2019 Annual Convention

Sheraton LaGuardia East Hotel
Flushing, New York
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**President’s Message**

On behalf of the Chinese Institute of Engineers, Greater New York Chapter, I welcome you to our 2019 convention. This year marks 102 years from the founding of CIE-USA. The convention is a major event of the institute in providing a forum to promote cooperation and experience sharing among fellow scientists and engineers in academia and industry. At the same time, we take the opportunity to celebrate and honor individuals and institutions who have made significant contributions to the field of science and engineering. Previous awardees include Nobel laureates, university presidents and professors, CEOs and technical leaders of Fortune 500 companies.

The theme of the convention is “Intelligent Technology Innovations and Applications - 智慧科技的創新與應用”. We are hosting parallel presentations and posters on Artificial Intelligence and Deep Learning, VLSI Device Technology, Health Science/Big Data/IT Computing, 5G/6G & High Speed Cellular Networks and Quantum Computing Technology.

Our distinguished awardees will share their valuable experience and insights with us in the plenary sessions in the afternoon and the keynote session during the evening banquet. In addition, there will be performances and presentations by our high school scholarship recipients.

My special thanks goes to our Executive Committee and volunteers who worked diligently from the preparation to execution of all the events today, and to our financial sponsors.

I sincerely hope that we will all be inspired by the many excellent presentations and enjoy the networking of fellow friends and professionals today.

Again, welcome to the 2019 CIE-USAGNYC Annual Convention in New York City!

Sincerely,

Keith Wong, Ph.D.
President
Chinese Institute of Engineers, Greater New York Chapter
# 2019 CIE-GNYC Convention Planning Committee

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2019 ANNUAL CONVENTION

CIE-USA/GNYC 2019 Annual Convention Program
Sheraton LaGuardia East Hotel, Flushing, NY 11354

Theme: Intelligent Technology Innovations and Applications

智慧科技的創新與應用

Saturday, October 19, 2019

12:00 PM  Registration
1:00 PM - 2:20 PM  Opening Remarks
Gallery Room

Dr. Monsong Chen (陳孟松) - Convention Chair

State of the Institute
Dr. Keith Kwong Hon Wong (黃洸漢) - President, CIE-USA/GNYC

Plenary Session
Chair – Dr. Rong N. Chang (張榮) - IBM Research

Prof. Stephen S. Yau (丘錫生)
School of Computing, Informatics, and Decisions Systems Engineering,
Founding Director of Information Assurance Center, Arizona State University,
AAAS Fellow, IEEE Fellow, Former President of IEEE CS & AFIPS
“Challenges to Meet the Expectations of Demands for Services
Applications with Dynamic Technologies”

Prof. Yuanyuan Zhou (周源源)
Dept. of Computer Science and Engineering, UCSD
Qualcomm Chair Professor, ACM Fellow, IEEE Fellow,
Co-founder of Pattern Insight, Co-founder of Whova
“10 Lessons Learned as a Chinese Tech-Entrepreneur in US”

2:20 PM (10 mins)  Break
2:30 PM - 3:50 PM  Parallel Session

Session I – AI Deep Learning
(Gallery Room)
Chair – Dr. Jinjun Xiong (熊瑾珺) -
Program Director, Cognitive Computing, IBM Research

Dr. Tengfei Ma (马腾飞) - Research Staff Member, IBM Research
“Graph Neural Networks for Healthcare Applications”

Prof. Bo Yuan (袁博) - Dept. of Electrical and Computer Eng., Rutgers University
“From Matrix to Tensor: Algorithm and Hardware Co-Design for
Energy-Efficient Deep Learning”
Prof. Junfeng Yang (楊峻峰) - Dept. of Computer Science, Columbia University
“Taming the AI Fire”

Session II – VLSI and Device Technology
(Boardroom East)
Chair - Mr. Cheng-Yi Lin (林政毅) - Advisory Product Engineer, IBM Systems

Dr. Zuoguang Liu (刘作光) - Research Staff Member, IBM Research
“Resistances in Future Logic Device Architectures”

Dr. Nanbo Gong (龚南博) - Research Staff Member, IBM Research
“Signal and Noise Extraction from Analog Memory Elements for Neuromorphic Computing”

Prof. Chung-Tse Michael Wu (吳宗澤) -
Dept. of Electrical and Computer Eng., Rutgers University
“Antenna-based Multi-target VitalSign Detection and Motion Tracking”

Session III – Healthcare
(Boardroom West)
Chair - Dr. Pei-Yun Sabrina Hsueh (薛沛芸) -
Health Informatics Leader, Viome Inc.

Dr. Xianchen Liu (劉賢臣) - Senior Medical Director, Pfizer
“Real-World Data in the New Era of Drug Development”

Dr. Jia Chen (陳佳) - Product Leader, Blockchain for Healthcare & Life Sciences & IBM Academy of Technology Leadership Team
“Leveraging Blockchain for Healthcare & Life Sciences Applications”

Dr. Jennifer Liang (梁容怡) - Medical Researcher, IBM Research
“Why Natural Language Processing on Patient Electronic Health Records is Different?”

3:50 PM (20 mins) Tea & Coffee Break

4:10 PM - 5:30 PM Parallel Sessions

Session IV – 5G High Speed Cellular Networks
(Boardroom East)
Chair – Dr. Sean Chiu (邱富萱) - Principal Engineer, Unisoc, San Diego, California

Dr. Guosen Yue (岳國森) - Principal Research Staff, Futurewei Technologies
“Adaptive Grouped Multicast Beamforming”

Dr. Kyle Jung-Lin Pan (潘鏡霖) - Principal Engineer, Innovation Labs, InterDigital
“Overview of Technologies for 5G”
2019 ANNUAL CONVENTION

Intelligent Technology Innovations and Applications

Poster Announcement
Co-Chair: Dr. Yuying Gosser (仇玉英) - Research Assistant Prof., City College of CUNY

Session V – Quantum Computing Technology
(Boardroom West)
Chair - Dr. Jeng-Bang Yau (姚正邦) - Research Staff Member, IBM Research

Dr. Jeng-Bang Yau (姚正邦) - Research Staff Member, IBM Research
“Introduction to IBM Q: Overview”

Mr. Richard Chen (陳均富) - Research Staff Member, IBM Research
“Introduction to IBM Q: Qiskit, an Open Source Platform for Quantum Computing”

Poster Announcement
Co-Chair: Prof. Dantong Yu (于丹彤) - Martin Tuchman School of Management, New Jersey Institute of Technology

Session VI – Poster Presentation
(Ballroom Hallway 5:30 PM – 6:00 PM)

5:30 PM (30 mins) Social
6:00 PM - 9:30 PM Banquet
Phoenix Ballroom MC – Mr. Chiao-Wei Lee (李憲誌) – Associate Director, Digital Innovation & Global Application Development, Ansell

Welcome Address –
Dr. Keith Kwong Hon Wong (黃漢權) - President, CIE-USA/GNYC

Performance and Presentation by Scholarship Recipients
Dr. Howard Chen (陳浩) - High School Scholarship Committee Chair

Keynote Speech
Mr. Tom Cho (卓桐華)
CEO of Inventec Corporation
“Taiwan IT Industry, Inventec as an Example”

Keynote Speech
Prof. Jeannette M. Wing (周以真)
Professor of Computer Science, Avanesians Director of the Data Science Institute, Columbia University
ACM Fellow, IEEE Fellow, AAAS Fellow
“Data for Good: Data Science at Columbia”
Awards Ceremony
Chair – Dr. C. Eric Wu (吳振藩) - Award Committee Chair

Distinguished Service Award
Mr. Tom Cho (卓柚華)
CEO of Inventec Corporation

Distinguished Achievement Award
Prof. Jeannette M. Wing (周以真)
Professor of Computer Science, Avanessians Director of the Data Science Institute, Columbia University
ACM Fellow, IEEE Fellow, AAAS Fellow

Distinguished Service Award
Prof. Stephen S. Yau (丘錫生)
School of Computing, Informatics, and Decisions Systems Engineering, Founding Director of Information Assurance Center, Arizona State University,
AAAS Fellow, IEEE Fellow, Former President of IEEE CS & AFIPS

Distinguished Service Award
Prof. Yuanyuan Zhou (周淵源)
Dept. of Computer Science and Engineering, UCSD
Qualcomm Chair Professor, ACM Fellow, IEEE Fellow,
Co-founder of Pattern Insight, Co-founder of Whova

Institute Service Award
Dr. I-Hsin Chung (鍾一新)
CIE-USA/GNYC President (2018)

High School Scholarship Awards
Baldwin Chen (陳博聞) - Ardsley High School
Lucas Lee (李頌天) - Pleasantville High School
Rebecca Lim (林詠雯) - Briarcliff Manor High School
Julia Lin (林亦勤) - Ridgefield High School
Erxi Lu (陸爾希) - Riverdale Country School
Annie Ma (馬安妮) - Friends Seminary
Nicholas Shen (沈善杰) - Great Neck South High School
Brandon Shih (石育融) - Rhinebeck High School
Alex Xin (辛孟軒) - Arlington High School
Richard Yan (顏睿奇) - Edgemont High School
Joanna Zhao (趙佳淇) - Bronx High School of Science

9:30 PM
Raffle Drawing

ACKNOWLEDGEMENT: CIE-USA/GNYC Thanks All Committee Members for Their Dedication and Hard Work That Make This Convention Possible.
2019 CIE-USA/GNYC Award Citations

Distinguished Achievement Award

Dr. Jeannett M. Wing (周以真博士)
For her intellectual in computer science, particularly in trustworthy computing

Distinguished Service Award

Mr. Tom Cho (卓栩華先生)
For his leadership at Inventec Corp. and the electronic industry in Taiwan

Dr. Yuanyuan Zhou (周源源博士)
For her setting-up an exemplary model to the Chinese American community as both an outstanding researcher and a successful entrepreneur

Dr. Stephen S. Yau (丘錫生博士)
For his dedication and leadership in software engineering and science

Institute Service Award

Dr. I-Hsin Chung (鍾一新博士)
For his devoted service to this institute
Jeannette M. Wing is Avanessians Director of the Data Science Institute and Professor of Computer Science at Columbia University. From 2013 to 2017, she was a Corporate Vice President of Microsoft Research. She is Adjunct Professor of Computer Science at Carnegie Mellon where she twice served as the Head of the Computer Science Department and had been on the faculty since 1985. From 2007-2010 she was the Assistant Director of the Computer and Information Science and Engineering Directorate at the National Science Foundation. She received her S.B., S.M., and Ph.D. degrees in Computer Science, all from the Massachusetts Institute of Technology.

Professor Wing's general research interests are in the areas of trustworthy computing, specification and verification, concurrent and distributed systems, programming languages, and software engineering. Her current interests are in the foundations of security and privacy, with a new focus on trustworthy AI. She was or is on the editorial board of twelve journals, including the Journal of the ACM and Communications of the ACM.

Professor Wing is known for her work on linearizability, behavioral subtyping, attack graphs, and privacy-compliance checkers. Her 2006 essay, titled “Computational Thinking,” is credited with helping to establish the centrality of computer science to problem-solving in fields where previously it had not been embraced.

She is currently a member of: the National Library of Medicine Blue Ribbon Panel; the Science, Engineering, and Technology Advisory Committee for the American Academy for Arts and Sciences; the Board of Trustees for the Institute of Pure and Applied Mathematics; the Advisory Board for the Association for Women in Mathematics; and the Alibaba DAMO Technical Advisory Board. She has been chair and/or a member of many other academic, government, and industry advisory boards. She received the CRA Distinguished Service Award in 2011 and ACM Distinguished Service Award in 2014. She is a Fellow of the American Academy of Arts and Sciences, American Association for the Advancement of Science, the Association for Computing Machinery, and the Institute of Electrical and Electronic Engineers (IEEE).
Keynote Speech Topic

Data for Good: Data Science at Columbia

Jeannette M. Wing

Avanessians Director of the Data Science Institute
Professor of Computer Science
Columbia University

Abstract

Every field has data. We use data to discover new knowledge, to interpret the world, to make decisions, and even to predict the future. The recent convergence of big data, cloud computing, and novel machine learning algorithms and statistical methods is causing an explosive interest in data science and its applicability to all fields. This convergence has already enabled the automation of some tasks that better human performance. The novel capabilities we derive from data science will drive our cars, treat disease, and keep us safe. At the same time, such capabilities risk leading to biased, inappropriate, or unintended action. The design of data science solutions requires both excellence in the fundamentals of the field and expertise to develop applications which meet human challenges without creating even greater risk.

