**Machine Learning
Artificial Intelligence
Blockchain
Computational Medicine**

CEWIT2019 CONFERENCE

NOVEMBER 6, 2019

CONFERENCE GUIDE

Center of Excellence
WIRELESS AND INFORMATION TECHNOLOGY
AT STONY BROOK UNIVERSITY

WELCOME

This is the 15th International Conference and Expo on Emerging Technologies organized by the Center of Excellence in Wireless and Information Technology (CEWIT) at Stony Brook University. The conference has gained international recognition as one of the premier conferences on the development and application of emerging technologies, and for bringing together academic research and industrial innovation at a single forum. Our sponsors of this year's conference include Softheon, Zebra Technologies, IEEE, Henry Schein, Inc., Intelibs, JDA Software, Hoffmann and Baron, Marcum LLC, and Manufacturing and Technology Resource Consortium (MTRC).

Information Technology will continue to create new and highly profitable businesses. Artificial Intelligence (AI), Machine Learning, IoT, Data Analytics, Computational Chemistry and Biology, Edge Computing, and other emerging technologies will span new industries. This year's conference is focused on Artificial Intelligence, Machine Learning, Blockchain and Computational Medicine. Machine Learning and AI applications are enhancing the economy and computers are learning the way things work in the world. The security, connectivity, privacy, and standardization in the IoT world will be addressed to allow the extraction of insights from data. Internal data streams will be combined with data streams coming from the external world such as social media and industry for data scientists to build new algorithms to make quick and intelligent decisions. It is critical that we drive technology commercialization by quickly moving technologies from research labs to the marketplace to help drive economic growth worldwide. The conference this year hosts a wide range of high-caliber speakers, including leading researchers, technologists, executives and policy makers, and a broad international audience to discuss innovations in Machine Learning, AI, Blockchain, and Computational Medicine.
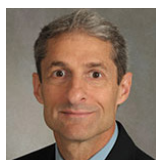
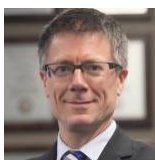My heartiest congratulations to all authors, and welcome to all participants.

Satya P. Sharma, PhD, MBA
Executive Director
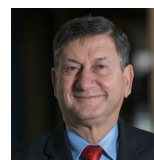*The Center of Excellence in Wireless and Information Technology (CEWIT)*

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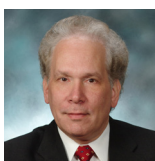
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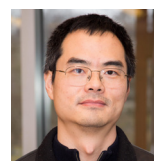*Chief Scientist, CEWIT*

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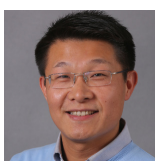*Director, Globalization, CEWIT*

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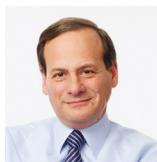*Director, Communications and Devices, CEWIT*

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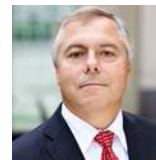*Sector Engineering Fellow, Northrop Grumman Corporation*

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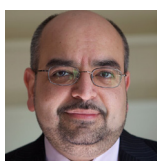*Senior Vice President, Zebra Technologies*

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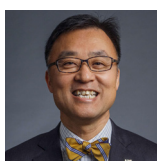
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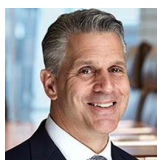
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CONFERENCE AGENDA

TIME	SPEAKER	TALK TITLE
7:30am	**Registration Open • Continental Breakfast**	
8:15am - 8:30am	Interim President Michael A. Bernstein Stony Brook University	*Opening Remarks*
8:30am -8:50am	Shantenu Jha, PhD Brookhaven National Laboratory	*The Power of Many: The Next Frontier*
8:50am - 9:10am	Tomi Teikko Tieto Corporation	*Empathic Reality (ER): Human-Centric Content in Virtual and Augmented Reality*
9:10am - 9:30am	Achille Fokoue IBM Research AI	*Unifying Learning and Reasoning*
9:30am - 9:50am	Peter A. Beling, PhD University of Virginia	*A System Theoretic Perspective on Transfer Learning*
9:50am -10:10am	Hidekazu Taoka, PhD DOCOMO Healthcare, Inc.	*Expectation and Reality of Japanese Health Tech Market*
10:10am – 10:30am	**BREAK**	
10:30am - 10:50am	Ambassador Ido Aharoni New York University, Emerson Rigby Ltd.	*Marketing in the Age of the New Participant*
10:50am - 11:10am	Joseph Jankowski, PhD Henry Ford Health System	*What it Will Take to Realize the Promise of Big Data, Connectivity and Machine Learning in Healthcare*
11:10am - 11:30pm	Daniel Holewienko Henry Schein, Inc.	*The Drive to Healthcare 4.0 through Big Data, Analytics, ML, Cloud, and IoT Enablement*
11:30am - 11:50pm	Steve Skiena, PhD Stony Brook University	*Word and Graph Embeddings for Machine Learning Models*
11:50pm - 1:00pm	**LUNCH**	
1:00pm - 1:20pm	Florence D. Hudson FDHint, LLC	*Harnessing Advanced Technology Innovations Today and into the Future*
1:20pm - 1:40pm	Pekka Abrahamsson, PhD University of Jyväskylä	*Implementing Ethics in AI*
1:40pm - 2:00pm	Steve Rogers IBM	*Blockchain in Practice- Beyond the Hype*
2:00pm - 2:20pm	Dan Wang, PhD The Hong Kong Polytechnic University	*Industry AIOps: Case Studies and Experiences in Data Driven Industry Operations*
2:20pm - 2:40pm	Voramon Dheeradhada, PhD GE Global Research	*Machine Learning Method for Parameter Development*
2:40pm - 3:00pm	**BREAK**	
3:00pm - 3:20pm	Pat Narendra, PhD Zebra Technologies	*Augmented Reality Extended: Beyond Games and Novelty to Creating Value in the Enterprise*
3:20pm - 3:40pm	Raju Gottumukkala, PhD University of Louisiana at Lafayette	*VAStream: A Visual Analytics System for Fast Data Streams*
3:40pm - 4:00pm	Ali Asmari, PhD ULC Robotics	*Utilizing Machine Learning to Solve the Challenges of the Energy Industry*
4:00pm - 4:20pm	James Xiaojiang Du, PhD Temple University	*e-Safe: Secure, Efficient and Forensics- Enabled Access to Wireless Implantable Medical Devices*
4:20pm - 5:20pm	Panel Moderated by The New York Academy of Sciences	*A.I. and Climate Change: Improving Prediction, Measuring Impact, and Driving Adaptation*
5:20pm - 7:00pm	**NETWORKING RECEPTION**	**Enhanced Networking Reception**

