



University POLITEHNICA of Bucharest
Faculty of Automatic Control and Computers

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Prof. Cătălin Buiu

Ph.D. supervisor in „Systems engineering”
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Research profile:

Prof. Buiu is conducting research at the interface of engineering, robotics and natural sciences with the greater goal of a profound understanding of information processing and adaptation mechanisms at biological level and of using these mechanisms to develop software for artificial systems with advanced cognitive and interactive abilities, e.g. for humanoid robots. Prof. Buiu is devoting a special attention to the theory of brain-computer interfaces and their applications in developing highly efficient systems for assistive medicine and human-computer interaction.

The applications of the research conducted by Prof. Buiu and his co-workers refer to the control of swarm robotic systems, to user-humanoid robots interfaces, to programming of humanoid robots to act as social, adaptive, and interactive companions for children, to the development of robotic systems for printing living cells and to the use of natural computing

techniques in bioinformatics.

Ph. D. Supervisor since 2011;

- 1 finished thesis;
- 3 on-going theses;

Scientific publications: 17 monographies / book chapters; 92 journal and conference papers.

Research projects (selection from the last 10 years):

- 2012-2016, ALLSKY, „*Audio-video station for automatic detection of meteors*”, PCCA
- 2013-2016, NEWSWARM, „*Bioinspired techniques for robotic swarms security*”, PCE
- 2008-2011, „*Development of biologically inspired integrated cognitive architectures*”, IDEI
- 2006-2008, 3DRoboVis, „*Development of an autonomous platform that is controlled by using a 3D virtual space generated using stereoscopic vision*”, CEEX

Member of scientific organizations and editorial boards

Member of IEEE, ACM; Academic Editor - PLOS ONE

Proposed research areas for Ph.D. students:

1. Children-humanoid robots interaction – new pedagogical scenarios: we aim at developing new ways for children to interact with humanoid robots using motion sensing devices, detection and recognition of emotions, gestures, and intentions. An example application is the interactive teaching of music using humanoid robots.
2. Distributed control of collective robotic systems: the goal of this project is to use the advantages of membrane systems (P systems), which are parallel and distributed computing models, for designing and developing a control architectures for swarm robotic systems, which would involve the use of enzymatic numerical P systems at inferior levels, hybrid P systems at intermediate levels, and symbolical P systems (P colonies, P swarms, P automata) at superior levels.