The Data Science Institute at Columbia University promotes “Data for Good”: using data to address societal challenges and bringing humanistic perspectives as—not after—new science and technology is invented. Started in 2012, the Institute is now a university-level institute representing over 300 affiliated faculty from 17 schools, colleges and institutes across campus. Data science literally touches every corner of the university.

In this talk, I will present the mission of the Institute and highlights of our educational and research activities.
**Keynote Speaker & Distinguished Service Award**

**Mr. Tom Cho**

**Mr. Tom Cho** is the Chairman & CEO of Inventec Corp. He joined the company in 1985 and remains loyal to the company for over 30 years. Previously, he became Inventec President in 1997 for 6 years and then elected as Chairman and CEO of several Inventec Subsidiary companies such as IESC, IMT, and ISEC. He was elected as the Chairman of Inventec in June 2017.

Mr. Cho received his B.S. degree in Electrical Engineering from National Taiwan University, and EMBA degree from Shanghai Jiao Tong University. He dedicated his career in product development in early years. In 1988, as the chief of Research and Development department, Mr. Cho led a team to build the first Notebook type Portable PC in the world for ZDS (Zenith Data Systems). The Zenith minisPORT notebook was announced and shipped in 1989, just a year later.

Inventec is one of the first companies that have built an IT industry in Taiwan for more than 30 years. Besides Notebook PC, Inventec and its subsidiaries develop and manufacture industry servers and storages, handheld and wearable devices, Smart Home, Car Electronics etc. The company has over 50,000 employees worldwide and annual revenue is about USD 16 billion in 2018.

Innovation, Quality, Open Mind, Execution – these are the company’s believes, and also the guideline that Mr. Cho manages the company. Inventec focus on technology and engineering to develop future electronic products that make human life easy.
Keynote Speech Topic

Taiwan IT Industry, Inventec as an Example

Mr. Tom Cho
CEO of Inventec Corp.
Taipei, Taiwan

Abstract

Electronics manufacturing has been playing an important role in Taiwan for the past 40 years. In the mid-1970s, several representative electronics companies were formed. Inventec, Calcom, Multitech (Acer), Hon Hai was founded around 1975. It began the booming era of Taiwan's information and electronics industry. At first, these companies began to manufacture consumer electronics products, such as electronic calculators, from electronic parts purchased from Japan. Old home appliance companies such as Tatung, Sampo, Teco also joined OEM the world's major players such as IBM.

There are several stages in the development of Taiwan's electronics industry: from white goods to audio products. Video games. An electronic street formed on The Chung-Hwa Road in Taipei City. While Mr. Lin Yanggang stop video games business, fortune or unfortunately, it makes the microprocessor based Apple2, IBM PC compatible products has become the mainstream of the electronics industry. In 1988 Inventec helped Chicago-based ZDS company to manufacture the world's first Notebook computer. The company's turnover from NT$5 billion that year to NT$500 billion today. Since then, Taiwan has become the world's electronics manufacturing base to replace Japan. And the electronics industry has also created several mega - level companies. The PC days can be said to be the era of Taiwanese companies in the world. Except THE CPU and OS, from the semiconductor chip, PCB, power supply all the way to the connector, the metal case, mechanical parts are all made by Taiwanese companies, and the so-called Taiwanese PC OEM five-giant occupy more than 80% market share in of the world.

But after iPhone introduced, Smartphone based mobile internet become popular, represented by BATJ in mainland China, has left Taiwanese companies far behind. Inventec as Taiwan's representative company, in Post-PC era with 8K, 5G, AI, how to catch up in the competition should be our generation of Taiwan engineer’s last job before retirement.
Dr. Yuanyuan Zhou

YY is a Qualcomm Chair Professor in Mobile Computing at University of California, San Diego (UCSD) since 2009. Prior to UCSD, she was a tenured professor in Computer Science at University of Illinois, Urbana Champaign. She also serves in Advisory Council of Princeton University's Keller Entrepreneurship Center. She is an ACM Fellow (2013), IEEE Fellow (2015), Sloan Research Fellow (2007), and the winner of ACM Mark Weiser award (2015), NetApp Faculty Award, IBM Faculty Award, NSF Career Award (2003), DOE Career Award (2005), and Anita Borg Career Award(2005). She obtained her MS and Ph.D. from Princeton University, and her BS from Peking University, China.

Her area of expertise includes computer reliability, data center management, and mobile systems. She has published more than 100 papers at top venues. She also served as the program chair in top conferences including ACM SIGOPS SOSP, USENIX FAST, ACM ASPLOS, USENIX ATC, and the Research Advisory Committee for IEEE Computer Society (2018-2019). She is always proud of her former and current Ph.D students, six of whom are now tenured or tenure-track faculty at top universities including University of Chicago, John Hopkins University, University of Illinois, Urbana-Champaign, University of Toronto, Purdue University and Ohio State University.

In parallel to her academic career, she has also co-founded three companies, with the first two successfully acquired by public companies such as VmWare. The product, Log Insight, built by her second startup, still remains as one of the most popular big data products from VmWare. Since 2014, she has been busy with her third startup, Whova. It has gained substantial customer traction worldwide and has helped more than 10,000 conferences/events in 85 countries, providing her deeper insights in understanding mobile app development process and its unique challenges.

She is a proud mom of two teenage daughters, who love soccer and math. Her older daughter still plays club soccer and enjoys math/CS puzzles as a college junior at Harvard University, and her younger daughter is juggling varsity soccer, theater, and math/physics competitions as a high-school sophomore. Both of them have been actively involved in activities to promote/attract more women to join STEM fields.
Stephen S. Yau is Professor of Computer Science and Engineering at Arizona State University (ASU), Tempe, Arizona, USA. He served as the chair of the Department of Computer Science and Engineering, and later as the founding director of Information Assurance Center at ASU. Previously, he was on the faculties of Northwestern University, Evanston, Illinois, and University of Florida, Gainesville.

He served as the president of the Computer Society of the Institute of Electrical and Electronics Engineers (IEEE) and the president of American Federation of Information Processing Societies (AFIPS). He was on the IEEE Board of Directors, and the Board of Directors of Computing Research Association. He served as the editor-in-chief of IEEE COMPUTER magazine. He organized many major conferences, including the 1974 National Computer Conference sponsored by the AFIPS, ACM, IEEE Computer Society and Simulation Council, 1989 World Computer Congress sponsored by the International Federation for Information Processing (IFIP), and the IEEE Annual International Computer Software and Applications Conference (COMPSAC) sponsored by IEEE Computer Society. He was the general chair of the 2018 IEEE World Congress on Services, including Cloud Computing, Web Services, Services Computing, Big Data, Cognitive Computing, Internet-of-Things, and Edge Computing, held in San Francisco, July 2 – 8, 2018.

His current research includes cloud and services computing, cybersecurity, software engineering, ubiquitous computing, Internet-of-Things, and blockchain for information assurance applications. He has received many awards and recognitions, including the Tsutomu Kanai Award and Richard E. Merwin Award of the IEEE Computer Society, the IEEE Centennial Award and Third Millennium Medal, and the Outstanding Contributions Award of the Chinese Computer Federation. He is a Life Fellow of the IEEE and a Fellow of the American Association for the Advancement of Science. He received the B.S. degree from National Taiwan University, Taipei, and M.S. and Ph.D. degrees from the University of Illinois, Urbana, all in electrical engineering.
Dr. I-Hsin Chung received the Ph.D. degree in computer science from the University of Maryland, College Park, in 2004, before joining IBM Research. After completing his Ph.D., Dr. Chung joined the IBM Research as a research scientist and worked on performance modeling, tuning and tools. Dr. Chung’s research is in the system architecture area including data-centric computing and high-performance computing. He is currently leading the efforts to co-design for future data center system with the strategic application workloads such as cognitive and cloud computing. His experience includes performance analysis and modeling on IBM platforms such as POWER, mainframe Z Systems, and the Blue Gene systems. He has worked in the system software and performance analysis of world-renowned CORAL and Blue Gene series supercomputer designs. He is also an adjunct faculty of Courant Institute at NYU.

Dr. Chung served as the President of CIE-GNYC in 2018, Vice-President of CIE-GNYC in 2017, and a member of CIE-GNYC Board of Director, 2015-2018. He is currently a member of CIE-GNYC Advisory Committee.
Chinese Institute of Engineers, USA/GNYC
2019 Annual Convention
Sheraton Hotel, Flushing, New York
Saturday, October 19, 2019

Plenary Session
(1:00 pm - 2:20 pm – Gallery Room)

Session Chair
Dr. Rong N. Chang (張榮) IBM Academy of Technology Member,
IBM Research

Plenary Speaker
Prof. Stephen S. Yau (丘錫生) School of Computing, Informatics, and
Decisions Systems Engineering, Arizona
State University

Prof. Yuanyuan Zhou (周源源) Department of Computer Science and
Engineering, UCSD
Plenary Session

Session Chair:

Dr. Rong N. CHANG (張榮)
Member of IBM Academy of Technology
IBM T.J. Watson Research Center
Yorktown Heights, NY, USA
http://www.linkedin.com/in/rongnchang

Biography:

Dr. Rong N. Chang is Member of IBM Academy of Technology at the IBM T.J. Watson Research Center. He is leading an in-market R&D effort in creating a hybrid multicloud based enterprise API services platform for financial service ecosystems. He received his Ph.D. degree in computer science & engineering from the University of Michigan in USA in 1990 and his B.S. degree in computer engineering with honors from the National Chiao Tung University in Taiwan in 1982. Before joining IBM in 1993, he was with Bellcore researching on B-ISDN based personal ubiquitous application services.

Dr. Chang has won one IEEE Best Paper Award, received six IBM corporate-level Outstanding Technical Achievement Awards, held 30+ patents, and published 50+ refereed technical papers in the areas of enterprise services computing, enterprise clouds, and service level agreement (SLA) management optimization.

Dr. Chang is Associate Editor-in-Chief of the *IEEE Transactions on Services Computing* and has served as a guest editor for *IEEE Transactions on Services Computing*, *IEEE Internet of Things Journal*, and *CIC/IEEE China Communications*. He is Steering Committee Member of *IEEE World Congress on Services*, *IEEE Cloud Computing for Emerging Markets*, *ACM/IEEE Symposium of Edge Computing*, and *CCF International Conference on Service Science*. He is General Chair of 2019 *IEEE International Conference on Cognitive Computing* and Co-Chair of *2019 IEEE SERVICES Symposia*. He has an ITIL Foundation certificate in IT Services Management and a Micro MBA certificate.

