

IEEE SSCS Singapore Chapter and Institute of Microelectronics Organize a Short Course on Many-Core System-on-Chip

On 20 August 2018, the IEEE Solid-State Circuits Society Singapore Chapter and the Institute of Microelectronics, A*STAR sponsored the one-day short course “Many-Core System-on-Chip (SoC),” by Dr. Vivek De, Fellow, Intel, at the Institute of Microelectronics’ Science Park II site. De began the short course with an introduction of the performance evolution of microprocessors and semiconductor technology and how the slowing of Moore’s law as well as Dennard scaling motivated the multicore and many-core architectures. He noted that, in many-core architectures, thread-level and processor-level parallelism are of significant importance.

De discussed the challenges faced in the successful development of many-core designs, such as the need for a wide dynamic operating voltage range, process and temperature variation, aging, power management, and network-on-chip (NoC). He presented techniques that address these challenges, such as multivoltage caches, near-threshold-voltage designs for peak energy efficiency, scalable NoC routing, power gating, and finally, fine-grain power management, in which integrated voltage regulators are poised to be an enabler of the highest efficiency.

De concluded the short course by explaining that, as the control of many-core chips becomes even more fine-grained, it is no longer just an IC design problem; instead, it is a problem that requires cooperation from software stacks (e.g., operating systems), low-level library functions, and awareness of these fine-grained controls at the application layer to fully exploit the advantages of many-core systems.

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Dr. Vivek K. De presents a short course, “Many-Core System-on-Chip (SoC).”



The audience interacts with Dr. De.



Dr. De (center) with attendees of the short course.

Throughout the short course, there were active interactions between De and the 33 attendees from local industry and academia communities such as ST Microelectronics; Huawei Technologies; Infineon; MediaTek; the Institute of Microelectronics, A*STAR; Institute of Inforcomm Research; the Institute of High Performance Computing; the National University of Singapore; Nan-

yang Technological University; and the Singapore University of Technology and Design.

—Jiang Wenyu
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—Wang Chao
Chair, SSCS Singapore Chapter