

FINAL Report on the IEEE CASS Outreach Initiative 2014.

Event Title: *Developing Inter-disciplinary Education in Circuits and Systems Community.*

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Brief description of the activity: it consisted in four seminars/tutorial presentations and a one-week Ph.D. course that were held at Politecnico di Milano during the period January-October 2014. The subjects of the presentations have been selected among the relevant topics covered by the research journals of the Society. The events have been attended by undergraduate and Ph.D. students as well as by faculties. The total number of people who attended the events is about 140 persons. The slides of the presentations have been collected and made available to CASS. The activity have been announced on the CASS web site, on that of the CASS Italian Chapter, on the web page of the Politecnico di Milano, DEIB, as well as on the web page of "Gruppo Nazionale Ricercatori Elettrotecnica". The single events are described in what follows.

Seminar: January 24th 2014, Number of Participants: 28

Luca Daniel, Massachusetts Institute of Technology: "*Stochastic Simulation, Modeling & Optimization of Complex Systems via Parameterized Model Reduction*"

Fernando Corinto, Politecnico di Torino: "*Introduction to Memristor Technology for Bio-inspired Nanocomputing*"

Federico Bizzarri, Politecnico di Milano: "*Advanced simulation of Analog Mixed Signal circuits modeled as hybrid systems: the PAN simulation environment*"

Seminar: March 6th 2014, Number of Participants: 26

Michael Peter Kennedy, University College Cork: "*Digital Delta-Sigma Modulators*"

Sergio Callegari, Università di Bologna: "*Convex optimization in the design of the noise shaping features of Delta-Sigma Modulators*"

Salvatore Levantino, Politecnico di Milano: "*The Basics of Digital PLLs*"

Seminar: May 23rd 2014, Number of Participants: 26

Ephraim Suhir, Portland State University: "*Probabilistic Design-for-Reliability (PDR) of Photovoltaic (PV) Products: Role and Significance of Predictive Modeling*"

Vito Giannini, IMEC, "*Sensing the World with Millimeter-Waves*"

Seminar: October 10th 2014, Number of Participants: 20

Marco Carminati, Politecnico di Milano: *"High-Resolution Impedance Sensing: Circuits and Applications"*

Lorenzo Codecasa, Politecnico di Milano: *"Novel Feedback Theory of Electric Circuits"*

One-week Course-June 30th-July 4th 2014, Number of Participants: 32

Title: *"Introduction to compact dynamical modeling"*

Teacher: Prof. **Luca Daniel**, Massachusetts Institute of Technology,

Assistant: Dr. **Zheng Zhang**, Massachusetts Institute of Technology.

Short description: Many complex systems developed by engineers (e.g. labs on chips, iPads, magnetic resonance imaging scanners, nationwide electrical/gas/oil transportation network, or buildings/automotive/aircraft frames) or found in nature (e.g. the human cardiovascular system, the brain neural network, biological systems, or the geophysical network of oil/water/gas reservoirs) can be viewed as large collections of interconnected dynamical system components. The performance and characteristics of each individual component critically depend on what engineers or scientists refer to as "second order effects", and can be captured only by resorting to expensive partial differential equation solvers. In addition, components are often affected by random uncertainties in parameters and in geometries. In this course we will survey several techniques for modeling and simulation of a large variety (e.g. aerospace, mechanical, electrical, energy and biomedical) of engineering and physical complex systems.

How the budget was expended.

The budget has been used to cover travel, accommodation and meal expenses for the speakers of the events organization, as follows:

January seminar:	2800 USD
March seminar:	1800 USD
May seminar:	3800 USD
June/July PhD course:	5800 USD
October seminar:	300 USD
Taxes:	1600 USD
Total:	16100 USD