Dr. Chang is Advisory Member of IEEE Technical Committee on Services Computing, Distinguished Member of ACM, and Life Member of Chinese Institute of Engineers – USA (CIE-USA). He is on the Advisory Council of CIE-USA and is US Chair of the 2018 Sino-American Technology and Engineering Conference (SATEC).
Plenary Session Speech Topic

Challenges to Meet the Expectations of Demands for Services Applications with Dynamic Technologies

Professor Stephen S. Yau

School of Computing, Informatics and Decision Systems Engineering
Arizona State University
Tempe, Arizona

Abstract

With the recent rapid advances in information, computing and related technologies, many innovative services applications are emerging, and the expectations on the services to be delivered become increasingly demanding and dynamic. It is certainly very challenging to meet such expectations in the dynamic technological environments. In this talk, the challenges from research and educational aspects are considered. Some experiences in improving information assurance and security of services applications using machine learning and blockchain technologies are discussed.
Plenary Session Speech Topic

10 Lessons Learned as a Chinese Tech-Entrepreneur in US

Professor Yuanyuan Zhou
Qualcomm Chair Professor in Mobile Computing
Department of Computer Science and Engineering
University of California, San Diego
La Jolla, CA

Abstract

As a co-founder of three startups (one as a fresh clueless Ph.D. graduate, and two as a professor and also a mom of two kids), Dr. Zhou has encountered many challenges, made abundant mistakes and learned valuable lessons along these adventures. Each stage of entrepreneurship, from the inception of an idea to the day she let go of her company to become a part of a large company, is filled with unexpected challenges, sacrifices, and rewards. Yet through these challenges and mistakes, she has gained confidence and wisdom to launch one adventure after another. In this talk, she will share the challenges and lessons of starting companies in US as a Chinese, technical founder, and hope that her tales from the trenches can benefit those courageous young people who decide to pursue the exciting journey of entrepreneurship.
Convention Chair

Dr. Monsong Chen (陳孟松)
Founder, President, CEO
InfoValue Computing, Inc
Email: mchen@infovalue.com
Phone: +1-914-345-5980 x 111

Biography:

Dr. Monsong Chen co-founded InfoValue Computing, Inc. in 1994 to develop video streaming technologies and apply them in high performance enterprise video solutions.

InfoValue’s flagship suite of IP Video solutions is adopted and in operation in many media & financial companies, luxury resorts, casinos, cruise liners, hospitals & clinics and military training facilities. Enterprise and private service providers can own and operate high performance IP based interactive TV (“IPTV”) systems that were previously available only to tier-one multi-service providers.

Examples of InfoValue’s outstanding technology milestones include:
- Delivered the patented QuickVideo software that turned standard Windows PC hardware into a high performance VOD server in 1995
- Pioneered video streaming After-Action-Review systems for F15/16 flight simulation and special force training facilities
- Delivered the world’s first Digital Congress System to Taiwan National Congress
- Received recognitions such as Frost & Sullivan Market Engineering Award, Byte Magazine’s Best of PC Expo.

Prior to founding InfoValue, Dr. Chen worked for IBM in various roles, ranging from Research Staff Member at the IBM T. J. Watson Research Center to Senior Manager at the IBM Networked Applications Services Division (NASD). During the nearly 10 years he was with IBM, Dr. Chen:
- Conducted research in network protocol and algorithm design, including routing, flow control, protocol verification and certification, optical communication, and large scale communication software parallel processing
- Developed a multiparty video conference system that composed videos directly using compressed data
- Developed the architecture and the advanced servers for collaborative business services over global networks.

Dr. Chen holds fundamental patents in video streaming and network multimedia technologies. He has also published more than 40 technical articles in books, journals, and conference proceedings in the areas of application systems, multimedia technology, and computer networks.

Dr. Chen received his Ph.D. in 1985 from NYC Polytechnic, NY, NY; an MSEE in 1982 from University of Washington, Seattle, WA; and a BSEE in 1978 from National Taiwan University, Taipei, Taiwan.
Program Chair:

Dr. Frank Y. Shih (施永強)
Professor
Department of Computer Science
New Jersey Institute of Technology
Newark, NJ 07102-1982, USA
shih@njit.edu

Biography:

Frank Y. Shih received B.S. from National Cheng Kung University, Tainan, Taiwan, in 1980, M.S. from State University of New York, Stony Brook, U.S.A., in 1983, and Ph.D. from Purdue University, West Lafayette, Indiana, U.S.A., in 1987. He is a Professor jointly appointed in the Department of Computer Science, the Department of Electrical and Computer Engineering, and the Department of Biomedical Engineering at New Jersey Institute of Technology, Newark, New Jersey. He currently serves as the Director of Artificial Intelligence and Computer Vision Laboratory.

Dr. Shih held a visiting professor position at Princeton University, Columbia University, National Taiwan University, National Institute of Informatics, Tokyo, Conservatoire National Des Arts Et Metiers, Paris, and Nanjing University of Information Science and Technology, China. He is an internationally renowned scholar and currently serves as Editor-in-Chief for the International Journal of Pattern Recognition and Artificial Intelligence. He was Editor-in-Chief for the International Journal of Multimedia Intelligence and Security. In addition, he is on the Editorial Board of 12 international journals. He has served as a steering member, session chair, and committee member for numerous professional conferences and workshops. He has received numerous grants from National Science Foundation, NIH, NASA, Navy and Air Force, and Industry. He has won the Research Initiation Award from NSF, the Outstanding Teaching Award and the Board of Overseers Excellence in Research Award from NJIT, and the Best Paper Awards from journals and conferences.

Dr. Shih is internationally recognized as an expert in Artificial Intelligence and Pattern Recognition, Deep Learning, Watermarking, Steganography, and Forensics. He has authored six books including “Digital Watermarking and Steganography,” “Image Processing and Mathematical Morphology,” “Image Processing and Pattern Recognition,” and “Multimedia Security: Watermarking, Steganography, and Forensics.” He has published over 140 journal papers, 100 conference papers, and 24 book chapters. His current research interests include artificial intelligence, deep learning, image processing, watermarking and steganography, digital forensics, pattern recognition, bioinformatics, biomedical engineering, fuzzy logic, and neural networks.
Chinese Institute of Engineers, USA/GNYC  
2019 Annual Convention  
Sheraton Hotel, Flushing, New York  
Saturday, October 19, 2019  

Session I  
AI Deep Learning  
(2:30 pm - 3:50 pm – Gallery Room)  

Session Chair  

Dr. Jinjun Xiong (熊瑾瑜)  
Program Director, Cognitive Computing, IBM Research  

Session Speakers  

Dr. Tengfei Ma (马腾飞)  
Research Staff Member, IBM Research  

Prof. Bo Yuan (袁博)  
Dept. of Electrical and Computer Eng., Rutgers University  

Prof. Junfeng Yang (杨峻峰)  
Dept. of Computer Science, Columbia University
Session I: AI Deep Learning

Session Chair:

Dr. Jinjun Xiong (熊瑾瑾)
Program Director
Cognitive Computing Systems Research
IBM T.J. Watson Research Center
Yorktown Heights, New York, 10598
jinjun@us.ibm.com

Biography:

Dr. Jinjun Xiong is currently the Program Director for Cognitive Computing Systems Research at the IBM Thomas J. Watson Research Center. He founded and co-directs the IBM-Illinois Center for Cognitive Computing Systems Research (C3SR.com), where he conducts cutting-edge AI systems research. He was also a founding PI for the IBM Smarter Energy Research Institute (SERI) with deep collaboration with a number of large electrical utility companies world-wide. Prior to that, the technologies he developed has been implemented inside IBM’s flagship EinsTimer/EinsStat tools, design and test methodologies used for designing multi-generations of IBM’s high performance ASICs and Processors. He has published more than 100s peer-reviewed international conferences, including top AI conferences and systems conferences. His publication won five Best Paper Awards and eight Nominations for Best Paper Awards. He also led teams to win top awards for various international research competitions, including the recent double championships for the DAC’19 Systems Design Contest on object detection as implemented on low-power FPGA and GPU devices.
Graph Neural Networks for Healthcare Applications

Session Speaker:

Dr. Tengfei Ma (马腾飞)
Research Staff Member
AI Foundations-Reasoning
IBM T. J. Watson Research Center
Yorktown Heights, NY 10598
Tengfei.Ma1@ibm.com

Biography:

Tengfei Ma is a research staff member of IBM Research AI. Prior to moving to the IBM T. J. Watson Research Center in 2016, he obtained his Ph.D. from the University of Tokyo in 2015 and worked in IBM Research Tokyo for one year. Before that, he got his master’s degree from Peking University and his bachelor degree from Tsinghua University. His research interests have spanned a number of different topics in machine learning and natural language processing. Recently his research is mainly focused on graph neural networks and their applications in healthcare and natural language processing, and the results have been published in top AI conferences such as NeurIPS, ICLR, AAAI, IJCAI.

Abstract:

Graphs are ubiquitous in the real world. Graph neural networks have attracted great attention in recent years by extending the scope of deep learning from Euclidean domain (grids) to graphs. Graph neural networks are extremely powerful in learning the graph/node representations. With the representations, we can perform various tasks in graphs, such as node classification, link prediction. This session will include a brief introduction to graph neural networks, and how they are applied to the healthcare research to help the prediction of drug-drug interaction and medical recommendation.
From Matrix to Tensor: Algorithm and Hardware Co-Design for Energy-Efficient Deep Learning

Session Speaker:

Dr. Bo Yuan (袁博)
Assistant Professor
Department of Electrical and Computer Engineering
Rutgers University
Piscataway, NJ 08854
bo.yuan@soe.rutgers.edu

Biography:

Dr. Bo Yuan is currently the assistant professor in the Department of Electrical and Computer Engineering in Rutgers University. Before that, he was with City University of New York from 2015-2018. Dr. Bo Yuan received his bachelor and master degrees from Nanjing University, China in 2007 and 2010, respectively. He received his PhD degree from Department of Electrical and Computer Engineering at University of Minnesota, Twin Cities in 2015.

His research interests include algorithm and hardware co-design and implementation for machine learning and signal processing systems, error-resilient low-cost computing techniques for embedded and IoT systems and machine learning for domain-specific applications. He is the recipient of Global Research Competition Finalist Award in Broadcom Corporation. Dr. Yuan serves as technical committee track chair and technical committee member for several IEEE/ACM conferences. He is the associated editor of Springer Journal of Signal Processing System.

Abstract:

In the emerging artificial intelligence era, deep neural networks (DNNs), a.k.a. deep learning, have gained unprecedented success in various applications. However, DNNs are usually storage intensive, computation intensive and very energy consuming, thereby posing severe challenges on the future wide deployment in many application scenarios, especially for the resource-constraint low-power IoT application and embedded systems.

In this talk, I will introduce my recent algorithm/hardware co-design works for energy-efficient DNN. First, I will show the use of low displacement rank (LDR) matrices can enable the construction of low-complexity DNN models as well as the corresponding energy-efficient DNN hardware accelerators. In the second part of my talk, I will show the benefit of using permuted diagonal matrix, as another type of structured and sparse matrix, for the energy-efficient DNN hardware design. Finally, I will introduce the benefits of tensor decomposition for DNN design and the corresponding high-performance DNN accelerator.
Taming the AI Fire

Session Speaker:

Dr. Junfeng Yang (杨峻峰)
Associate Professor
Department of Computer Science
Columbia University
New York, NY 10027
junfeng.yang@columbia.edu

Biography:

Junfeng Yang is Associate Professor in Computer Science, co-founder of Columbia spin-off NimbleDroid, member of the Data Science Institute, co-director of the Software Systems Lab, Sloan Research Fellow, Air Force Office of Scientific Research Young Investigator Program awardee, and National Science Foundation CAREER awardee. Yang’s research centers on building reliable, secure, and fast software systems. Today’s software systems are large, complex, and plagued with errors, some of which have caused critical system failures, breaches, and performance degradation. Yang has invented techniques, algorithms, and tools to analyze, test, debug, monitor, and optimize real-world software, including Android, Linux, production systems at Microsoft, machine learning systems, and self-driving platforms, benefiting hundreds of millions of users. His research has resulted in numerous vulnerability patches to real-world systems; practical adoption at some of the largest technology companies; press coverage in Scientific American, The Atlantic, The Register, Communications of ACM, and other news outlets; and Best Paper Awards at the USENIX Symposium on Operating System Design and Implementation in 2004 and the ACM Symposium on Operating Systems Principles in 2017. Yang received BS in Computer Science from Tsinghua University and MS and a PhD in Computer Science from Stanford University. [http://www.cs.columbia.edu/~junfeng/](http://www.cs.columbia.edu/~junfeng/).

