KEYNOTE SPEAKER

OCTOBER 21 | MONDAY | 08:20-09:20

Prof. Keshab K. Parhi, IEEE Fellow, AAAS Fellow
University of Minnesota, USA

Bio: Keshab K. Parhi received the B.Tech. degree from the Indian Institute of Technology (IIT), Kharagpur, in 1982, the M.S.E.E. degree from the University of Pennsylvania, Philadelphia, in 1984, and the Ph.D. degree from the University of California, Berkeley, in 1988. He has been with the University of Minnesota, Minneapolis, since 1988, where he is currently Distinguished McKnight University Professor and Edgar F. Johnson Professor of Electronic Communication in the Department of Electrical and Computer Engineering. He has published 650 papers, is the inventor of 30 patents, and has authored the textbook VLSI Digital Signal Processing Systems (Wiley, 1999) and coedited the reference book Digital Signal Processing for Multimedia Systems (Marcel Dekker, 1999). His current research addresses VLSI architecture design of machine learning systems, hardware security, data-driven neuroscience and molecular/DNA computing. Dr. Parhi is the recipient of numerous awards including the 2017 Mac Van Valkenburg award and the 2012 Charles A. Desoer Technical Achievement award from the IEEE Circuits and Systems Society, the 2004 F. E. Terman award from the American Society of Engineering Education, the 2003 IEEE Kiyo Tomiyasu Technical Field Award, the 2001 IEEE W. R. G. Baker prize paper award, and a Golden Jubilee medal from the IEEE Circuits and Systems Society in 1999. He served as the Editor-in-Chief of the IEEE Trans. Circuits and Systems, Part-I during 2004 and 2005. He was elected a Fellow of IEEE in 1996 and a Fellow of the American Association for Advancement of Science (AAAS) in 2017.

TALK ON

Machine Learning and Deep Learning Systems: Low-Energy VLSI Architectures and Applications

Abstract: Machine learning and data analytics continue to expand the fourth industrial revolution and affect many aspects of our lives. This talk will explore machine learning applications in data-driven neuroscience, and low-energy implementations of machine learning and deep learning systems. Data-driven neuroscience can exploit machine learning approaches including deep learning to generate hypotheses associated with biomarkers for specific neuro-psychiatric disorders. In the first part, I will talk about use of machine learning to find biomarkers for epilepsy. In the second part of the talk, I will talk about approaches for energy-efficient implementations for both traditional machine learning and deep learning systems. I will talk about the roles of feature ranking and incremental-precision approaches in reducing energy consumption of traditional machine learning systems. I will then talk about reducing energy consumption in deep learning systems. I will describe our recent work on Perm-DNN based on permuted-diagonal interconnections in deep convolutional neural networks and how structured sparsity can reduce energy consumption associated with memory access in these systems.

KEYNOTE SPEAKER

OCTOBER 22 | TUESDAY | 08:20-09:20

Prof. Deming Chen, IEEE Fellow
University of Illinois at Urbana-Champaign, USA

Bio: Dr. Deming Chen obtained his BS in computer science from University of Pittsburgh, Pennsylvania in 1995, and his MS and PhD in computer science from University of California at Los Angeles in 2001 and 2005 respectively. He joined the ECE department of University of Illinois at Urbana-Champaign in 2005 and has been a full professor in the same department since 2015. His current research interests include system-level and high-level synthesis, machine learning, GPU and reconfigurable computing, and hardware security. He has given more than 110 invited talks sharing these research results worldwide. He obtained the Arnold O. Beckman Research Award from UIUC in 2007, the NSF CAREER Award in 2008, and eight Best Paper Awards. He also received the ACM SIGDA Outstanding New Faculty Award in 2010, and IBM Faculty Award in 2014 and 2015. In 2017 and 2019 respectively, he led a team to win the first place of DAC International System Design Contest in the IoT domain. He is included in the List of Teachers Ranked as Excellent in 2008 and 2017. He is the Donald Biggar Willett Faculty Scholar of College of Engineering, an IEEE Fellow, an ACM Distinguished Speaker, and the Editor-in-Chief of ACM Transactions on Reconfigurable Technology and Systems (TRETS). He is also involved with several startup companies, including co-founding Inspirit IoT, Inc. in 2016.