SPEAKERS

Pekka Abrahamsson, PhD
Professor of Information Systems and Software Engineering, University of Jyväskylä

Implementing Ethics in AI

ABSTRACT
The field of Artificial Intelligence (AI) has progressed rapidly in the past few years. AI systems are having a growing impact on society and concerns have been raised whether AI system can be trusted. A way to address these concerns is to employ ethically aligned design principles to the development of AI software. Yet these principles are still far away from practical application. This talk provides state-of-the-art empirical insight into what should researchers and professionals do today when the client wants ethics to be added to their system.

BIO
Pekka Abrahamsson received his PhD on Software Engineering in 2002 from University of Oulu. His research is in the area of emerging software technologies, empirical software engineering and the ethics of artificial intelligence. Prior to his current position he has served as a full professor in Italy and in Norway. He has also worked at VTT Technical Research Centre of Finland as a research professor. He has published broadly in his fields of expertise and received many awards and recognitions. He received the Nokia Foundation Award in 2007, Aminer.org selected him as Top-100 Most Influential Scholar in software engineering in 2016 and he co-authored the best paper of 2018 in *Journal of Systems and Software*. He is the co-founder of the Software Startup Research Network (SSRN) and a seasoned expert in leading international research projects.

Ambassador Ido Aharoni
Global Distinguished Professor, New York University, Co-Founder, Emerson Rigby Ltd.

Marketing in the Age of the New Participant

ABSTRACT
The information revolution has given rise to the emergence of Participatory Culture characterized by unprecedented access to media in today's ubiquitous digital environment. The innumerable hours participants spend connected to new technologies, devices and ideas, have fundamentally shaped the way they think, process information and experience life. While most analysts refer to this phenomenon in generational terms (millennial-centered marketing for example), new data collected globally indicates that there is a new type of cross-generational consumer emerging, not necessarily defined by chronological age: The New Participant. In this talk, New York University Professor and non-product branding expert Ido Aharoni, will share these fascinating findings and their implications for the business world.

BIO
Ambassador Ido Aharoni is a Global Distinguished Professor for International Relations at NYU, a member of International Advisory Council, APCO Worldwide, a 25-year veteran of Israel's Foreign Service, a public diplomacy specialist, and is a co-founder and principal at Emerson Rigby, where he developed their core methodology R-SWIM. He served 25 years in the Israeli Foreign Service, ending as the longest served Israeli Consul to NY. In 2016, New York Mayor Bill De Blasio proclaimed July 29, 2016, as "Ambassador Ido Aharoni Day" in New York.
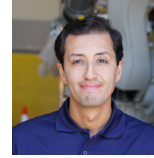
Ali Asmari, PhD
Program Manager, Robotics Roadworks and Excavation Systems, ULC Robotics

Utilizing Machine Learning to Solve the Challenges of the Energy Industry

ABSTRACT
ULC Robotics assists gas and electric companies and the broader energy industry to keep up with the increasing need to repair and maintain their infrastructure while causing less disruption to the public, reducing the greenhouse gas emissions and lowering costs by developing and deploying innovative robotic repair solutions and advanced inspection systems. Through the deployment of advanced robotics, ULC gathers an abundance of data for different inspection purposes every year. With the acquisition of data comes the time-consuming challenge of processing and interpreting the data which requires highly trained experts. By developing customized deep learning models that learn over time and are tailored to specific applications, ULC can process all of the acquired data and produce reliable, repeatable, and accurate reports to serve different sectors of the industry. In this talk, Dr. Asmari will present a diverse set of applications of Machine Learning and Artificial Intelligence in the energy industry that has been developed and deployed by ULC Robotics. These methods cover a broad range of applications such as identification of whales in aerial images to protect the endangered species, and development of an autonomous inspection system for mapping and monitoring electric and gas networks to improve maintenance and repair operations.

BIO
Ali Asmari is currently supervising all the AI and Machine Learning development for ULC Robotics. In addition to leading the ML team, he is managing the Robotic Roadworks and Excavation System (RRES) at ULC. Asmari has an MS in the robotics and automation and a PhD in Mechanical Engineering with specialization in Computer Vision and Machine Learning from Oklahoma State University. Since graduation, he has been involved in the development of autonomous systems and robotic solutions. Prior to ULC, Dr. Asmari has spent over fifteen years in the field of robotics, with experience in design and development, Automation and Control, and has led projects in a diverse set of industries.