Abstract:

AI in particular Machine Learning (ML) has made tremendous progress in recent years, achieving or surpassing human-level performance for a diverse set of tasks including image classification, speech recognition, and game playing such as Go. These advances have led to widespread adoption of ML in security- and safety-critical systems such as self-driving cars, malware detection, and aircraft collision avoidance systems. Unfortunately, ML systems, despite their impressive capabilities, often demonstrate unexpected or incorrect behaviors on corner-case inputs, leading to disastrous consequences such as fatal collisions of self-driving cars. In this talk, I'll present some of our initial research towards effective tools to build safer and more secure machine learning systems.
Chinese Institute of Engineers, USA/GNYC
2019 Annual Convention

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Saturday, October 19, 2019

Session II

VLSI and Device Technology
(2:30 pm - 3:50 pm – Boardroom East)

Session Chair

Mr. Cheng-Yi Lin (林政毅)  Advisory Engineer, IBM Systems

Session Speakers

Dr. Zuoguang Liu (刘作光)  Research Staff Member, IBM Research

Dr. Nanbo Gong (龚南博)  Research Staff Member, IBM Research

Prof. Chung-Tse Michael Wu (吳宗澤)  Dept. of Electrical and Computer Eng., Rutgers University
Session II: VLSI and Device Technology

Session Chair:

Mr. Cheng-Yi Lin (林政毅)
Advisory Product Characterization Engineer
IBM Systems
IBM East Fishkill Site
2070 Route 52, B300,
Hopewell Junction, NY 12533
lincheng@us.ibm.com

Biography:

Mr. Cheng-Yi Lin joined IBM Systems in 2015. He is currently an Advisory Product Characterization Engineer, and he works on 14HP technology to drive delivery of high-performance P9/zThemis server chips. His expertise includes data analysis/mining of in-line electrical signals, product yield, and Wafer Final Test (WFT) results. To drive manufacturing improvement, he provided root cause analysis of Health of Line (HOL) macros, functional yields, and device parameter metrics with vintage, tool/chamber understanding. He established WFT comments, performed data visualization, conducted correlation studies, investigate lot history, and provide yield projections to support production and process controls. Prior to joining IBM, he was employed by UCLA as a Research Assistant in the Duan and Device Research Laboratory. He prototyped and optimized a portable, internet-capable, and low-cost readout circuit for In$_2$O$_3$/RGO nanocomposite gas sensors. He achieved the functions of real-time I-V measurement, online data display, and automated SMS text/LED alert. In 2008, he was a Summer Intern at the Process Integration Engineering Department of Taiwan Semiconductor Manufacturing Company (TSMC) in Hsinchhu Taiwan. He optimized halo implant conditions via TCAD simulation for 35HV 13.5V PMOS in 0.35 µm technology.

Mr. Lin received his M.S. degree in Electrical Engineering (EE) from the University of California, Los Angeles (UCLA), his B.S. degree in Power Mechanical Engineering and an M.S. degree in Electronic Engineering from National Tsing-Hua University, Taiwan. He was awarded a Government Scholarship to Study Abroad from the Ministry of Education, Taiwan. He has published two technical papers, filed a patent, several publications through IBM, and conducted numerous EE projects.

In 2016, he joined CIE as a lifetime member. He is currently a secretary of CIE-USA/GNYC. He has been actively involving in the activities of CIE to promote STEM education. He was in charge of presentation set-up for the 2016 Asian American Engineer of the Year (AAEOY) and CIE-USA Centennial in 2017. He was selected as an Honorary Member of Talent Net--Epoch Foundation since 2009 and is a member of IEEE.
Resistances in Future Logic Device Architectures

Session Speaker:

Dr. Zuoguang Liu (刘作光)
Research Staff Member
IBM Research
257 Fuller Rd
Albany, NY 12202
zliu@us.ibm.com

Biography:

Dr. Zuoguang Liu is a Research Staff Member of IBM. In 2012-2018 at IBM, he worked on multiple technology nodes (32nm/14nm/10nm/7nm) as well as exploratory device architectures for 5nm/3nm nodes. He also works with partner companies developing new materials and techniques for technology enablement. Since 2018, memory devices for neuromorphic computing is his research focus. Dr. Liu is an author/co-author of more than 30 peer-reviewed high-level publications. He is a Golden Reviewer for IEEE Elec Dev Lett, and Trans Elec Dev. He is an IBM Master Inventor with ~200 patents. Dr. Liu received his PhD degree in Elec Eng and Appl Phys from Yale University in 2012, and B.S. degree in Physics from Peking University in 2007.

Abstract:

More-Moore logic device technology roadmap suggests lateral/vertical gate-all-around (LGAA/VGAA) architectures beyond FinFETs for further scaling and performance. At extremely scaled gate pitches, parasitic resistance significant impacts performance of the devices. Direct partition of the resistance components in FinFETs has been established. Stacked LGAA devices at further scaled gate pitches exhibit high source/drain series resistance and contact resistance. VGAA transistors have a very different structure from FinFETs or LGAA’s. Their asymmetric bottom and top source/drain results in significant spreading resistance and asymmetric contact resistance. Separate partition of resistances at the bottom and top is needed. In this paper, the above future logic device architectures are discussed from the perspective of their resistance components.
Signal and Noise Extraction from Analog Memory Elements for Neuromorphic Computing

Session Speaker:

Dr. Nanbo Gong (龚南博)
Research Staff Member
IBM T. J. Watson Research Center
1101 Kitchawan Rd.
Yorktown Heights, NY 10598
Nanbo.gong1@ibm.com

Biography:

Dr. Gong joined IBM T. J. Watson Research Center in 2018. He is currently a research staff member and his research interests are mainly in Phase Change Memory. He received the B.S. degree from Peking University, Beijing, China in 2013, in Physics, and the M.S. and the Ph.D. degrees from Yale University, New Haven, CT, US in 2015 and 2018, both in Electrical Engineering. Dr. Gong has reviewed more than 30 papers from respected academic outlets, including IEEE Transactions on Electron Devices, IEEE Electron Device Letters, Applied Physics Letters and Advanced Materials.

Abstract:

Dense crossbar arrays of non-volatile memory (NVM) can potentially enable massively parallel and highly energy-efficient neuromorphic computing systems. The key requirements for the NVM elements are continuous (analog-like) conductance tuning capability and switching symmetry with acceptable noise levels. However, most NVM devices show non-linear and asymmetric switching behaviors. Such non-linear behaviors render separation of signal and noise extremely difficult with conventional characterization techniques. In this study, we establish a practical methodology based on Gaussian process regression to address this issue. The methodology is agnostic to switching mechanisms and applicable to various NVM devices. We show tradeoff between switching symmetry and signal-to-noise ratio for HfO$_2$-based resistive random access memory. Then, we characterize 1000 phase-change memory devices based on Ge$_2$Sb$_2$Te$_5$ and separate total variability into device-to-device variability and inherent randomness from individual devices. These results highlight the usefulness of our methodology to realize ideal NVM devices for neuromorphic computing.
Metamaterial Antenna-based Multi-target Vital Sign Detection and Motion Tracking

Session Speaker:

Dr. Chung-Tse Michael Wu (吳宗澤)
Assistant Professor
Department of Electrical and Computer Engineering
Rutgers University
Piscataway, NJ 08854
ctm.wu@rutgers.edu

Biography:

Dr. Chung-Tse Michael Wu is an assistant professor in the Department of Electrical and Computer Engineering at Rutgers, The State University of New Jersey. His research interests include applied electromagnetics, antennas, passive/active microwave and millimeter-wave components, RF systems and metamaterials. He received his B.S. degree from National Taiwan University (NTU) in 2006. He then received his M.S. and Ph.D. degree in the Department of Electrical Engineering, University of California at Los Angeles (UCLA) in 2009 and 2014, respectively. From September 2008 to June 2014, he worked as a graduate student researcher at the Microwave Electronics Laboratory in UCLA. In 2009, He was a summer intern in Bell Labs, Alcatel-Lucent, Murray Hills, NJ. In 2012, he was a special-joint researcher at Japan Aerospace Exploration Agency (JAXA) in Kanagawa, Japan. From 2014 to 2017, he was an assistant professor in the ECE department, Wayne State University (WSU) in Detroit, Michigan. Dr. Wu was also a visiting assistant professor at National Chung Hsing University, Taichung, Taiwan, in summer 2017. Dr. Wu was a recipient of the National Science Foundation (NSF) Faculty Early Career Development (CAREER) Award, the WSU College of Engineering Faculty Research Excellence Award in 2016, and the DARPA Young Faculty Award (YFA) in 2019.

Abstract:

Metamaterials (MTMs) are artificial electromagnetic materials with novel effective medium properties that may not be available in nature. The concept of metamaterial structures has led to the design of many novel circuits exhibiting component enhancements. One type of metamaterial-based antenna structure is so-called composite right/left-handed transmission line (CRLH-TL) leaky-wave antennas (LWAs). This kind of antenna structure has been shown to offer significant advantages over conventional LWAs. For example, a balanced CRLH-TL LWA is able to achieve continuous backfire-to-endfire frequency-dependent beam scanning with a true broadside beam, good impedance matching over an entire operating band with a simple feeding structure. Utilizing the frequency-space mapping characteristics of CRLH LWAs, the locations of unknown targets can be determined by simply reading the spectral components of the reflected wave. This results in a real time detection scheme since the data acquiring speed is mostly depending on the frequency sweeping speed of signal source, which is typically on the order of milliseconds. Furthermore, the field-of-view of the sensor can be enlarged due to the wide scanning angle provided by CRLH LWAs. Leveraging this unique feature of MTM antennas, various applications including fast 2-D beamforming, real-time remote sensing with large field-of-view that can be used in vital sign detection or motion detection.
Chinese Institute of Engineers, USA/GNYC
2019 Annual Convention

Sheraton Hotel, Flushing, New York
Saturday, October 19, 2019

Session III

Healthcare
(2:30 pm - 3:50 pm – Boardroom West)

Session Chair

Dr. Pei-Yun Sabrina Hsueh (薛沛芸) Health Informatics Leader, Viome Inc.

Session Speakers

Dr. Xianchen Liu (劉賢臣) Senior Medical Director, Pfizer

Dr. Jia Chen (陳佳) Product Leader, Blockchain for Healthcare & Life Sciences & IBM Academy of Technology Leadership Team

Dr. Jennifer Liang (梁容怡) Medical Researcher, IBM Research
Session III: Healthcare

Session Chair:

Dr. Pei-Yun Sabrina Hsueh (薛沛芸)
Health Informatics Leader
Viome Inc.
241 W 37th St, New York, NY
pyhsueh@gmail.com

Biography:

Dr. Pei-Yun Sabrina Hsueh is currently at Viome Inc, leading the company’s health informatics mission in decoding individual biology and behavior for evidence-based precision medicine. She has been a leader in this area, holding position such as the elected Chair of the American Medical Informatics Association Consumer and Pervasive Health Informatics Work Group and the incoming Chair of the International Medical Informatics Association Exposome Informatics Work Group. She also serves on the ACM Practitioners Board and the IEEE standard committee. Prior to joining Viome Inc, she was the IBM Academy of Technology Member and Research Staff Member at IBM Research.

Dr. Hsueh is a pioneer in the area of personal health informatics and computational health behavior science. She has led multiple teams to develop science-driven industry solutions, specializing in handling heterogeneous health data sources, widely ranging from microbiome tests, nutrition outcome registry, care management records, surveys, self-reported outcomes, ecological momentary assessments to wearable/IOT sensor data. Her expertise in the emerging area makes her a sought-after speaker and consultant, winning a series of Inventor awards, Manager Choice Awards and Eminence Awards.

Dr. Hsueh’s work has recently won her the AMIA 2018 Distinguished Paper Award. Her thought leadership led to an impactful series of panels/workshops on patient-generated health data in MEDINFO, MIE, and AMIA since 2013. She has authored 20+ patents and 60+ technical papers and book chapters, and is currently authoring a new book on Machine Learning for Medicine and Healthcare (Springer Nature). She is the invited guest editor for Sensors Journal (special issue: Data Analytics and Applications of Wearable Sensors in Healthcare) and JAMIA OPEN (special issue: Precision Medicine in the Era of Patient-centered Care).

