Future computing systems will inevitably be built using nanoelectronics or an optoelectronics, i.e., from devices and wires with feature sizes below thirty nanometers. There is a predicts that traditional silicon-based systems will have feature sizes of below 40 nm within the decade. There are also advances being made in building computing systems using new technologies, such as molecular electronics. Successfully harnessing nanoelectronics requires a rethinking of the abstractions and models that are the basis of designing computing systems. While each technology has its own unique requirements, we show that new abstractions are necessary strictly, because the feature sizes are nanoscale. The ever-increasing number of available faster transistors fuels the ever-increasing improvement in processor performance, but a hierarchy of abstractions drives it. The world of solid-state electronics has moved in a growing pace toward fabricated quantum devices starting from the introduction of synthetic super lattices and quantum wells. Extremely small dimensions bring forth the common features of all these low dimensional structures and devices, such that the wave nature of electrons dominates. QW structures with planar contacts do not present problems with input/output. However, recent focus on nanoscale electronic and optodevices with quantum dots runs into some serious problems in the implementation towards an industrial impact led by transistors and ICs. In addition to input-output problem, robustness, and redundancy, etc. must be solved before any system can move from a laboratory experiment to industrial application. This special issue seeks to bring forward and highlight the research challenges of Nanoelectronics and Optoelectronics.

**SUBJECT COVERAGE**

Topics include, but are not limited to, the following:

- Electronic and luminescent nanomaterials
- Magneto-optical and nonlinear optical materials
- Fiber optics, liquid crystals
- Organic and hybrid materials,
- Thin film processing,
- Semiconductor hetero- and nanostructures,
- Assembly and characterization of nanostructures for electronic and optoelectronic applications,
- Molecular electronics.

(Topics should be strictly based on the Research Challenges of Nanoelectronics and Optoelectronics)
GUEST EDITOR(S)

Prof. Dr. B. Nagaraj M.E., Ph.D., MIEEE
Head- Karpagam Innovation Centre
Karpagam College of Engineering
Coimbatore
Tamilnadu India
nagaraj@kce.ac.in

Prof. Dr. Danilo Pelusi,
University of Teramo, Italy
Department of Communication Engineering
Dayeh University
dpelusi@unite.it

Prof. Subramaniam Ganesan
Professor of Electrical and Computer Engineering,
Oakland University
ganesan@oakland.edu

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