SPEAKERS

Peter A. Beling, PhD
Professor,
University of Virginia

Voramon Dheeradhada, PhD
Senior Materials Scientist,
GE Global Research

James Xiaojiang Du, PhD
Professor and Director, Security and Networking (SAN) Lab, Temple University

A Systems Theoretic Perspective on Transfer Learning

Machine Learning Method for Parameter Development

e-Safe: Secure, Efficient and Forensics-Enabled Access to Wireless Implantable Medical Devices

ABSTRACT

The machine learning formulation of transfer learning is incomplete from a systems theoretic perspective. It focuses on algorithm parameters, features, and samples, and neglects the perspective offered by considering system structure and system dynamics. Furthermore, while the machine learning formulation serves to classify methods and literature, the systems theoretic formulation we propose serves to provide a framework for the top-down design of transfer learning systems, including a novel definition of transfer learning and identification of key design parameters. We dichotomize the transfer learning problem into a question of transferring system structure and dynamics. We formulate our framework in the context of input-output systems and discuss results for several real-world systems.

BIO
Peter A. Beling is a professor in the Department of Engineering Systems and Environment at the University of Virginia (UVA). Dr. Beling's research interests are in the area of decision-making in complex systems, with emphasis on adaptive decision support systems and on model-based approaches to system-of-systems design and assessment. His research has found application in a variety of domains, including mission-focused cybersecurity, reconnaissance and surveillance, prognostic and diagnostic systems, and financial decision making. He directs the UVA site of the Center for Visual and Decision Informatics, a National Science Foundation Industry/University Cooperative Research Center, and the Adaptive Decision Systems Laboratory, which focuses on data analytics and decision support in cyber-physical systems. Dr. Beling has served as editor and reviewer for many academic journals and as a member of several National Academies panels. Dr. Beling received his PhD in operations research from the University of California at Berkeley.

ABSTRACT

Recent development of nickel superalloys for additive manufacturing has shown to be challenging due to the susceptibility to micro cracking in as build micro-structure. Significant effort has gone into optimizing build parameters for these hard to process alloys. To reduce the parameter development cycle for challenging materials, GE Research developed and continue to enhance a framework that utilizes probabilistic machine learning (ML), intelligent sampling and optimization protocols, coupled with high-through put printing, characterization, and in-situ monitoring systems to dramatically accelerate the developmental process. A new protocol was developed by leveraging machine learning algorithm. In this presentation, the framework along with demonstration of the use of machine learning method to guide parameter development for additive manufacturing will be given.

BIO
Voramon Dheeradhada is a senior materials scientist in the Structural Materials discipline at GE Research in the area of material developments especially in alloy and metallic coating for structural applications focusing on environmental degradation. Her areas of expertise include but not limited to high temperature structural materials for aerospace and power generation, additive manufacturing, alloy design, processing-microstructure-property relation, thermodynamic, metallic coatings, characterization, and machine learning. She has worked on several alloy systems such as nickel superalloy, cobalt alloys, titanium, and titanium aluminide as well as refractory intermetallics. She received her MS and PhD in Materials Science from Purdue University in 2005.

ABSTRACT

To facilitate monitoring and management, modern Implantable Medical Devices (IMDs) are often equipped with wireless capabilities, which raise the risk of malicious access to IMDs. Although schemes are proposed to secure the IMD access, some issues are still open. First, pre-sharing a long-term key between a patient's IMD and a doctor's programmer is vulnerable since once the doctor's programmer is compromised, all of her patients suffer; establishing a temporary key by leveraging proximity gets rid of pre-shared keys, but as the approach lacks real authentication, it can be exploited by nearby adversaries or through man-in-the-middle attacks. Second, while prolonging the lifetime of IMDs is one of the most important design goals, few schemes explore to lower the communication and computation overhead all at once. Finally, how to safely record the commands issued by doctors for the purpose of forensics, which can be the last measure to protect the patients' rights, is commonly omitted in the existing literature. Motivated by these important yet open problems, we propose an innovative scheme e-SAFE, which significantly improves security and safety, reduces the communication overhead and enables IMD-access forensics. We present a novel lightweight compressive sensing based encryption algorithm to encrypt and compress the IMD data simultaneously, reducing the data transmission overhead by over 50% while ensuring high data confidentiality and usability. Furthermore, we provide a suite of protocols regarding device pairing, dual-factor authentication, and accountability-enabled access. The security analysis and performance evaluation show the validity and efficiency of the proposed scheme.

BIO
Xiaojiang (James) Du is a Professor in the Department of Computer and Information Sciences at Temple University, Philadelphia, USA. He is the director of the Security and Networking (SAN) Lab at Temple University. Dr. Du received his BS and MS degree in

Achille Fokoue
Principal Research Staff Member and Master Inventor,
IBM Research AI

Unifying Learning and Reasoning

Raju Gottumukkala, PhD
Director of Research, Informatics Research Institute, and Professor, University of Louisiana at Lafayette

VAStream: A Visual Analytics System For Fast Data Streams

Electrical Engineering from Tsinghua University, Beijing, China in 1996 and 1998, respectively. He received his MS and PhD degree in Electrical Engineering from the University of Maryland College Park in 2002 and 2003. His research interests are security, wireless networks, and systems. He has authored over 330 journal and conference papers in these areas, as well as a book published by Springer. Dr. Du has been awarded more than 5 million US dollars research grants from the US National Science Foundation (NSF), Army Research Office, Air Force Research Lab, NASA, Qatar Foundation, the State of Pennsylvania, and Amazon. He won the best paper award at IEEE GLOBECOM 2014 and the best poster runner-up award at the ACM MobiHoc 2014. Dr. Du is a Senior Member of IEEE and a Life Member of ACM.