Prior to coming to US, she was elected as European Google Anita Borg Scholar and has worked for the EU FP Augmented Multiparty Interaction (AMI) and AMI-Distant Access program with 22 partner sites across 7 countries. She obtained her Bachelor’s degree in Computer Science from National Taiwan University, Master’s degree from University of California, Berkeley and PhD in Informatics from University of Edinburgh respectively.
Real-World Data in the New Era of Drug Development

Session Speaker:

Dr. Xianchen Liu (劉賢臣)
Senior Medical Director
Pfizer Inc
235 E 42nd St, New York, NY 10017
Kelinresearch6@gmail.com

Biography:

Dr. Liu is Senior Medical Director at Pfizer and visiting research fellow of the University of Pennsylvania's Center for Public Health Initiatives. Dr. Liu obtained his medical degree from Shandong Medical University and PhD at University of Tokyo. He did postdoctoral research at NIH. He was assistant professor of Psychiatry at University of Pittsburgh before he started his career in the pharmaceutical industry in 2008. His research interests and experiences include behavioral and chronic disease epidemiology, sleep medicine, mental disorders, neurosciences, cardiovascular diseases, cancer, health economics, outcomes research, real-world data, and clinical trials. He has published more than 200 scientific papers.

Abstract:

Randomized Clinical Trials (RCTs) have been considered the gold standard to provide evidence about the efficacy of new medications during the drug development process for regulatory approval. Although well-conducted RCTs demonstrate the causality and provide the most valid estimates of the relative efficacy of competing medications or healthcare interventions, RCTs do not necessarily reflect the “real-world” experience. Furthermore, the clinical evidence (mainly phase 3 RCTs) may not be enough to fully guide clinicians and policy makers in choosing the optimal treatment for their patients because most medicines (especially newly marketed medications) approved for the same disease or indication have not been directly compared by RCTs. To address these limitations of RCTs and answer some questions that cannot be answered by RCTs, real-world evidence (RWE) obtained from real-world data (RWD) has become increasingly important as a complementary source to RCT data in the digital era. This presentation will discuss 1) Real-World Data and Real-World Evidence; 2) RWD Sources; 3) Applications of RWE; and 4) Challenges/limitations.
Transforming Healthcare with Blockchain Technology

Session Speaker:

Dr. Jia Chen (陈佳)
Product Leader
Blockchain for Healthcare & Life Sciences
Innovation & Solution Incubation, IBM
jiachen@us.ibm.com

Bioography:

Dr. Jia Chen is a Product Leader of Blockchain solutions for Healthcare and Life Sciences at IBM’s Innovation and Solution Incubation team. She serves on the IBM Academy of Technology Leadership team. She previously led technical strategy at IBM Watson Health Innovation, with a focus on data and AI. Prior to that, Dr. Chen held leadership positions for Innovation, Health Solutions for Smarter Cities, Technical Sales & Watson Client Experience Centers at CHQ, Global Markets and IBM Watson. She led the identification, structuring and execution of first of a kind technology and business initiatives that provide innovative and sustainable differentiation for IBM’s clients.

Dr. Chen received her Ph.D. in Physics from Yale University. Her research work was recognized as one of the ‘Breakthrough of the Year’ by Science magazine in 2001. She was named as one of the top 35 technology innovators under the age of 35 worldwide by MIT’s Technology Review in 2005, the Best Researcher of the Year by Small Times magazine in 2006 and one of the top 26 tech women innovators at IBM in 2015. She’s an innovation catalyst with over 36 patents, 8 book chapters and 50+ journal and conference papers. She serves on the Yale Graduate School Alumni Association Board.

Abstract:

The healthcare industry is transforming at a velocity that is catching many organizations unprepared. The industry aspires to move toward higher value – delivering better quality care and outcomes at more affordable cost. These changes require many foundational shifts - transparency – into both the costs and the effectiveness of care delivered. At the same time, the amount and complexity of available medical, genomic and life sciences and real world data has been growing at an unprecedented rate. The industry is on the cusp of new learnings, thanks to the vast quantities of health data, along with intelligent systems to help make sense of all of it. We’ll discuss how to leverage Blockchain to empower the shift from volume to value, to simplify processes and improve efficiencies, to glean the right information at the point of care, to improve quality and reduce cost.
Why Natural Language Processing on Patient Electronic Health Records is Different?

Session Speaker:

Dr. Jennifer J Liang (梁容怡)
Medical Researcher
IBM T. J. Watson Research Center
1101 Kitchawan Rd.
Yorktown Heights, NY 10598
jjliang@us.ibm.com

Biography:

Dr. Jennifer Liang is a Medical Researcher in the electronic medical records analysis group under IBM Research. As the resident subject matter expert, she works closely with researchers to define use cases and develop analytics for use in the medical domain based on natural language processing and machine learning. In her role, she also leads the annotation effort to generate ground truth necessary to advance analytics on medical and clinical data.

Her current focus is on applications for use in the clinical setting, including analytics on electronic medical records and clinical decision support systems. Dr. Liang holds an M.D. from New York Medical College and a B.S. in Materials Science and Engineering from Massachusetts Institute of Technology.

Abstract:

Unstructured clinical notes within the patient electronic health record (EHR) are traditionally a rich source of data where detailed information about the patient’s medical history and clinical care process is documented. However, healthcare providers at the point of care are mostly unable to review much of this information due to the abundance of notes within a patient EHR and the time constraint inherent in the clinical setting.

In this talk, we will explore the potential for NLP on unstructured EHR data to reduce clinicians’ cognitive load. We will discuss the challenges inherent in working with clinical data and review various use cases to demonstrate the effects of such challenges on complex clinical NLP tasks.
Chinese Institute of Engineers, USA/GNYC  
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Sheraton Hotel, Flushing, New York  
Saturday, October 19, 2019

Session IV

5G High Speed Cellular Networks  
(4:10 pm - 5:30 pm – Boardroom East)

Session Chair

Dr. Sean Chiu (邱富崑)  
Principal Engineer, Unisoc, San Diego, California

Session Speakers

Dr. Guosen Yue (岳國森)  
Principal Research Staff, Futurewei Technologies

Dr. Kyle Jung-Lin Pan  
(Pan 鍾霖)  
Principal Engineer, Innovation Labs, InterDigital
Session IV: 5G High Speed Cellular Networks

Session Chair:

Dr. Sean Chiu (邱富奎)
Principal Engineer
Unisoc, San Diego, California
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Biography:

Sean Chiu received the B.S. and M.S. degree in Electrical Engineering from National Taiwan University, Taipei, Taiwan in 1997 and 1999, respectively, and the Ph.D. degree in Electrical Engineering from University of Southern California, Los Angeles, California in 2006. He was a Communication Systems Engineer at Texas Instruments, San Diego. From 2008 to 2015, he was with Broadcom Corporation, Matawan, New Jersey, as a System Design Scientist. He is now a Principal Engineer at Unisoc, San Diego, California. His research interests are in the general areas of wireless communications and signal processing.
Adaptive Grouping and Beamforming for Multi-group Multicast with Massive MIMO

Session Speaker:

Dr. Guosen Yue (岳国森)
Principal Research Staff
Futurewei Technologies, Inc.

Biography:
GUOSEN YUE received the B.S. degree in physics and the M.S. degree in electrical engineering from Nanjing University, Nanjing, China, in 1994 and 1997, respectively, and the Ph.D. degree in electrical engineering from Texas A&M University, College Station, TX, USA, in 2004. He was a Senior Research Staff at NEC Laboratories America, Princeton, NJ, USA, where he conducted research on broadband wireless systems and mobile networks. From 2013 to 2015, he was with Broadcom Corporation, Matawan, NJ, USA, as a System Design Scientist. He is now a Principal Research Staff at Futurewei Technologies, Bridgewater, NJ, USA. His research interests are in the general areas of wireless communications and signal processing. He has served as an Associate Editor of the IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS and EURASIP Research Letters in Communications, the Guest Editor of EURASIP Journal of Wireless Communication and Networking special issue on interference management, Elsevier’s Physical Communication special issue on signal processing and coding. He served as the Symposium Co-chair for IEEE ICC 2010, IEEE GlobeCom 2019, the Track Co-chair for IEEE ICCCN 2008, the steering committee member for IEEE RWS 2009. He served as the director of IEEE MMTC Communication Frontier. He is a senior member of the IEEE.

Abstract:

We consider the problem of downlink multicast transmission of user data in massive MIMO systems. Due to the nature of multicast transmission, the common data rate in a multicast group is constrained by that of the user with the worst Signal-to-Noise-Ratio (SNR). As a consequence, serving a large number of users in a single multicast group might degrade the system performance. To overcome this drawback, utilizing spatial degrees of freedom offered by large number of transmit antennas, we propose to dynamically divide the set of serving users into multiple multicast groups and jointly design the user grouping pattern and co-channel beamforming vectors of these groups. Given the NP-hardness of the considered problem, we decompose it into a multi-group multicast beamforming subproblem and a user grouping subproblem. We proposed several low-complexity methods to iteratively solve these subproblems in order to achieve a suboptimal solution to the original problem. Simulation results show that our proposed algorithms for GRouping And Beamforming (GRAB) scheme achieve significantly higher average sum-rate performance compared to that of the existing multicast schemes.
Overview of Technologies for 5G

Session Speaker:

Dr. Kyle Jung-Lin Pan (潘鍾霖)
Principal Engineer
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2 Huntington Quadrangle
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Biography:

Kyle Jung-Lin Pan received the B.S. degree in electrical engineering from National Tsing Hua University, Taiwan, in 1992, and the M.S. and Ph.D. degrees in electrical and computer engineering from Stony Brook University, New York, in 1995 and 1998 respectively. In 1998, he joined InterDigital for R&D for 3G, 4G, LTE/LTE-A, WCDMA and WiFi technology development. He is currently a Principal Engineer in Innovation Labs, InterDigital. His primary research interest includes 5G, 4G, 3G, wireless communications, advanced signal processing, multi-user detection, OFDM, MIMO, architecture and system for cellular communications, medium access control, dynamic channel allocation, air interface techniques, compressed sensing, etc.

Dr. Pan holds more than 200 patents granted in U.S., and numerous patents and patent applications worldwide including US, Europe, China, Japan and Asia covering variety of technologies including those for 5G, 4G LTE and LTE-A, WCDMA, HSPA, WiFi, MIMO, etc. He is also a co-inventor of over 250 pending patent applications in U.S. and worldwide. Dr. Pan received numerous awards including Chairman Awards, President Awards, Innovation Awards, CTO Awards and Distinguished Publication Awards from InterDigital.

Dr. Pan has comprehensive knowledge of specification and standardization processes in 3GPP and WiFi and extensive and significant contributions and leadership in 3GPP standardization. He attended 3GPP meetings as lead delegate for multiple 3GPP Agenda Items. Dr. Pan made more than 240 technical contributions and 55 way forward proposals to 3GPP standards covering 3G/4G/5G on various areas including OFDM, initial access and mobility, V2X, NR-U, NOMA, 2-step RACH, IAB, URLLC, beam management, MIMO, carrier aggregation, control and data channel, HARQ, etc.
Overview of Technologies for 5G

Abstract:

Based on the general requirements set out by ITU-R, NGMN and 3GPP, a broad classification of the use cases for emerging 5G systems can be depicted as follows: Enhanced Mobile Broadband (eMBB), Massive Machine Type Communications (mMTC) and Ultra Reliable and Low latency Communications (URLLC). Different use cases may focus on different requirements such as higher data rate, higher spectrum efficiency, low power and higher energy efficiency, lower latency and higher reliability. A wide range of spectrum bands ranging from 700 MHz to 100 GHz are being considered for a variety of deployment scenarios.

