

**HiPC 2018 EduHiPC Workshop**  
**December 17, 2018 – Bengaluru, India**  
**Invited Talk – Curricular Innovations and Adoption**

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**Title: Role of Concurrency and Distributed Programming in the Era of Blockchains, PGAS, GPUs**

**Abstract**

Blockchains have revolutionized building complex financial management systems. They satisfy three important properties, like distributed, public and immutable, that has made it an ideal candidate for enabling interaction among untrusted agents without banking on trusted third parties. To enable speedy realization, the notion *smart contracts* has emerged for which programming languages like Solidity have been proposed and deployed. The smart contracts are founded on various concepts of distributed programming, concurrency as well as parallelism. Thus, the introduction of blockchains has made it necessary to update the curriculum needs of high-performance computing as blockchains represent a huge application of HiPC. In the talk, we shall highlight conceptual topics needed for programming HiPC that cater to classical HiPC (that include MPI, GPUs, GPGPUs, programming language families like partial global address programming languages (PGAS)) and blockchains.

**Bio**

R K Shyamasundar is a Fellow of IEEE, a Fellow of ACM, Distinguished ACM Speaker, a Distinguished Alumnus of Indian Institute of Science, served as IEEE Distinguished Speaker, is currently JC Bose National Fellow, Distinguished V. Professor at the Department of Computer Science, IIT Bombay where he is the principal investigator of the Information Security Research and Development Centre (ISRDC) from Ministry of Electronics and Information Technology (MeiTY) from the Govt. of India and also directs the Centre of Excellence by Ripple. He was awarded the 2014 SN Mitra award for excellence in research by the Indian National Academy of Engineering. Since 2015, he holds the distinguished position of Scholar-in-Residence at IIT Jodhpur. He is the founding Dean of the School of Technology and Computer Science at TIFR. He has made outstanding contributions to Real-Time Distributed Computing, Logics of Programs, Network and Computer Security. His research interests include distributed real-time systems, Logics of Programs, Concurrent and Parallel programming Languages, Formal Methods, Cyber Security etc. He has more than 300 publications, 8 books, 8 international patents, 3 Indian patents, and 3 Best Paper Awards. Thirty-five students have completed Ph.D. under his guidance, has served on IEEE Esterel Standards and served as consultant to ESPRIT projects. He did post-doctoral work under the legendary Turing Laureate Professor Dr. Edsger W. Dijkstra and was a Distinguished Visiting fellow under the UK Royal Academy of Engineering at the Computing Laboratory of University of Cambridge. He has also served as a Distinguished

Visiting Fellow by the UK Royal Academy of Engineering in 2016 at the City University of London. He has served as Faculty/Staff at IBM TJ Research, Eindhoven University, State University of Utrecht, Pennsylvania State University, University of Illinois, University of California at San Diego at Lajolla, University of Cambridge, University of Linkoping, SUNU at Albany, UNM at Albuquerque, IRISA, INRIA, CWI, JAIST Japan, Max Planck Institute, IBM Research India etc.

He was Founding Chair of conference series Foundations of Software Technology and Theoretical Computer Science (FSTTCS), founding President of Indian Association of Research in Computing Science (IARCS.), founding Dean of School of Technology and Computer Science and Founder of the Center for Formal Design and verification of Software as a tri-partite center among BARC, TIFR and IIT Bombay) located at IIT Bombay. He serves/served on the Governing Council of IIIT Allahabad, IIIT Jabalpur, CSIR Centre CMMACS (CSIRFPI) Bangalore, serves on the Technical Advisory Board of BSE (Bombay Stock Exchange), and Research Advisory Board for Institute of Development and Research in Banking Technology (IDRBT) of RBI at Hyderabad.

He is a Fellow of Indian Academy of Sciences, Indian National Science Academy, National Academy of Sciences, National Academy of Engineering, India and a Fellow of the Academy of Sciences of the Developing world (TWAS), Trieste, Italy. He serves on the IEEE Fellow selection committee on Product safety. He is also a recipient of Diamond Jubilee medal from IETE and also its' Fellow.

He has served on IEEE Esterel Standards Committee and serves on the Editorial board of Journal of Parallel and Distributed Computing, the Editor-in-Chief for Sadhana- Journal of Engineering Sciences of the Indian Academy of Sciences for the Computing and Data Sciences.