ABSTRACT

Over the past decade Deep Learning has been extremely successful at leveraging large amount of available training data to reach and, in some cases, surpass human level performance at pattern detection oriented tasks in a variety of domains including vision, speech, and machine translation. However, this learning based approach to Artificial Intelligence has proven insufficient to successfully tackle relatively simple tasks requiring a deeper level of understanding and reasoning: e.g., answering elementary school science questions. In this talk, I will compare and contrast deep learning against traditional knowledge and reasoning approaches, which used to be the core component of early AI systems. I will then present some approaches, explored at IBM Research AI, to address some key limitations of today's AI systems by bridging the gap between learning and reasoning with systems that learn to reason and use knowledge and symbolic reasoning to learn more efficiently (i.e., with less data while providing explanations).

BIO

Achille Fokoue is a Principal Research Staff Member and Master Inventor at IBM Research AI in Yorktown Heights, where he leads the Foundations of AI Reasoning group. He has over 18 years of research experience in knowledge representation and reasoning focused on developing theories, algorithms, standards, and systems for scaling reasoning over large and expressive knowledge bases that tolerate inconsistencies and uncertainties inherent in KBs populated from unstructured sources. He has led various research efforts on applying machine learning and knowledge representation and reasoning in many domains including the Tiresias project that aggregates information from multiple data sources to predict adverse drug reactions. He is a co-editor of the OWL 2 Web Ontology Language Profiles specification, and has authored or co-authored over 90+ scientific reports and manuscripts that have been cited, in aggregate, more than 2400 times.

ABSTRACT

Processing high-volume, high-velocity data streams is an important big data problem in many science, engineering, and technology domains. There are many big data frameworks and tools that offer low-latency stream processing at scale. However, the visualization and user-interaction components of these systems are limited to visualizing the outcome of stream processing results. In this talk, I will discuss VAStream, an NSF funded big data infrastructure supports fast machine learning and interactive visualization of data streams. I will also present two real-world streaming applications that use VAStream.

BIO

Raju Gottumukkala is the Director of Research, Informatics Research Institute, and AAMA/LEQSF Regents Assistant Professor with the College of Engineering at University of Louisiana at Lafayette. His research interests are in the areas of cyber-physical systems, distributed computing and data mining. He has over 40 publications, and has experience leading various research and development efforts amounting to seven million in the domains of big data, disaster management and cyber-physical system security. He also serves as the associate editor for *Springer's Data-Enabled Discovery and Applications*.

SPEAKERS

Daniel Holewienko
Executive Director, Big Data and Business Intelligence, Henry Schein, Inc.

The Drive to Healthcare 4.0 Through Big Data, Analytics, ML, Cloud, and IoT Enablement

ABSTRACT

Healthcare operations and clinical care over the last 40 years has greatly evolved-from Healthcare 1.0, with manual medical and clinical processes, physical medical records, and non-existent or limited local tech-to Healthcare 2.0, where tech improves, EMRs emerge, and integration and HIEs afford improved access and speed to patient information (mins/secs vs hours/days). However, patient experience and patient info are still largely disjunct-to Healthcare 3.0, being more patient-centric, and having payers, providers, and patient data merged to promote "patient shepherding". Single view of the patient emerges along with managed care services driven by payers-to Healthcare 4.0, which leverages Industry 4.0 enablers (list below) to drive much high customer focus, superior patient experience, self-service, distributed healthcare, and point of presence monitoring.

The goal being much improved predictive care with close to "friction-less" workflow. Enablers Employed:
- Big Data, Advanced Analytics, ML, and AI
- Mobile devices
- Internet of Things (IoT) Platforms
- Location Detection Technologies
- Advanced Human-Machine Interfaces
- Authentication and Fraud Detection
- Smart Sensors
- Multilevel Customer Interaction and Customer Profiling
- Augmented Reality/ Wearables
- Fog, Edge and Cloud Computing

Come join us for this session where we will talk about the promise of Healthcare 4.0 and how the enablers of Big Data, Analytics, ML, Cloud, and IoT are reshaping the patient experience and the quality and cost of healthcare. We will provide two real-world use cases and a live working demo of Healthcare 4.0 in action. Joining Daniel will be two colleagues from Marlabs, Inc.: Sanjay Bhakta, VP and Global Head of Enterprise Solutions; and Amit Phatak, Principal Architect.

BIO

Daniel Holewienko is a 20+ year experienced Technology Executive in the Healthcare, Financial Services, Media, Education, and Retail industries. He started his career in software development and later focused on overall Technology Strategy, Transformation, and Management in mid to large-size regional and global organizations. Along the way, Dan has held Managing Director, Executive Director, Director, VP, CTO, and CIO titles at firms such as Seiko, CIT Group, WNET-Channel Thirteen, Lord Abbett & Co, Kaplan, Northwell Health System, Marlabs, and Henry Schein. He has also been contracted to coach and directed IT and business executives in technology transformation and strategy in such firms as Practicing Law Institute, Dan is presently the Executive Director, Big Data and Business Intelligence at Henry Schein, where he is boot-strapping their Big Data program to consolidate internal and external data globally and use advanced ML and AI technologies, data science, and advance analytics to create higher customer value and new business opportunities. Dan is an active member of the New York Chapter CTO Club and author of numerous industry articles. He has been a guest speaker, panelist, and moderator at dozens of user groups and conferences throughout his career. Dan holds a BA from CUNY and several management and tech-related accreditations/certifications.