It is well known that as the carrier frequency increases, the severe path loss becomes a crucial limitation to guarantee the sufficient coverage area. Transmission in millimetre wave systems could additionally suffer from non-line-of-sight losses, e.g., diffraction loss, penetration loss, oxygen absorption loss, foliage loss, etc. During initial access, the base station and user equipment (UE) need to overcome these high path losses and discover each other. Utilizing dozens or even hundreds of antenna elements to generate a beam formed signal is an effective way to compensate the severe path loss by providing significant beam forming gain. Beamforming techniques may include digital, analogue and hybrid beamforming.

In this talk the essential design principles for 5G system such as beam-centric designs, ultra-lean system designs, etc are discussed. The corresponding features and enabling technologies for 5G new radio (NR) such as spectrum flexibility, scalable numerology, frame structure, grant-free uplink transmission, massive MIMO, beam management, channel coding, etc are introduced and discussed. The most recent progress and status for 5G NR standardization are provided. The latest developments in 3GPP standards for 5G NR are summarized. 5G NR unlicensed band operations, cellular-based vehicle to everything (V2X), non-orthogonal multiple access (NOMA), etc are also discussed. What is next for 5G is discussed as well.
Chinese Institute of Engineers, USA/GNYC
2019 Annual Convention

Sheraton Hotel, Flushing, New York
Saturday, October 19, 2019

Session V

Quantum Computing Technology
(4:10 pm - 5:30 pm – Boardroom West)

Session Chair

Dr. Jeng-Bang Yau (姚正邦) Research Staff Member, IBM Research

Session Speakers

Dr. Jeng-Bang Yau (姚正邦) Research Staff Member, IBM Research

Mr. Richard Chen (陳均富) Research Staff Member, IBM Research
Session V: Quantum Computing Technology

Session Chair:

Dr. Jeng-Bang Yau (姚正邦)
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Biography:

Dr. Jeng-Bang Yau is a Research Staff Member at the IBM T.J. Watson Research Center. He received his Ph.D. degree in electrical engineering from Princeton University in 2002 and his B.S. and M.S. degrees in electrical engineering from National Tsing Hua University in Taiwan in 1992 and 1994, respectively. The research topic of his Ph.D. thesis has been featured in the Research Highlights of Nature Physics Portal and in the Science’s Compass column in Science magazine. Prior to joining IBM Research in 2006, he was a postdoctoral research associate in the Dept. of Applied Physics at Yale University.

Dr. Yau is recipient of corporate honors including IBM Inventor Plateau Award, Manager Choice Award, and Eminence and Excellence Award. He holds over 80 patents and published 20+ peer-reviewed technical papers. He was in the Semiconductor Research upon joining IBM and his current focus is in the Experimental Quantum Computing Technology. Dr. Yau is a member of IEEE and American Physical Society and have chaired in various conferences such as the IEEE SOI-3D-Subthreshold Microelectronics Technology Unified Conference. He is a regular referee of technical and scientific journals such as IEEE journals, Applied Physics Letters, Journal of Applied Physics, and Physical Reviews.
Introduction to IBM Q: Overview

Session Speaker:

Dr. Jeng-Bang Yau (姚正邦)
Research Staff Member
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Biography:

Dr. Jeng-Bang Yau is a Research Staff Member at the IBM T.J. Watson Research Center. He received his Ph.D. degree in electrical engineering from Princeton University in 2002 and his B.S. and M.S. degrees in electrical engineering from National Tsing Hua University in Taiwan in 1992 and 1994, respectively. The research topic of his Ph.D thesis has been featured in the Research Highlights of Nature Physics Portal and in the Science’s Compass column in Science magazine. Prior to joining IBM Research in 2006, he was a postdoctoral research associate in the Dept. of Applied Physics at Yale University.

Dr. Yau is recipient of corporate honors including IBM Inventor Plateau Award, Manager Choice Award, and Eminence and Excellence Award. He holds over 80 patents and published 20+ peer-reviewed technical papers. He was in the Semiconductor Research upon joining IBM and his current focus is in the Experimental Quantum Computing Technology. Dr. Yau is a member of IEEE and American Physical Society and have chaired in various conferences such as the IEEE SOI-3D-Subthreshold Microelectronics Technology Unified Conference. He is a regular referee of technical and scientific journals such as IEEE journals, Applied Physics Letters, Journal of Applied Physics, and Physical Reviews.

Abstract:

Quantum computing, an emerging paradigm potentially for next generation computation, has received significant amount of attention over the past few years thanks to the advancements in both software and hardware. In May 2016, IBM launched IBM Q Experience that offered a first-ever real 5-qubit machine online. Since then, this initiative has had over 100,000 users worldwide, with software and applications created with Qiskit, an open source quantum computing software development framework. In this talk, I will give a brief overview of the background and progress of quantum computing and the introduction of IBM Q.
Introduction to IBM Q: Qiskit, an Open Source Platform for Quantum Computing

Session Speaker:

Mr. Richard Chen (陳均富)
Research Staff Member
IBM T. J. Watson Research Center
1101 Kitchawan Rd.
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Biography:

Chun-Fu (Richard) Chen is a Research Staff Member in IBM T.J. Watson Research Center. His research background is on image/video processing, computer vision, deep learning, graph computing, and quantum computing. His research focus includes cognitive visual analytics, which balances performance and speed on resource-limited devices, and software tools for quantum computing and quantum chemistry.

Abstract:

The quantum computing has reached promising progress in the recent years, a toolkit to interface with this new computing paradigm is essential from a classical computer. Qiskit is an open-source platform to help the Quantum community to speed up the research; furthermore, Qiskit is a full-stack from applications to low-level pulse control on a Quantum computer. In this talk, I will present the overview of Qiskit and introduce the functionalities of Qiskit elements, including terra, aer, aqua and ignis. On the other hand, I will also give some recent research works, such as quantum chemistry, quantum machine learning, etc.
Session VI: Poster Presentation

Session Co-Chair:

Dr. Yuying Q. Gosser (仇玉英)
Research Assistant Professor
Department of Chemistry
Former Director of Student Research and Scholarship
Grove School of Engineering
The City College of the City University of New York
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ygosser@ccny.cuny.edu, yygosser@gmail.com

Biography:

Dr. Yuying Q. Gosser graduated from University of Science and Technology of China with a BS in Polymer Physics. After obtaining a Master’s of Chemical Engineering from the Research Institute of Petroleum Processing of China she came to U.S and earned a PhD in Physical Organic Chemistry and NMR from Brown University. She did postdoctoral research on multi-dimensional NMR spectroscopy at Yale University and on NMR structural biology at Rockefeller University. Prior joining the City College of CUNY, she worked in Memorial Sloan-Kettering Cancer Center (MSKCC) to study protein and RNA structures and their interaction with potential drug molecules.

At the City College of CUNY, in the Science Division, supported by NSF and HHMI Science education fund, Dr. Yuying Q. Gosser established the Pathways Bioinformatics Center and the Gateway Laboratory, and directed undergraduate research training in Structural Biology and Bioinformatics. She joined national Genomics Education Partnership (http://gep.wustl.edu/) and developed research-based Bioinformatics course for undergraduate education. In the School of Engineering, in close collaboration with faculty, she developed a research-oriented engineering scholarship program and successfully directed many aspired engineering students to nation-wide research institutions, such as NIST, IBM, JPL, etc. She also served as the Executive Editor of the Journal of Student Research (JSR) since its inception in 2008 (www.ccnyosrs.org). Her dedication to undergraduate research was recognized by 2015 City College President’s S.T.A.R. award, and she was invited to serve on the Biochemistry and Structural Biology Review Panel for National Science Foundation Graduate Research Fellowship Program in 2015 and 2016.
Session VI: Poster Presentation

Session Co-Chair:

Dr. Dantong Yu (丁丹彤)
Associate Professor
Martin Tuchman School of Management,
New Jersey Institute of Technology,
Newark, NJ 07102-1982, USA
dantong.yu@njit.edu

Biography:

Dantong Yu is an Associate Professor in Martin Tuchman School of Management, and Graduate Program Director of Ph.D. in Business Data Science. He received a BS degree in computer science from Peking University and a Ph.D. degree in Computer Science from University at Buffalo. He joined Martin Tuchman School of Management at New Jersey Institute of Technology in 2016. He also holds guest appointment in the Department of Computer Science and Mathematics at BNL. He founded and led the Computer Science Group in BNL between 2009 and 2016. He developed the data management tool that thousands of physicists use. His research interests include data mining, machine learning, data network and storage. He has published 70 papers in leading technical journals and conferences. He has served on the review panels for NSF, DOE Early Career Investigator and DOE SBIR/STTR. He is the PC member of KDD, ICDM, ICDE, ICCCN, HiPC, and ICPADS.
Towards Accurate Instance-level Text Spotting With Guided Attention

Haiyan Wang, The City College of New York, hwang005@citymail.cuny.edu
Haiyan Wang: hwang005@citymail.cuny.edu; Xuejian Rong: xrong@ccny.cuny.edu
Yingli Tian: ytian@ccny.cuny.edu

Biography:

Haiyan Wang is a third year Ph.D. student in the Media Lab, Dept. Electrical Engineering at The City College of New York, CUNY, advised by Professor Ying-Li Tian. My current research focuses on text detection and 3D point cloud segmentation & completion. Prior to CUNY, I finished my Bachelor degree from Beijing University of Posts and Telecommunications.

Abstract:

We tackle the text detection problem from the instance-aware segmentation perspective, in which text bounding boxes are directly extracted from segmentation results without location regression. Specifically, a text-specific attention model and a global enhancement block are introduced to enrich the semantics of text detection features. The attention model is trained with a weakly segmentation supervision signal and enforces the detector to focus on the text regions, while also suppressing the influence of neighboring background clutters. In conjunction with the attention model, a global enhancement block (GEB) is adapted to reason the relationship among different channels with channel-wise weights calibration. Our method achieves comparable performance with the recent state-of-the-arts on ICDAR2013, ICDAR2015, and ICDAR2017-MLT benchmark datasets.
Towards Weakly Supervised Semantic Segmentation in 3D Graph-Structured Point Clouds of Wild Scenes

Haiyan Wang, The City College of New York, hwang005@citymail.cuny.edu
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Abstract:

The deficiency of 3D segmentation labels is one of the main obstacles to effective point cloud segmentation, especially for wild scenes with varieties of different objects. To alleviate this issue, we propose a novel graph convolutional deep framework for large-scale semantic scene segmentation in point clouds with solely 2D supervision. Different with numerous preceding multi-view supervised approaches focusing on single object point clouds, we argue that 2D supervision is also capable of providing enough guidance information for training 3D semantic segmentation model of natural scene point clouds while not explicitly capturing their inherent structures, even with only single view per sample. Specifically, a Graph-based Pyramid Feature Network (GPFN) is designed to implicitly infer both global and local features of point sets, and a perspective rendering and semantic fusion module are proposed to provide refined 2D supervision signals for training along with a 2D-3D joint optimization strategy. Extensive experimental results demonstrate the effectiveness of our 2D supervised framework which achieves comparable results with the state-of-the-art approaches trained with full 3D labels for semantic point cloud segmentation on the popular S3DIS benchmark.
3DFPN-HS²: 3D Feature Pyramid Network Based High Sensitivity and Specificity Pulmonary Nodule Detection

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First Author & presenter: Jingya Liu  Email: jliu1@ccny.cuny.edu

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Liangliang Cao: Google AI, New York, NY 10011
Oguz Akin: Memorial Sloan Kettering Cancer Center, New York, NY 10065

Biography:

Jingya Liu, a fourth year Ph.D. student of the City College of New York, under the supervision by Prof. Yingli Tian. My research focuses on computer vision based medical image analysis, such as object detection, and virtual image synthesis. The current research is on high sensitivity and specificity pulmonary nodule detection to accelerate the diagnose by the powerful deep learning-based models. Currently seeking opportunities for the 2020 summer internship.

