nodeland at the Institute for Advanced Computational Science, December 7, 2016, 1:15pm: Perhaps the most well known implementation of wavelet compression, today, is JPEG 2000. By representing data in terms of a series of scaling coefficients and time shifts of a wavelet basis, we can store data efficiently with minimal loss. This type of compression can be used for signals which exist in any dimension. The problem is, choosing a wavelet basis which suits your data. And while there is a proof of existence of an optimal wavelet basis, there is no common procedure to find it. Through experimentation and analysis using IACS supercomputers, we hope to uncover this procedure. Wavelets have uses from data compression, to biomedical and astrophysical applications, and of course, music.

Alex is a first-year Ph.D student in the Applied Mathematics and Statistics Department researching optimal graphs for supercomputer interconnect topologies and creating a global network of supercomputers over InfiniBand under CEWIT faculty Dr. Yuefan Deng and Dr. Margaret Schedel of the Music department. Alex furthermore is a member of the joint Consortium for Digital Arts, Culture, and Technology (cDACT) and CEWIT STEAM (Science, Technology, Engineering, Arts, Math) Residency Program at the Center which serves as a **catalyst for new research and the basis for collaboration between two of Stony Brook's dynamic and forward-looking associations.**

ICYMI: MEDICAL IMAGE COMPUTING; THE USE OF DNS TO STUDY INTERNET ABUSE & CYBERATTACKS

Dr. Manos Antonakakis, Assistant Professor, School of Electrical and Computer Engineering, Georgia Institute of Technology at the Department of Computer Science, December 6, 2016: The Domain Name System (DNS) is a critical component of the Internet. The critical nature of DNS often makes it the target of direct cyber-attacks and other forms of abuse. Cybercriminals rely heavily upon the reliability and scalability of the DNS protocol to serve as an agile platform for their illicit network operations. For example, modern malware and Internet fraud techniques rely upon the DNS to locate their remote command-and-control (C&C) servers through which new commands from the attacker are issued, serve as exfiltration points for the information stolen from the victim's computer and to manage subsequent updates to their malicious toolset. In this talk I will discuss how we can reason about Internet abuse using DNS and explore methods to reliably and systematically detect Internet abuse facilitated by Domain Name Generation Algorithms (DGAs).

Dr. Ron Kikinis, Founding Director, Surgical Planning Laboratory, Department of Radiology, Brigham and Women's Hospital, Harvard Medical School at the Department of Computer Science, December 6, 2016: The practice of medicine is undergoing an industrialization process and imaging is evolving at a rapid pace with new modalities and acquisition methods being added at an ever increasing pace. In parallel, results from basic research in the fields of genetics and immunology are beginning to translate into patient care.

Driven by these disruptive changes, the importance of MIC is increasing rapidly. Image Informatics, Machine Learning, Radiomics and quantitative imaging are all contributing to the portfolio of tools and technologies being deployed to address the new challenges.

FROM OUR PARTNERS:

THE CLEAN ENERGY BUSINESS INCUBATOR PROGRAM SPOTLIGHT ON CLEAN ENERGY

Generation technologies typically receive the majority of attention when clean energy is discussed. However, effectively and efficiently storing energy once it is produced is equally important, particularly given the limited

production windows and variable output of renewable energy sources such as solar and wind. Three of the Clean Energy Business Incubator Program (CEBIP) at Stony Brook University's newest client companies are **pursuing solutions that address the goal of storing clean energy and releasing it to meet changing demand: Read More**.

THE CENTER FOR BIOTECHNOLOGY AWARDED $500K U.S. DEPARTMENT OF COMMERCE GRANT

The Center for Biotechnology at Stony Brook University has received a three-year, $500,000 U.S. Department of Commerce i6 Challenge Investment to support the Center's efforts in bolstering the regional bioscience ecosystem by **supporting a formal mentorship program, as well as a critical NIH-focused SBIR/STTR training and application development program** which will assist in capital formation and launching new companies.

The Center is among 35 organizations from 19 states that will receive nearly $15 million to create and expand cluster-focused, proof-of-concept and commercialization programs, and early-stage seed capital funds through the Economic Development Administration's (EDA) Regional Innovation Strategies (RIS) program. **Read More**.

HACK@CEWIT IoT&MICROSERVICES

The Center of Excellence in Wireless and Information Technology

INNOVATION IS HERE:

Leverage student brainpower to build a quick and effective product prototype, explore unique and cutting-edge interpretations of pre-existing technology and drive targeted, company-specific innovations in IoT and microservices.

The region-wide, 150 graduate/undergraduate student event will feature an interactive speaker series, hands-on, deep dive workshops, industry hacker guru program, multimedia experiences, and specialized opportunities for recruitment in CEWIT's 100,000 s.f. next generation research and education facility — at Stony Brook University.

43 HOUR HACK · FEBRUARY 17-19, 2017

www.cewit.org/hack | Sponsor Prospectus & Student Pre-Registration, Limited Space

UPCOMING EVENTS:

December 7, 2016 · IACS: Optimal Wavelet Bases for Audio Compression

December 8, 2016 · LISTnet Long Island Tech Showcase

December 8, 2016 · I-Corps at NIH Informational Webinar

December 9, 2016 · Long Island Capital Alliance: Healthcare Capital Forum

December 12, 2016 · Stony Brook University Cyber Day

January, 2017 · Computer Science Distinguished Lecture Series

February 17-19, 2017 · Hack@CEWIT: IoT & Microservices

March, 2017 · Stony Brook Entrepreneurs Challenge 2017

June 8, 2017 · Stony Brook University 2017 Incubator Company Showcase

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

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)

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