Florence D. Hudson
Founder and CEO, FDHint, LLC

Harnessing Advanced Technology Innovations Today and into the Future

ABSTRACT

Advanced technology innovations are disrupting our world, while aspiring to improve the human experience. The Internet of Things (IoT), Blockchain, Artificial Intelligence, Machine Learning, Big Data and Analytics, are all part of this evolving landscape. IoT is everywhere, in your homes, cars, labs, and lives. The leverage of all these technology innovations for connected healthcare is a rapidly growing and evolving field, as we journey toward precision medicine and the quest to continually improve health outcomes. From the Internet of Medical Things to computational approaches for cancer, there are efforts around the world to improve outcomes with technology. Connected devices and systems, including wearables and implantables, can be hacked, so we must work as a community to increase the Trust, Identity, Privacy, Protection, Safety and Security (TIPPSS) of the devices, data and humans. We will discuss how to harness the power of advanced technology innovations, while securing the future, including leading standards work in TIPPSS for clinical IoT data and device interoperability, in the evolving and exciting frontier of computational medicine.

BIO

Florence Hudson is Founder and CEO of FDHint, LLC, consulting in advanced technologies and diversity and inclusion. Her areas of expertise include artificial intelligence, big data and analytics, blockchain, connected healthcare, cybersecurity, Internet of Things (IoT), and Smart Cities. Formerly IBM Vice President and Chief Technology Officer, Internet2 Senior Vice President and Chief Innovation Officer, and an aerospace engineer at Grumman and NASA, she is Special Advisor for TrustedCI - the NSF Cyber-security Center of Excellence at Indiana University, and Northeast Big Data Innovation Hub at Columbia University. She serves on Boards for Princeton, Cal Poly, and Stony Brook University, and Blockchain in Healthcare.

She leads IEEE working groups for Clinical Internet of Things and Blockchain. She is editor in Chief for a new book from Springer Nature on "*Women Securing the Future with TIPPSS for IoT: Trust, Identity, Privacy, Protection, Safety, Security for the Internet of Things*". She graduated from Princeton University with a BSE in Mechanical and Aerospace Engineering, with executive education at Harvard Business School and Columbia University.

Joseph Jankowski, PhD
Senior Advisor to Chief Innovation Officer, Henry Ford Health System

What it Will Take to Realize the Promise of Big Data, Connectivity and Machine Learning in Healthcare

ABSTRACT

There is immense potential for data-enabled technologies- MLA, IoT, AI and computational medicine – to transform healthcare. While early in their life cycle, we've already seen undeniable value propositions that range from patient-specific outcome improvements to efficiencies in system administration and population-level care. However, each any of these technologies are merely a tool and ultimate benefit will reside in the healthcare sector's ability to appropriately utilize such tools. In this presentation, I will provide examples of high-value technology advances in care, coupled to discussion of current limitations that hinder wide-spread adoption and/or ultimate utility of such emerging interventions.

BIO

In 2012, Joseph Jankowski joined Henry Ford Innovations as leader of its technology management group. An additional passion of Jankowski is teaching in the innovation and entrepreneurship space. He leads the HFHS Davidson Fellowship for Entrepreneurs in Digital Health, a monthly convening of System leaders who partner to assess and develop digital health innovations. Dr. Jankowski serves as Case Western Reserve University's first Chief Innovation Officer. Alongside partners from the CWRU School of Law and Weatherhead School of Management, Jankowski co-founded and serves as an instructor in the CWRU "Fusion" program that educates integrated teams of JD, MBA and PhD students in the realms of intellectual property, commercialization and corporate finance and partnering. From 2003 to 2013, Jankowski directed the CWRU Technology Transfer Office (TTO). Dr. Jankowski holds a PhD in Chemistry from the State University of New York's College of Environmental Sciences, an MBA from the Weatherhead School of Management and a dual BS in Chemical and Environmental Engineering Technologies from the University of Dayton.

Shantenu Jha, PhD
Chair, Center for Data Driven Discovery, Brookhaven National Laboratory

The Power of Many: The Next Frontier

ABSTRACT

Current computing trends make the ensemble computational model highly relevant; it has the ability to overcome limitations of single task applications, and to achieve significant performance gains on large-scale parallel machines. Not surprisingly, the concept of running ensembles on large-scale HPC systems is thus gaining in importance. We discuss some of the challenges in executing ensembles at scale. We discuss the abstractions (pilot-systems), software systems (RADICAL-Cybertools) and execution models that we have developed to address many of these challenges. We will discuss how RADICAL-Cybertools, along with advances in statistical and adaptive algorithms have enabled ensemble-based applications to overcome limitations of traditional single task applications. In spite of order(s) of magnitude efficiency gains, much greater improvements are still needed. We will close with a brief mention of novel application architectures that hold promise to provide the needed improvements.

BIO

Shantenu Jha is the Chair of the Center for Data Driven Discovery (C3D) at Brookhaven National Laboratory and Associate Professor of Computer Engineering at Rutgers University. His research interests are at the intersection of high-performance distributed computing and computational and data science. Shantenu leads the RADICAL-Cybertools project which are a suite of middleware building blocks used to support large-scale science and engineering applications. He was appointed a Rutgers Chancellor's Scholar (2015) and was the recipient of the inaugural Chancellor's Excellence in Research (2016) for his cyberinfrastructure contributions to computational science. He is a recipient of the NSF CAREER Award (2013), several prizes at SC'xy and ISC'xy as well as the winner of SCALE 2018.