Abstract:

Lung cancer is one of the leading cancer killers around the world which makes the study of lung cancer diagnosis eminently crucial. Computer-aided diagnosis systems provide assistance for radiologists to accelerate the diagnosing process. Therefore, accurate detection of pulmonary nodules with high sensitivity and specificity is essential for automatic lung cancer diagnosis from CT scans. Although many deep learning-based algorithms make great progress for improving the accuracy of nodule detection, the high false positive rate is still a challenging problem which limited the automatic diagnosis in routine clinical practice. In this paper, we propose a novel pulmonary nodule detection framework based on a 3D Feature Pyramid Network (3DFPN) to improve the sensitivity of nodule detection by employing multi-scale features to increase the resolution of nodules, as well as a parallel top-down path to transit the high-level semantic features to complement low-level general features. Furthermore, a High Sensitivity and Specificity (HS2) network is introduced to eliminate the falsely detected nodule candidates by tracking the appearance changes in continuous CT slices of each nodule candidate. The proposed framework is evaluated on the public Lung Nodule Analysis (LUNA16) challenge dataset. Our method is able to accurately detect lung nodules at high sensitivity and specificity and achieves 90.4% sensitivity with 1/8 false positive per scan which outperforms the state-of-the-art results 15.6%.
A Joint Task Deep Learning Model for Pneumonia Localization

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Biography:

Shaobo Liu is a Ph.D. candidate at Computer Vision Lab, Computer Science Department, New Jersey Institute of Technology, supervised by Professor Frank Shih. Shaobo earned his BS degree in electrical power engineering from Agriculture University of Hebei, China and MS degree in electrical and computer engineering from Stevens Institute of Technology, NJ. His research interests include Computer Vision, Medical Image Segmentation, Medical Image Classification, Explainable Learning, Machine Learning and Deep Learning.

Abstract:

Chest X-ray images are notoriously hard to analysis due to its noisy nature. Automatic identification of pneumonia on medical images has attracted intensive studies recently. It can be described as two steps: first, the model should be able to tell healthy sample from pneumonia samples. Second, the model should be able to highlight the target pneumonia area. Recently, deep learning has become more and more popular with the improvement of computing capacity, especially in computer vision and image processing. In this paper, a joint task of deep neural network using shared parameters is applied for both pneumonia classification and localization. Our proposed joint-task model combines classification model and segmentation model with shared weights. Experimental results performed on the massive dataset of Radiology Society of North America have confirmed the efficiency of our model. By define the data samples to be healthy and pneumonia, the classification model’s test accuracy is achieved by 93%. However, the segmentation model achieves a mean precision result of 0.65. The low segmentation accuracy is partly due to noisy nature in Chest X-ray images and segmentation model make its prediction on healthy samples. Based on the relatively higher confidence of classification model, we decide to trust classification model’s prediction and use it to improve the segmentation model’s result. The Experimental result shows that the segmentation model’s result is improved by 20% based on classification model’s prediction. Furthermore, a class saliency-map based interpretable learning method is applied to highlight corresponding area when classification model makes its prediction. By confirming classification model and segmentation are focusing on the same area, we finally decide whether to trust the joint task model’s prediction.
Classifying Histopathology Images with Random Depthwise Convolutional Neural Networks

Yunzhe Xue¹, Yanan Yang¹, Fadi G. Farhat¹, Frank Y. Shih¹, Olga Boukrina², A.M. Barrett³, Jeffrey R. Binder¹, William W. Graves⁵, and Usman W. Roshan¹

¹ Department of Computer Science, New Jersey Institute of Technology, Newark NJ, USA
² Stroke Rehabilitation Research, Kessler Foundation, West Orange, NJ, USA
³ Emory University and Atlanta VA Medical Center, Atlanta, GA, USA
⁴ Department of Neurology, Medical College of Wisconsin, Milwaukee, WI, USA
⁵ Department of Psychology, Rutgers University – Newark, Newark, NJ, USA

Biography:

Yanan Yang is a 2nd year Ph.D. candidate in Computer Science at New Jersey Institute of Technology. She earned her B.S. degree in Management in China and M.S. degree in Computer science in USA. Now her research area focuses on deep learning on medical images, supervised by Professor Frank Shih. She has been involved in several projects on classifying different type of medical images (2D & 3D). Now she’s doing linear classifier and unsupervised machine learning model, which is a type of self-organized learning without pre-existing labels. That can help a lot in finding all kinds of unknown patterns in data and is very useful for categorization.

Abstract:

In this work, we present the Random Depth Convolutional Neural Network (RDCNN), a deep learning system that attempts to learn a feature space with random depth-wise convolutions on which a linear support vector machine or stochastic gradient descent is then applied. The system is tested on brain MRI (Magnetic Resonance Imaging) scans and on microscopic breast cancer biopsy images. The network performed well for similarity search on the brain MRI scans. Our experiments show that RDCNN can detect similarity between images that share a similar background or texture better and easier than trained models. With histopathology (breast cancer biopsy) images, background and texture also matters, and our system produces high accuracy results on binary as well as multiclass classification. We also demonstrate the advantage of data augmentation with validation accuracies reaching almost 100%. The importance of pre-processing training data is also highlighted and demonstrated, especially for medical images, which require extensive preparation to improve classifier and detector performance.
Josephson Circuits Isolated from the Environment by Superinductors

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Biography:
Wen-Sen is a Ph.D. candidate in the Department of Physics and Astronomy at Rutgers University, where he joined in 2014 as a graduate fellow. He obtained his master's degree in physics from National Taiwan University, Taiwan, in 2011. He was a process integration engineer in research and development team of Taiwan Semiconductor Manufacturing Company focusing on advanced IC fabrication and 3D packaging. His current research interests are mainly in meso-scopic physics at low temperature, primarily the application of aluminum based superconducting Josephson circuits in artificial atoms and quantum computing.

Abstract:
Superinductors offer new types of functionality, including non-dissipative high-impedance isolation of quantum circuits from the environment. In our work we studied single JJ isolated from the environment by the superinductors made of strongly disordered Aluminum. The superinductors have been fabricated as nanowire meanders with small in-plane dimensions (i.e. small parasitic capacitance) and the kinetic inductance up to 2 µH. We have measured the microwave response of the current-voltage characteristics of junction with the normal-state resistance around 3 kΩ. We observed further reduction of the critical current when the microwave frequency is at the frequency of meander-junction self-resonance mode. We will discuss this strong suppression of the switching current for Josephson junctions in the high-Z environment, which is in-line with the idea of Q enhancement due to superinductors.
Deep Semantic 3D Visual Metric Reconstruction Using Wall-Climbing Robots

Jinglun Feng, Liang Yang, Yifeng Song, Haiyan Wang, Jizhong Xiao

Biography:

Jinglun Feng is a currently Ph.D. candidate at the City College of New York, City University of New York under the supervision of Prof. Jizhong Xiao at the CCNY Robotics Lab. He had his Master’s degree in Robotics Lab, Shandong University. His research interests include visual Simultaneous Localization and Mapping, indoor navigation for mobile robots based on sensor fusion, Non-Destructive Evaluation based on Ground Penetration Radar, 3D underground targets migration and deep inspection for construction. He interned at Geophysical Survey System. Inc. at 2019 summer, where he was developing a 3D GPR migration system.

Abstract:

Ground Penetrating Radar (GPR) is one of the most important non-destructive evaluation (NDE) devices to detect the subsurface objects (i.e. rebars, utility pipes) and reveal the underground scene. One of the biggest challenges in GPR based inspection is the subsurface targets reconstruction. In order to address this issue, this paper presents a 3D GPR migration and dielectric prediction system to detect and reconstruct underground targets. This system is composed of three modules: 1) visual inertial fusion (VIF) module to generate the pose information of GPR device, 2) deep neural network module (i.e., DepthNet) which detects B-scan of GPR image, extracts hyperbola features to remove the noise in B-scan data and predicts dielectric to determine the depth of the objects, 3) 3D GPR migration module which synchronizes the pose information with GPR scan data processed by DepthNet to reconstruct and visualize the 3D underground targets. Our proposed DepthNet processes the GPR data by removing the noise in B-scan image as well as predicting depth of subsurface objects. For DepthNet model training and testing, we collect the real GPR data in the concrete test pit at Geophysical Survey System Inc. (GSSI) and create the synthetic GPR data by using gprMax3.0 simulator. The dataset we create includes $350$ labeled GPR images. The DepthNet achieves an average accuracy of $92.64\%$ for B-scan feature detection and an $0.112$ average error for underground target depth prediction. In addition, the experimental results verify that our proposed method improve the migration accuracy and performance in generating 3D GPR image compared with the traditional migration methods.
Unified Spherical Optimal Transport

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Biography:

Xin Qi is a PhD student at Computer Science department, Stony Brook University. His research interests are computational geometry, computer graphics, computer vision and medical imaging. He got his Bachelor degree from Beijing Institute of Technology and Master degree from Hough Graduate School of Business, University of Florida. He has been a research assistant in Stony Brook University, a research fellow in Tsinghua University, Capital Normal University and Harvard University Center of Mathematical Sciences and Applications.

Abstract:

Optimal transportation (OT) problem aims at finding the most economical way to transform one probability measure to the other, which plays a fundamental role in many fields, such as computer graphics, computer vision, machine learning, geometry processing and medical imaging. We introduce a novel theoretic framework and computational algorithms to compute the optimal transportation map on the sphere with various cost functions. Constructing with a variational principle approach, our spherical OT problem is carried out by solving a convex energy minimization problem and building a spherical cell decomposition.

In theory, we unify the spherical optimal transport with various cost functions and propose a general framework to solve such problems. In specific, we provide rigorous proof of the existence and uniqueness of solutions to such problems with two different cost functions and propose efficient algorithms using the variational framework. These two specific cost functions lead the optimal transport problem to the famous Alexandrov’s problem and the popular reflector antenna design problem.

Our experimental results on a variety of models demonstrate efficacy and efficiency of the proposed methods. From the algorithms, we generate area-preserving parameterization for topological spherical surfaces and obtain the convex embedding for the surfaces with certain curvature given (Alexandrov’s Problem). We also provide precise design of a reflector surface with specific far field patterns (reflector antenna problem). Moreover, for medical imaging purposes, our algorithms can provide meaningful parameterization for brain imaging, and can be used to extract shape related features for malignant lung nodule detection.
A Single-Vector Approach to Hypercholesterolemia Gene Therapy With AAV- Cas13d

Author: Shuqi (Nancy) Wang, New York University, sw3787@nyu.edu
Mentor: Alexander Brown, University of Massachusetts Medical School, Alex.Brown@umassmed.edu

Biography:

I’m a junior in NYU major in psychology in pre-med track. I want to be a doctor and now interested in participating in a different kind of lab to explore my interest in the science and medical field. In the summer of 2018 and 2019, I did research on gene therapy of plasmid AAV at the Horae Gene Therapy Center of the University of Massachusetts Medical School, to help the Lab find a more efficient way to overcome the hypercholesterolemia. Through the experiments I did in these two years, the results demonstrate my gene of interest Cas13d is actually work more efficiently than other subtypes under Cas13 that had been done, but further researches are required to get stronger evidence. I also intern as a physician’s assistant at Duke Medicine Pavilion in August of 2018, I assisted and shadowed physicians and nurses in patient diagnosis and medical procedures, also ensured patient and family questions and needs were promptly taken care of.

I have a non-profit organization “Global Arts for Venture Inc” to raise the money by having artworks auction online donated by art schools in Long Island and cooperate with Long Island Care to donate the money to the foundation for the children who need treatments but the family have poor economic status. NYU as a diverse community, I participated in the NYU Residential Hall Council for two tears as a Director of Recognition and Development to meet different people and make sure E-broad member is on their task and works smoothly and efficiently which fulfill my leadership experiences.

