IEEE CASS
Shanghai Jiao Tong University

IEEE CASS Seasonal School on AI-Driven Circuit, System, and EDA Tools

Shanghai, China
November 2019

Main/Co- Organizers:
Associate Professor Yongfu Li & Associate Professor Jiang Li
Publication Coordinator:
Assistant Professor Mingyi Chen
Publicity Coordinator:
Assistant Professor Jian Zhao (Chinese) & Assistant Professor Nabil Sabor (English)
IEEE CAS Local Chapter Chairperson:
Professor Peilin Liu
IEEE CAS Shanghai SJTU Student Branch Chairperson:
Xinzi Xu

Circuit Program Track Coordinator:
Assistant Professor Jian Zhao
EDA Program Track Coordinator:
Associate Professor Jiang Li

Local Arrangement Student Coordinator:
Yuhang Zhang, Li Cen
Registration Student Coordinator:
Yi Ma

Location:
Shanghai Jiao Tong University, No. 800 Dongchuan Road, Minhang District, Shanghai, China

Website:
https://www.idesign-ic.com/seasonal/seasonal-school
Photos:
https://pan.baidu.com/s/1XamHsd2TFXtYAojtADfDtw#list/path=%2FSeasonal%20School%20photo

IEEE CASS Seasonal School on AI-Driven Circuit, System and EDA Tools

Artificial Intelligence (AI) is driving the new revolution in all industries, creating a profound impact on all aspects of our lives. AI discipline ranges from hardware acceleration, energy-efficient system architecture, design methodology, and tools, emerging devices, to neuromorphic computing, algorithms, and applications.

As a result, a continuous wave of innovations in circuit architecture, computing platforms, software algorithms, and system applications has emerged to support and power the AI technology. To further accelerate the growth in this interdisciplinary and cross-disciplinary field, it is important to provide educational opportunities to our IEEE members and students in China.

According to the white paper from “China’s IC industry talents (2017-2018), the number of employees in China’s IC industry is about 400,000 and is expected to grow to 720,000 by 2020. The growth in the IC industry is inseparable from its local talents. Therefore, in this year, during the National Committee of the Chinese People’s Political Consultative Conference, the China government official has officially elevated the IC design discipline as the first level education discipline to address the shortage of related talents in the industry.

As a key leader in the AI field, IEEE CAS society embraces a wide range of AI-related disciplines. IEEE CASS can facilitate interaction among aspiring students, early-stage researchers, scientists, and engineers. The first IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS), which was held in March 2019 in Hsinchu, Taiwan, serves as the best platform allowing scholars, technological researchers, and industry from both domestic and international communities to exchange experiences, demonstrate their studies and further advance AI technologies on circuits and systems.

To promote our IEEE CASS vision in fostering interdisciplinary and cross-disciplinary talents and provide educational opportunities to our IEEE members and students in China, we aim to organize the “IEEE CASS Seasonal School on AI-Driven Circuit, System and EDA Tools” in Region 10, Shanghai, China. Shanghai being the epic-center of AI research and development and product development, is one of the best locations to promote our IEEE CASS and AI-discipline. In our first inaugural seasonal school, we aim to foster a productive industry-academia collaboration program in the field of AI Circuit and System. This event is led by the Department of Micro and Nano Electronics Engineering at the School of Electronics, Information and Electrical Engineering, Shanghai Jiao Tong University, China. We have engaged with several industry partners such as Cadence Inc, National Instrument, Soliton, and Digilent to support this education program.

The seasonal school prepares our members with the technical and practical skills to understand and design a broader range of circuits and systems, in the field of AI, spanning from understanding the design of energy-efficient neuromorphic computing

architecture to signal processing/deep learning and system evaluation. Furthermore, this program allows a good balance between academia and industry and combined with a judicious selection of worldwide distinguished Lecturers. The local industry partners will provide practical skill training to our participants and increase their proficiency before entering the workforce and graduate education.

Program Outline

For our seasonal school, we have organized the event into 2 parallel sessions over 3 days, covering the different aspects of our theme, namely, “circuits and systems” and “Signal Processing & EDA and Testing.” We invited our IEEE CAS distinguished lecturers several industry speakers. In total, we have over 200 students registered for our event. More details are available in our design school website:

https://www.idesign-ic.com/seasonal/seasonal-school

Track #1	Track #2
Prof. Arindam Basu Lecture: Low-power Adaptive Neuromorphic Systems: Device, Circuits, Algorithms and Architectures	Professor Hai “Helen” Li Lecture: Brain Inspired Computing: The Extraordinary Voyages in Known and Unknown Worlds
Professor Keshab Parhi (DLP) Lecture: Brain Inspired Computing: Low-Energy Neuromorphic Computing Accelerator Architectures	Professor Kejie Huang Lecture: In Resistive Memory Computing for Neural Network Processors
Professor Jun Zhou Lecture: Brain Inspired Computing: Low Power Smart Sensor Node Processor Design	Professor Rui Yan Lecture: Neuromorphic Computing Approaches for Learning, Memory and Cognition
Professor Fengwei An Lecture: Energy-efficient VLSI Design of Image Recognition and Machine Learning Algorithms for Automotive Applications	Dr. Yifan Qu, Cadence Inc. Lecture: Intelligent System Design and Artificial Intelligence in Cadence
Mr. Haijiao Ni, National Instruments Inc. Lecture: ADC Testing with PXI Instruments and System	Mr. Hao Zhou, Shanghai Gubo Tech Lecture: The Challenge of Mixed-Signal IC Testing

Venue

The venue was held in the Shanghai Jiao Tong University. The University is located at No. 800 Dongchuan Road, Minhang District, Shanghai, China

Sponsors and Acknowledges

Organizing School:

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IEEE CASS Seasonal School on

AI-Driven Circuit, System, and EDA Tools

Shanghai, China November 2019

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Day 1

Prof. Arindam Basu

Low-power Adaptive Neuromorphic Systems: Device, Circuits, Algorithms and Architectures

Prof. Helen Li

Brain Inspired Computing: The Extraordinary Voyages in Known and Unknown Worlds

Day 2

Prof. Keshab K. Parhi

Brain Inspired Computing: Low-Energy Neuromorphic Computing Accelerator Architectures

Prof. Rui Yan

Neuromorphic Computing Approaches for Learning, Memory and Cognition

Prof. Kejie Huang

In Resistive Memory Computing for Neural Network Processors

Prof. Jun Zhou

Brain Inspired Computing: Low Power Smart Sensor Node Processor Design

Day 3

Prof. Fengwei An

Energy-efficient VLSI Design of Image Recognition and Machine Learning Algorithms for Automotive Applications

Dr. Yifan Qu

Intelligent System Design and Artificial Intelligence in Cadence

Mr. Haijiao Ni

ADC Testing with PXI Instruments and system

Mr. Hao Zhou

The challenge of mixed-signal IC testing

人工智能研究院
Artificial Intelligence Institute

IEEE

CAS

cadence
ACADEMIC NETWORK

DIGILENT

NATIONAL INSTRUMENTS

Soliton

Highlight of the events

The list of key organizers and their qualifications.

Fig. 1. Group photo after the opening speech by Professor Yongfu Li on “Introduction to IEEE CASS and Young Professionals”

Fig. 2. Prof. Arindam Basu shared his knowledge on analog/mixed-signal neuromorphic systems, titled: “Low-power Adaptive Neuromorphic Systems: Device, Circuits, Algorithms and Architectures”

Fig. 3. Professor Keshab Parhi presented his lecture on
“Brain Inspired Computing: Low-Energy Neuromorphic Computing Accelerator Architectures”

Fig. 4. Professor Kejie Huang presented neuromorphic systems using emerging memory, titled:
“In Resistive Memory Computing for Neural Network Processors”

Fig. 5. Professor Jun Zhou presented his lecture on
“Lecture: Brain Inspired Computing: Low Power Smart Sensor Node Processor Design”

Fig. 6. Professor Rui Yan presented her neuromorphic systems lecture on
“Lecture: Neuromorphic Computing Approaches for Learning, Memory and Cognition”

Fig. 7. Dr. Yifan Qu, Cadence Inc., presented his EDA lecture on "Intelligent System Design and Artificial Intelligence in Cadence"

Fig. 8. Mr. Haijiao Ni, National Instruments Inc., shared his experienced in "ADC Testing with PXI Instruments and System"

Fig. 9. Ph.D. student from USTC asked questions related to the usage of Cadence EDA tool to design his custom library.

Fig. 10. Professor Yongfu Li presented a token of appreciation and certificate to Professor Arindam Basu

Fig. 11. Professor Yongfu Li presented a token of appreciation and certificate to Professor Rui Yan

Fig. 12. Professor Yongfu Li presented a token of appreciation and certificate to Mr. Haijiao Ni

Fig. 13. Professor Jian Zhao presented a token of appreciation and certificate to Professor Kejie Huang

To conclude, we have successfully organized our first inaugural industry-academia IEEE CASS R10 Seasonal School in Shanghai. We hope that this event has helped to our students to gain better understanding in artificial intelligence, and hope that they will be the next generation of driving force in the development of AI technology.