SPEAKERS

Pat Narendra, PhD
Product and Solution Strategy and Innovation, Zebra Technologies

Augmented Reality Extended: Beyond Games and Novelty to Creating Value in the Enterprise

ABSTRACT

Augmented Reality has hit the main-stage in consumer smartphone applications. We have all been exposed to AR emoji, trying out furniture in your living room, multiple "measure" apps, and playing interactive AR games. In this talk, we pull back the curtain on what the game changer is in smartphone AR, the current framework limitations, and how we can extend it to Enterprise applications. First, the core technology that enables precise motion tracking that underpins AR is briefly explained –They are real-time fusion of the IMU (accelerometer and gyro) and the camera visual tracking to estimate precise position and orientation. The insertion of virtual objects in the camera scene (i.e. AR) flows from this.

We describe how the AR framework can be extended to meet the enterprise challenge:

1. The AR scene model needs to persist across: sessions, time, users, devices and even reproduce in a totally different location! Most of the current applications of the AR frameworks are transient sessions. Once you put the device in your pocket you cannot recover what you were doing before.

2. Make the solutions robust within the workflow constraints of the Enterprise user. The enterprise associate needs to be able seamlessly execute the function on demand, switch contexts and later return to the function on without even being aware of the "AR" limitations beneath the app (like getting "lost" when the camera loses track).

3. Developing a family of innovative solution apps – for Planogram generation and compliance, AR assisted picking in store, AR assisted stocking, remote dimensioning using additional sensor integration. A sample of these applications will be demonstrated in this talk.

BIO

Pat Narendra is a member of the Zebra Enterprise Mobile Computer Emerging Technology organization, where he passionately explores augmented reality, mobile locationing, deep and machine learning in the enterprise ecosystem. Pat has a PhD in EE/CS from Purdue University (his thesis on Pattern Recognition and Machine Learning resulted in over a dozen refereed journal articles with over 4000 citations) and spent his early career in computer vision and signal processing research in Honeywell. Mid-career, he obtained an MBA in Strategy from the University of Minnesota. He launched his product development career in Motorola Mobility, Motorola Solutions, and Zebra where he has created and launched over a dozen products (and 9 granted patents). Pat is a hands-on business and technical architect, equally at home in prospecting for customer ROI and coding up prototypes using the latest augmented reality frameworks on Zebra mobile computers and machine learning platforms such as Tensorflow lite.

Steve Rogers
Vice President, Blockchain Initiatives for Supply Chain Platform Services, IBM

Blockchain in Practice - Beyond the Hype

ABSTRACT

Blockchain is a technology like hybrid cloud, AI, and Robotic Process Automation but less well understood. A lot has been written about the promise of Blockchain. While some are predicting it is years away from implementation and in delivering on those promises, thought leading companies are putting it into practice and operating networks overcoming formerly intractable challenges. This presentation will briefly describe blockchain's capabilities but more importantly what early adopters are doing with it, especially in Supply Chain applications. It will also provide insight into lessons learned from the early adopter applications and their attempts to build networks around common goals.

BIO

Steve joined IBM in 1981 as an engineer after receiving a BSIE degree from Georgia Tech. In 1986, he joined finance after receiving an MBA from Wake Forest. He was the Division Controller for the PC business and later became the Manufacturing Controller for Server Group. He then became VP of Finance and Operations for IBM's System X Server division. In 2002, Steve joined the Integrated Supply Chain organization with responsibility at times for the Supply Chain for Retail Store Solutions, System X Intel Servers, Storage, Software, Solutions, Demand/Supply and Inventory Planning for all hardware, and supply chain acquisitions and divestitures. In 2013, he became VP of Supply Chain Transformation and in 1Q 2017, became the VP of Blockchain Initiatives for Supply Chain in the IBM Industry Platforms organization.

Steve Skiena, PhD
Director of the Institute for AI-Driven Discovery and Innovation, Stony Brook University

Word and Graph Embeddings for Machine Learning Models

ABSTRACT
Distributed word embeddings (word2vec) provides a powerful way to reduce large text corpora to concise features readily applicable to a variety of problems in NLP and data science. I will introduce word embeddings, and review several of our recent efforts to apply them for natural language processing (NLP) including the Polyglot system for entity recognition, POS tagging, and sentiment analysis for over 100 different languages. DeepWalk is an approach we have developed to construct vertex embeddings: vector representations of vertices which be applied to a very general class of problems in data mining and information retrieval. DeepWalk exploits an appealing analogy between sentences as sequences of words and random walks as sequences of vertices to transfer deep learning (unsupervised feature learning) techniques from natural language processing to network analysis. DeepWalk has become extremely popular, having been cited by over 2000 research papers since its publication at KDD 2014. In this talk, I will introduce the notion of graph embeddings, explain how DeepWalk constructs them, and demonstrate why they make such powerful features for machine learning applications.

BIO
Steven Skiena is a Distinguished Teaching Professor of Computer Science and Director of the Institute for AI-Driven Discovery and Innovation at Stony Brook University. His research interests include the design of graph, string, and geometric algorithms, and their applications (particularly to biology). He is the author of six books, including "*The Algorithm Design Manual*", "*The Data Science Design Manual*", and "*Who's Bigger: Where Historical Figures Really Rank*". Skiena received his PhD in Computer Science from the University of Illinois in 1988, and is the author of over 150 technical papers. He is a former Fulbright Scholar, recipient of the ONR Young Investigator Award, and the IEEE Computer Science and Engineer Teaching Award.