TALK ON

Cognitive Computing on Heterogeneous Hardware Systems for the AI Revolution

Abstract: Many envision that AI (artificial intelligence) will usher in the next iteration of technology revolution, where humans and machines will work side-by-side to augment, enhance, or accelerate our ability to analyze, learn, create, and think. There are successful stories emerging fast already, such as IBM Watson, Microsoft HoloLens, and Google AlphaGo. One essential component to enable the new AI revolution is IoT (Internet of Things). Cognitive computing can learn from the rich IoT data, reason from models, and most importantly interact with us to perform complex tasks (ranging from healthcare to education to financial services) better than either humans or machines can do by themselves. Meanwhile, high-performance computing would be of paramount importance to help achieve the grand vision of cognitive computing. In this talk, Prof. Chen will share his recent research results on machine learning, reconfigurable computing, GPU computing, and cognitive application benchmarking. He will also present his recent work on extremely fast software and hardware modeling and the automated software/hardware co-design for accelerating cognitive computing workloads. Compelling AI applications will be introduced as well, such as autonomous driving and facial recognition.

KEYNOTE SPEAKER

OCTOBER 23 | WEDNESDAY | 08:20-09:20

Sunny Zhang, Principle Engineer

Director of Communication Infrastructure Research, Intel Labs China

Bio: As principle engineer and director of communication infrastructure research in Intel labs China, Sunny is 15 years veteran on wireless communication system and wireless signal processing design. Sunny initialized and led Intel multi-radio coexistence, digital enhanced radio and Cloud Radio Access Network research effort, developed the first highly optimized LTE stacks on general purpose architecture, the first scalable and high performance Cloud RAN BBU pool reference design, which became Intel FlexRAN 4G and 5G product, widely used by cellular industry. Sunny leads Intel Lab China's 5G research on Radio Access Network architecture, proposed 5G low layer split massive MIMO solutions, widely adopted by industry. Sunny also leads Intel lab China team designing high performance programmable wireless processor to achieve efficiency and programmability at the same time. Sunny and his team received 1 Intel lab Gordy Award, and Intel Achievement Award in Intel, which are the highest award in Intel lab and Intel.

Prior joined Intel, Sunny was as the physical layer architect, designed the first passive optical network in 2001. From 2002 to 2004, he was at startup companies in Silicon Valley, and responsible for optical devices and RFID devices design.

Sunny got bachelor and master degree in Tsinghua University and Beijing University of post and telecom communication respectively. Published 10+ papers and filed 10+ patents.

TALK ON

Wireless Signal Processing at AI Era

Abstract: About 8 years ago, there were one paper asked the question and talked about "is PHY research dead?", of course, you can imagine that the conclusion from a wireless researcher definitely will be not, the paper also proposed quite a few innovation directions, such as short code, impairments of mmWave which are actually the key features of 5G now, which also talked about "wireless research is not as vibrate as before", "implementation" should be taken more attentions. 8 year later, if we revisit this question, we see the trend that wireless system become extremely complex on the standard and also implementation, industry wants to re-shape the wireless eco-system with open architecture and interface, power efficiency and higher frequency became the focal point of wireless implement, for signal processing side, AI technology is emerging which become another toolbox for wireless research but the directions are not clear on what can be done and what should done. In this talk, will talk about the problem in wireless system, where AI techniques can be applied such as on channel estimation, on MAC scheduler, on massive MIMO beamforming, the possibility and challenge to bring that into reality, as well as from design perspective, how could we apply wireless signal processing + AI processing together to solve practical problem on radar sensing, how can we combine wireless processing and AI processing together on same processor.