The Vibrant Field of Parallel and Distributed Computing
—Scan the Special Issue in Honor of
Professor Kai Hwang's 80th Birthday

It is my great pleasure to write this editorial for the special issue in honor of Professor Kai Hwang's 80th birthday. The articles are written by Professor Hwang's academic descendants and colleagues, to pay tribute to his decades of contributions to the vibrant field of parallel and distributed computing.

Professor Hwang obtained his Ph.D. degree in electrical engineering and computer science in 1972, from the University of California at Berkeley. He taught for 44 years at Purdue University and the University of Southern California. He currently serves as Presidential Chair Professor of Computer Science and Engineering at the Chinese University of Hong Kong (Shenzhen). In his five decades of academic career, Professor Hwang has supervised 21 Ph.D. students, authored 10 textbooks, and published over 260 scientific papers. He served as the founding Editor-in-Chief of the Journal of Parallel and Distributed Computing (JPDC), an influential international journal in this field.

A much-told tale in China's computer science community is that in 2005, 2009 and 2018, the China Computer Federation (CCF) conferred its prestigious Outstanding Achievement Award (Award for Overseas Outstanding Contributions) to Kai Hwang, his Ph.D. student Lionel Ni, and Ni's Ph.D. student Xian-He Sun. This special issue shows a deeper academic lineage of five generations: Hwang-Ni-Sun-Cameron-Ge.

Lionel Ni serves as Chair Professor and Founding President of the Hong Kong University of Science and Technology (Guangzhou). He contributes two papers to this special issue. First, Ni's team presents HXPY, a parallel computing software package for financial time-series data processing, that is orders of magnitudes faster than its counterparts. Second, Ni and his colleagues present a comprehensive and timely survey on ubiquitous WiFi and acoustic sensing researches, a growing subfield of distributed computing.

Xian-He Sun is a University Distinguished Professor at the Illinois Institute of Technology and the Editor-in-Chief of IEEE Transactions on Parallel and Distributed Systems. His team has contributed a comprehensive review of the memory-bounded speedup model, which is called Sun-Ni's Law in Kai Hwang's textbooks.

Kirk W. Cameron is a professor at Virginia Tech and a pioneer in green HPC. His team presents a retrospective on scalability beyond Amdahl's Law, especially how power-performance measurement and modeling at scale influenced server and supercomputer design.

Rong Ge is a Dean's Distinguished Professor in the School of Computing at Clemson University. Her team has devised a vision called the paradigm of power-bounded HPC, which is different from previous low-power computing and power-aware computing paradigms.

Interestingly, three other first-generation Ph.D. students of Professor Hwang have also contributed to this issue. Zhi-Wei Xu is a professor at the University of Chinese Academy of Sciences and the Editor-in-Chief of the Journal of Computer Science and Technology. His team presents Information Superbahn, a perspective on future computing utility with low entropy and high goodput characteristics.

Another academic star spawned by Hwang is Ahmed Louri, a Chair Professor at George Washington Univer-

sity and the Editor-in-Chief of IEEE Transactions on Computers. His team presents GShuttle, a graph convolutional neural network acceleration scheme that minimizes off-chip DRAM and on-chip SRAM accesses.

Yet another is Dhabaleswar K. Panda, a professor at Ohio State University and an influential HPC expert. His MVAPICH software has been used by thousands of organizations worldwide. His team is credited with a cutting-edge study of communication performance on the world's first exascale supercomputer with the most recent interconnect (Slingshot).

Not to be overlooked are two other second-generation Ph.D. students who have contributed review articles. Yun-Hao Liu is a Chair Professor at Tsinghua University, Beijing, and the Editor-in-Chief of ACM Transactions on Sensor Network. His team has presented a timely survey of clock synchronization techniques for Industrial Internet scenarios.

Xiaoyi Lu is an assistant professor at the University of California at Merced. His team has come up with a comprehensive survey on xCCL, a host of industry-led collective communication libraries for deep learning, and has answered why the industry has chosen xCCL instead of classic MPI.

The parade of Hwang-nurtured talents is hardly complete without Hai Jin as a representative of many postdoctorals who worked with Professor Hwang. Dr. Jin is a Chair Professor at Huazhong University of Science and Technology and a co-Editor-in-Chief of Computer Systems Science and Engineering, an open-access journal. His team has invented a new method for Chinese entity linking, a natural language processing problem that is important workload for parallel and distributed systems.

Wei-Min Zheng is a professor at Tsinghua University, Beijing, and a past president of China Computer Federation. It is he who, being a long-time colleague, has translated Hwang's textbook into Chinese. His team has devised a perspective on unified programming model for heterogeneous high-performance computers, a fundamental issue of future parallel and distributed computing.

Guest Editor

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Guo-Jie Li received his B.S. degree in physics from Peking University, Beijing, in 1968, his M.S. degree in computer science from University of Science and Technology of China, Hefei, in 1981, and his Ph.D. degree in electrical engineering from Purde University, West Lafayette, in 1985. He is an academician of Chinese Academy of Engineering and a former director of Institute of Computing Technology, Chinese Academy of Sciences, Beijing. His main research interests include high-performance computer architecture and high-performance computing.