Hidekazu Taoko, PhD
Executive Director of Corporate Division, DOCOMO Healthcare, Inc.

Expectation and Reality of Japanese Health Tech Market

ABSTRACT
The Japanese market is leading the world in terms of super-aging and the high expectation for the health tech solutions to reduce the total social security expense in Japan. He will also explain a few bottleneck factors to stunt the growth and conclude with some possible ideas on how to solve the issues.

BIO
Mr. Taoka has been working in the mobile communications industry since April 2000. He was named Director of Corporate Department and a member of the board at DOCOMO Healthcare, Inc. in June 2018. He has been responsible for corporate management and strategy as well as development and operation of healthcare platform called Watashi-Move. Before getting into the healthcare domain, he assisted President and CEO's internal and outside activities as a secretary of NTT DOCOMO in the President Office from 2013 to 2017. Prior to that position, he was based in Munich, Germany from 2010 to 2013 and played a leading role in identifying the fifth-generation (5G) key technologies in an EU funded research project in which more than 20 partners participated throughout EU. Mr. Taoka has an MBA from Massachusetts Institute of Technology (2018), MS in Physical Science from Kyoto University (2000) and PhD in Electrical Communication Engineering from Tohoku University (2009).

Tomi Teikko
Founder and Advisor, Tieto Corporation

Empathic Reality (ER): Human-Centric Content in Virtual and Augmented Reality

ABSTRACT
Digital twin is a hype, but do we really know how to enable the best possible end-user experience? How to ensure human-centric content to virtual and augmented reality. Tomi will give practical examples of how to use humans to enable real smart building experience.

BIO
Tomi Teikko is a digital futurist and an entrepreneur from Finland. He has a skill for explaining in layman's terms the impact that technology and science will have on our daily life. He has led application development projects, teams and business units for over 25 years, creating digital consumer services for banks, retail stores, forest companies, manufacturing industry and media corporations generating billions of euros to my customers. Fifteen years ago, he started as an employee at Tieto Corporation, a leading Nordic software and services company. He has worked with global companies in manufacturing, forest, retail, banking, insurance and public sector creating digital services.

SPEAKERS

Dan Wang, PhD
Associate Professor,
The Hong Kong Polytechnic University

Industry AIOps: Case Studies and Experiences in Data Driven Industry Operations

ABSTRACT

With the success of AI technologies, recently, we see extensive advocation on applying AI technologies into industry production, operation and maintenance, or the so-called Industry 4.0. Landing such a concept into practice is not straightforward, however. It seems to be a case by case study in different industry sectors; and it heavily involves interdisciplinary knowledge. In this talk, we will present two case studies, one on data driven industry production and one on data driven industry operations. We also discuss some thinking in common design patterns of applying AI technologies in industry.

BIO

Dan Wang is currently an associate professor at Department of Computing, The Hong Kong Polytechnic University. He is an expert in computer networking, and he is recently working in the inter-discipline domains of smart energy systems, industry 4.0. He publishes extensively in top networking conferences, such as ACM SIGCOMM, ACM SIGMETRICS, IEEE INFOCOM and in top inter-discipline conference, such as ACM e-Energy, ACM Buildsys. He won the Best Paper Award of ACM e-Energy 2018, and the Best Paper Award of ACM Buildsys 2018. He will serve as the TPC co-Chair of ACM e-Energy 2020. He has extensive experience in applied research. His platform SPET won the TechConnect Global Innovation Award 2017, and part of the technology was adopted by Henderson Ltd.

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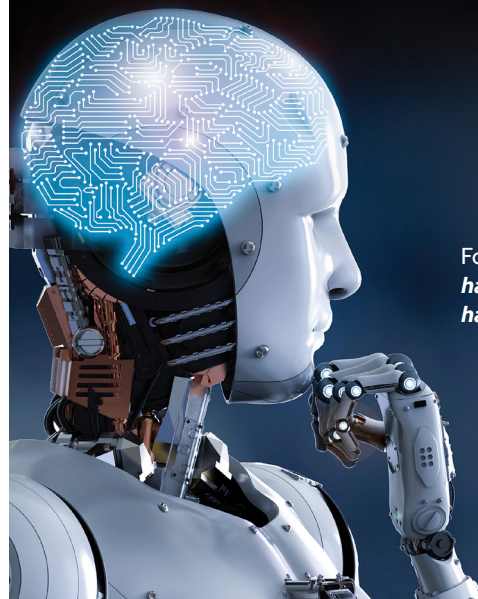For more information visit cewit.org or contact conference@cewit.org

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PANELISTS

Jennifer L. Costley, PhD
Director, Physical Sciences, Sustainability & Engineering,
The New York Academy of Sciences

BIO

Jennifer L. Costley, PhD, is the Director of Physical Sciences, Sustainability & Engineering at the New York Academy of Sciences. She has more than 20 years of experience as a technology manager for leading firms including Credit Suisse, DoubleClick, and Bell Labs. She has chaired several groups developing environmental and sustainability standards for electronic products. She earned a PhD in Chemical Physics from Columbia University, an Advanced Certificate in Finance from New York University, and a Certificate in Conservation Biology from Columbia University's Center for Environmental Research and Conservation.
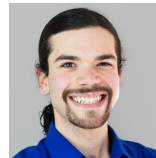
David Rolnick, PhD
NSF Postdoctoral Fellow,
University of Pennsylvania

BIO

David Rolnick is an NSF Postdoctoral Research Fellow at the University of Pennsylvania, where he studies the mathematical foundations of deep learning. David is founder of Climate Change AI, a group of academics and industry leaders dedicated to furthering applications of machine learning that meaningfully address the climate crisis.

