Logic Design of Quantum Circuits and Memristor based Systems

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Overview

There have been significant advances in fabrication and logic design technologies over the last several decades. This has led to the proliferation of battery operated powerful devices and newer applications that have changed the way we communicate and live. Some of the major challenges are to address the power consumption issue in modern-day circuits, and also to provide sustained scalability for future developments.

The proposed course aims to review the evolution of logic design techniques over the decades, and identify the challenges faced by present-day designers. With the research community being excited with the prospect of having quantum computation as a tool in the not-so-distant future, interests in the design and optimization of quantum circuits have picked up in recent times. A sound knowledge in this area will be helpful in the development and implementation of quantum algorithms and systems.

Also with the recent emergence of memristors as the missing fourth fundamental circuit element, various efforts in the fabrication and characterization of these devices are being pursued. Since memristors are capable of storing information as well as manipulating them, they provide a unique platform to develop new logic design methodologies and storage systems. This technology is feasible and already several companies have announced their next generation systems built around memristor technology.

The course participants will be learning these topics through lectures and tutorial sessions. Also assignments will be shared to stimulate research motivation of participants.

Modules	A: **Introductory Module** : **August 8** B: **Logic design using Memristors** : **August 9-10** C: **Quantum Circuit and their Design** : **August 10-12** **Number of participants for the course will be limited to 35.**
You Should Attend if…	▪ you are an electronics / computer science student or research scientist interested to learn logic design aspects of quantum circuits, and also for memristors based systems; ▪ you are a working professional wishing to upgrade your knowledge to the couple of emerging technologies covered as part of the course.
Course Fees	The registration fees for attending the course is as follows: **Industry/ Research Organizations: Rs. 10000** **Academic Institutions:** **Rs. 5000** The above fee include all instructional materials, computer use for tutorials and assignments, and free internet facility. The participants will be provided with single bedded accommodation in hotels on payment basis.

The Faculty

Prof. Robert Wille is a Full Professor in the Institute for Integrated Circuits, Johannes Kepler University Linz, Austria. His research interests include reversible and quantum computing, and development of design technologies with particular focus on the design, verification and test of circuits and systems, for both conventional and emerging technologies.

Prof. Bhargab B. Bhattacharya is a Professor of Computer Science and Engineering in the Advanced Computing and Microelectronics Unit, Indian Statistical Institute Calcutta. His research interests include VLSI design and test, VLSI physical design, nanotechnology and giga-scale integration.

Dr. Kamalika Datta is an Assistant Professor in the Department of Computer Science and Engineering, National Institute of Technology, Meghalaya. Her research interest include reversible and quantum circuit synthesis and optimization, memristors-based system design, and embedded systems.

Course Co-ordinator:

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Venue:

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