Abstract:

Hypercholesterolemia is the presence of high levels of cholesterol in the blood. High cholesterol can limit blood flow, increasing the risk of heart attack or stroke. The problem of hypercholesterolemia is that cholesterol combines with ApoB form LDL(low-density lipoprotein) which is “bad” cholesterol because it contributes to fatty buildups in arteries (atherosclerosis). This condition narrows the arteries and increases the risk for heart attack, stroke and peripheral artery disease. ApoB100 combines with LDLR(low-density lipoprotein receptor) which is a primary carrier of cholesterol in the blood and is degraded in the lysosome. Pcsk9 binds to LDLR in the luminal secretory compartment and targets LDLR to lysosomes. We used AAV(Adeno-associated virus) gene therapy which is great for monogenic LoF(loss-of-function) diseases. Transgene antibodies, RNAi, and CRISPR may aid in treating GoF(gain-of-function). We want to know whether AAV can be employed for the treatment of more complex diseases and if cholesterolemia serves as a model for adapting AAV quickly and effectively to meet a patient’s specific gene therapy needs. We use Cas13d which is an RNA-guided RNA nuclease and Cas13d enzymes, are prominently SMALLER than other Cas13 subtypes, which is at an average size of 930 aa compared to 1120-1250 aa for other Cas13s, also is facilitating flexible packaging into size-constrained therapeutic viral vectors such as AAV. We designed three gRNA for each gene of interest ApoB and Pcsk9 for Cas13d with hU6-DR30-BbsI Backbone for In vitro testing, after confirming the result we packaging into AAV for further In vivo testing.
Chinese Institute of Engineers, Greater New York Chapter
2019 High School Scholarship Award

Baldwin Chen (陳博聞) is a senior at Ardsley High School. He has been working on a science research project to analyze cross-cancer genome mutual information and determine the statistical significance of empirical data on cancer classification and detection. Under the guidance of Dr. Nianjun Zhou of IBM, Baldwin extracted the prostate cancer sequencing data from The Cancer Genome Atlas (TCGA) to test the viability of fitting machine-learning models to RNA sequencing data, and coauthored a paper that was presented at 2019 BigData Conference. Baldwin is a gold medalist at the Science Olympiad regional finals, and the vice president of his school’s robotics club and academic challenge club. He has also worked as a math tutor at Mathnasium for over a year.

Lucas Lee (李頌天) is a senior at Pleasantville High School. He is very passionate about performing arts and the fields of STEM. Lucas is proficient in 6 musical instruments (piano, violin, trumpet, trombone, mellophone, and French horn), a member of the acapella group and choir, as well as a member in the school’s spring musical production. He also performed with the Greater Westchester Youth Symphony at Lincoln Center in the spring of 2019. Academically, Lucas has received high honors every year, and earned many awards such as outstanding achievement in AP computer science, AP music theory, honors physics, Spanish 5, and wind ensemble. As an active member of Pleasantville Friends of STEM, Lucas serves as a mentor for the middle school Science Olympiad and robotics teams, and a student helper for the elementary school robotics enrichment program. As a National Honors Society member, he also volunteers as a peer tutor, helping out in subjects such as calculus, physics, music, and Spanish. Lucas has participated in the summer high school academic program for engineers (SHAPE) at Columbia University. He plans to study mechanical engineering in college.

Rebecca Lim (林詠雯) is a senior at Briarcliff Manor High School. As a gifted athlete, she has been participating in United States Tennis Association (USTA) junior tournaments since she was 6 years old. Rebecca was selected to train at Billie Jean King National Tennis Center and had represented the United States to compete with top junior players from Canada in 2014 and 2015. Despite being unseeded, Rebecca won the Section 1 girls tennis singles title in her freshman year, and reached the quarterfinals of NYSPHSAA (New York State Public High School Athletic Association) Girls Tennis Championships. As a Section 1 runner-up in her junior year, Rebecca advanced to the semifinals of New York State Championships and led her varsity team to Section 1 champions as well. Through her rigorous tennis training, Rebecca has developed the work ethic that provided her the mental toughness to continuously challenge herself. This summer, Rebecca volunteered at SPARC (Special Program And Resource Connection), where she not only used her artistic talents to design brochures and flyers, but also assisted in organizing therapeutic and recreational activities for people with developmental disabilities.
Julia Lin (林亦勤) is a senior at Ridgefield High School. She is interested in human biology, and aspires to pursue a career in medicine. Julia has participated in Regeneron’s mentorship program, where she shadowed scientists to observe their research on therapeutic proteins. After attending the Inspiring Women in Engineering & Medicine (IWEM) workshop hosted by University of Connecticut, she was further exposed to the field of orthopaedic surgery and plans to complete the training for emergency medical technician (EMT) next summer. Julia is a talented artist. She received the national silver medal and regional gold key from Scholastic Art Awards. As a grand prize winner of the Congressional Art Competition, she also had the distinct honor of having her painting displayed for one year at the U.S. Capitol. Julia leads the cello section in various regional orchestras, and is a co-captain of her club soccer team. On weekends, Julia volunteers as a teacher assistant at Huaxia Chinese School, where she assists in teaching AP Chinese classes, as well as organizing therapeutic and recreational activities.

Erxi Lu (陸瑞希) is a senior at Riverdale Country School. As a child, Erxi was a regular at her mother’s laboratory. She wanted to understand why her mom’s eyes lit up when she was dropping a blue gel into colored liquid. Chasing after the science of magic, Erxi obtained an internship at the pharmacology department of Weill Cornell Medical College. She researched the role of hydrogen sulfide in the development of colorectal cancer. Afterwards, she presented at her school’s science symposium, and was a plenary presenter at Berkeley Carroll’s Science Fair. Erxi obtained a paid research internship at Lisman Labs, where she researched the mechanisms by which estuarine life adapts to an increasingly urban environment. After her internship, she was accepted into a Weill Cornell Medicine program for young women interested in biology and medicine. In addition, she learned how to become a successful businesswoman at a summer program in the Indiana University Kelley School of Business. Erxi is a semifinalist for National Merit Scholarship, and she has served as a peer assistant leader, peer tutor, swim coach, and teaching assistant for Chinese school.

Annie Ma (馬安妮) is a junior at Friends Seminary. She is interested in STEM, particularly engineering, as well as advocating for women’s rights. This year, she was featured in an interview on Sinovision’s Teen Talent Show and talked about breaking barriers for women in STEM. During the interview, Annie offered her thoughts about redefining the gender roles in scientific fields as well as breaking the stigma regarding women in STEM. She is also a part of the programming club and Model UN team at her school. Annie is taking AP chemistry, AP US history, and AP psychology this year, which she finds profoundly interesting and stimulating. Aside from STEM, she also plays the guzheng and has performed at Carnegie Hall. Annie won the first prize at the 2019 Global Talent Show & Lincoln Center Awards Concert, and the grand prize at the 2015 Asian Traditional Performing Arts Competition. This summer, Annie volunteered at her guzheng school and subsequently began teaching lessons on the weekends. Annie also started a club this year in partnership with the organization Girl Up. It is the first volunteer and service based club at her school to promote education and gender equality for women around the globe.
Nicholas Shen (沈善杰) is a junior at Great Neck South High School. Like many other American-born Chinese children, Nick was given violin and piano lessons at a young age. His parents hoped that he could develop his innate musical talent and become a piano prodigy someday. However, as luck would have it, Nick found his passion for diving instead. At the age of ten, he discovered that diving is something that he really enjoyed and was good at. During his first tryout session, Nick looked around the pool in awe as the sounds of the board echoed around the room. After practicing the basic skills for a month, his coach decided to let him attempt a front flip. Little did he know that the impact of the water could cause so much pain. He started off the board and tucked while closing his eyes. Bam! His back felt as if it was on fire. After five excruciating, but exciting years of training alongside his New York Dive Club teammates, Nick is now a two-time Nassau County diving champion, and a three-time qualifier for the USA Diving Junior Nationals. Selected as one of the top 100 All-America one-meter boy divers by the National Interscholastic Swim Coaches Association (NISCA) in 2019, Nick plans to continue diving in college.

Brandon Shih (石育融) is a junior at Rhinebeck High School. He values academics, athletics, and Chinese culture. Due to his interest in Chinese culture, he has practiced and won many awards in Chinese yoyo, Chinese calligraphy, and Chinese painting. Most notably, Brandon was invited to perform Chinese yoyo at the CIE Centennial Convention in 2017. He is also a member of Formosa Association of Student Cultural Ambassadors and received the President’s Volunteer Service Award in 2018 and 2019. Academically, Brandon has been on the high honor roll in high school and received an academic scholarship award from the Association of Chinese Schools. Athletically, he has achieved the rank of third-degree black belt in martial arts, and been a member of the varsity cross country and crew team. Brandon started playing the piano at the age of five and the trumpet at the age of ten. He enjoys music and regularly performs with the Rhinebeck High School band, youth orchestra, American Legion Band, jazz band, and pit band. With his strong interest in science and technology, Brandon plans to study engineering and applied sciences in college.

Alex Xin (辛孟轩) is a senior at Arlington High School. Since a child, Alex has been a different type of exceptional. He wasn’t the best athlete on his swim team, the most talented musician in the marching band, or even the smartest student in his class. What distinguishes him from his peers is his self-driven work ethic. As a national AP scholar and the top-ranked student in his class, Alex received the IEEE first prize award for his science research on “novel method to create cryptographically secure random number generators” at the Dutchess County regional science fair. He also serves as the president of student government, vice president of Future Business Leaders of America chapter, and club president and national field ambassador of American Red Cross Youth. Alex is not obsessed with perfection, but he always strives for personal excellence to reach his full potential.
Richard Yan (顏睿奇) is a junior at Edgemont High School. He shows great passion and talent in music and performing arts. Richard plays piano, guitar, trumpet and percussion, sings in Edgemont’s vocal Jazz ensemble, and acts in the school musical. Years of practice have earned him seven awards in international competitions in piano and voice, with five performances in Carnegie Hall. Richard has also built his YouTube channel “ShredderFTW”, which currently has about 250,000 subscribers and more than 40 million views worldwide. He has made over 520 videos in four years, including music videos, short films, and skits with friends as actors. He produced, edited and performed in these videos himself. Richard initially created this community online to interact with people around the world. Now, he is happy to be able to spread positive energy and laughter to an international fan base daily. Recently Richard has also taught himself music production. The five music videos that he has showcased on his YouTube channel, where he covers popular music, have accumulated over 240,000 views and 5,000 likes. He also dabbles in songwriting and has written two original scores so far.

Joanna Zhao (趙佳淇) is a senior at Bronx High School of Science. Although she was born premature, and had suffered from speech impediment in her childhood, Joanna has grown both physically and mentally to overcome various developmental challenges. She has been swimming since she was six years old and currently serves as the captain of Bronx Science girls’ varsity swim team. She also completed 9 years of Chinese school, and has been working as a volunteer teaching assistant at the Huaxia Central Chinese School. Joanna received the New York Yankees youth leadership award for her community service at local libraries. She also completed lifeguard and CPR training, and worked as a lifeguard for the New York City Department of Parks & Recreation in the past summer. Joanna is a National Merit Scholarship semifinalist, and plans to major in biology in college. She hopes to pursue a career in sports medicine, which specializes in the prevention and treatment of sports injuries.
2019 CIE Convention Banquet Student Performance and Presentation

Brandon Shih – Chinese yo-yo

Erxi Lu – Establishing recognition for Asian Pacific American Heritage Month

Nicholas Shen – Diving by Nicholas Shen

Julia Lin – Cello solo
Cello Suite No. 1, IV. Allegro .............................. Ernest Bloch

Baldwin Chen – Tech show and tell

Annie Ma – Chinese harp solo
Fantasia (幻想曲)

Alex Xin – 18 years Alex Xin

Rebecca Lim – Paintings showcase

Richard Yan – Guitar singing
Perfect ................................................................. Ed Sheeran

Joanna Zhao – Lifeguard on the Beach

Lucas Lee – Piano solo
Fantaisie-Impromptu ........................................ Frédéric Chopin