Minghua Zhang, PhD
*Interim Provost,*
Stony Brook University

BIO

Minghua Zhang has been a member of the School of Marine and Atmospheric Sciences (SoMAS) faculty since 1990, currently serving as Interim Provost. His research focus is in numerical modeling of climate and global climate change. Dr. Zhang is a Fellow of the American Meteorological Society.

Tian Zheng, PhD
Professor and Department Chair of Statistics,
Columbia University

BIO

Tian Zheng is Professor and Chair of Statistics at Columbia University and Associate Director for Education of Columbia's Data Science Institute. In her research, Tian develops novel methods for exploring and understanding patterns in complex data from different application domains such as biology, psychology, and climatology.
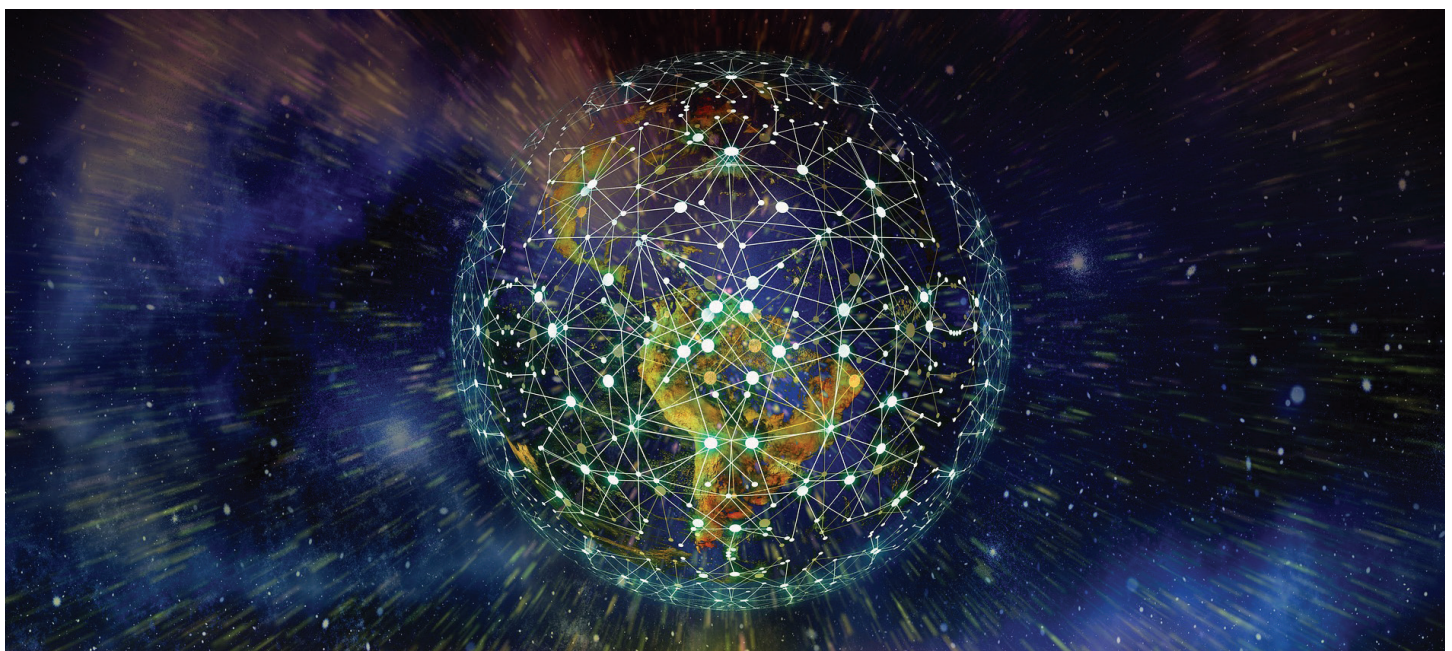
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AT STONY BROOK UNIVERSITY

MTRC is Empire State Development's Regional Manufacturing Extension Partnership (MEP) center for the Long Island region. MTRC is one of the ten centers within the NIST NY-MEP program, designed to support small to medium-sized manufacturers by matching their cash investments in business growth and development projects.

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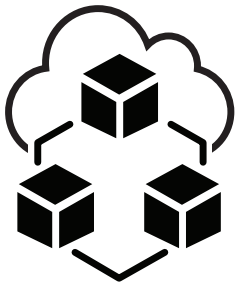
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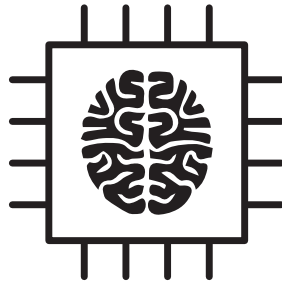zebra.com

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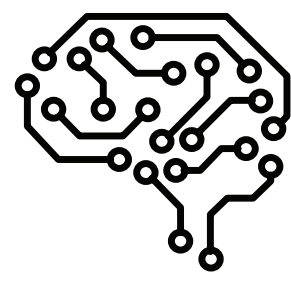
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