# Research and Development Projects
# for Young Researchers

## INTERNAL COMPETITION OF POLITEHNICA UNIVERSITY OF TIMISOARA
## RESEARCH AND DEVELOPMENT PROJECTS FOR YOUNG RESEARCHERS   PCD-TC-2017

Domain - Computers and Information Technology
**POPA Călin-Adrian**
Project title - Complex-Valued Deep Neural Networks
Abstract - Three types of complex-valued deep neural networks will be proposed: convolutional networks, deep belief networks, and long short term memory networks, which will be applied for real-valued and complex-valued image recognition and time series prediction.

Domain - Automation and Applied Informatics
**BOJAN-DRAGOS Claudia-Adina**
Project title - Practical applications of tensor product model transformation-based adaptive control
Abstract - The proposed control techniques combine the advantages of both paradigms involved in the design: simplicity and wide applicability.

Domain - Chemical Engineering, Environmental Engineering, Food Engineering
**CIOPEC Mihaela Elvira**
Project title - New materials chemically modified used for arsenic adsorption from water
Abstract - In full accordance with the principles of sustainable development, the project present an integrated concept of arsenic removal from water using new materials chemically modified by doping with crown ethers and iron ions.

Domain - Electronics, Telecommunications, Nanotechnologies
**POP-CALIMANU Ioana-Monica**
Project title - Multiphase converters for solar energy conversion and battery charging in electric vehicles
Abstract - Two systems for energy conversion are proposed: a solar energy conversion system and a battery-charging system in electric vehicles, both based on two new dc-dc multiphase converter families.

Domain - Electrical Engineering, Powers Systems Engineering
**SIMO Attila**
Project title - LoRa - intelligent infrastructure for communications and decision support in power systems
Abstract - The goal is to create a LoRa pilot infrastructure and to develop performant algorithms for: forecasting electricity consumption, forecasting generated power (photovoltaic) and consumption pricing.

Domain - Civil Engineering and Equipments, Cadaster and Geodesy

**TESILA Clara Beatrice**

Project Title - Optimizing risk reduction strategies for geomorphological hazards by 3D modeling

Abstract - Natural hazards, especially landslides, are complex phenomena both regarding their generating causes and also the effects they produce; thus representing a risk factor to be determined and quantified. 3D modeling of geospatial data characteristic to landslides acquired using terrestrial laser scanning technology is useful for monitoring and determining the risk potential of certain areas as well as for managing the destructive effects of geomorphologic hazards on the environment and to optimize their forecasting and post-factum approaches. Nowadays, about 80% of national or local decisions in different areas of activity, such as demography, territorial planning, hazards, infrastructure etc. involves geospatial or georeferenced data. The geodetic engineer participates to the acquisition, manipulation, visualization and analysis of geospatial data characteristic of hazards in order to adopt the most appropriate methods of protecting and preserving the environment in order to adapt to climate change. The project aims to optimize risk reduction strategies for geomorphological hazards by their 3D modeling in the context of Romania's susceptibility and poor management of local authorities who are insufficiently prepared to manage such situations.

Domain - Mechanical Equipment (Mechanical Engineering, Motor Vehicle Engineering, Transportation Engineering)

**STOICA Virgil**

Project Title - Reducing Fuel Consumption of an ICE by recovering lost energy

Abstract - We propose the construction of an experimental test bench with an internal combustion engine for testing, dissipated thermal energy recovery solutions, and reintroduction into the engine cycle.

Domain - Mechanical Equipments (Mechanical Engineering, Automotive Engineering, Transportation Engineering)

**LINUL Emanoil**

Project Title - Mechanical characterization of advanced composite structures with aluminum foam core

Abstract - The proposed project is part of a research direction of innovative materials dealing with the development, mechanical characterization and structural integrity assessment of new advanced composite structures. The obtained composite structures presents exceptional mechanical properties, specialized for applications in the transport field and generally applications requiring lightweight rigid structures. The ultimate goal of these materials is to reduce the weight of the products and to increase the exploitation safety.

Domain - Materials Engineering, Industrial Engineering

**CODREAN Cosmin**

Project Title - Obtaining and characterization of bulk amorphous steels

Abstract - In this project we aim to obtain and characterize bulk amorphous steels from the Fe-Cr- (Mo, Mn) - (Y, Ga) -C- (B, Si, P) family by copper mold casting and using ferro-alloys as raw materials.

Domain - Mechatronic and Robotic
**ZABAVA Eugen Sever**
Project Title - Innovative electronic devices for configuring and reusing packagings.
Abstract - The basic idea of this project is to create and develop a mechatronic device to reconfigure a packaging of conventional materials that, until its recycling, can be reused for another purpose.

Domain - Mathematics, Physics
**LAZUREANU Cristian-Virgil**
Project title - The study of Hamilton-Poisson systems and their integrable deformations using the energy-Casimir mapping
Abstract - We study the connections between the dynamics of Hamilton-Poisson systems and the corresponding energy-Casimir mapping. We consider some classes of integrable systems and integrable deformations of known dynamical systems.

Domain - Economic Sciences and Business Administration
**TAUCEAN Ilie Mihai**
Project Title - Research and Didactic Laboratory: "Lean and Sustainability"
Abstract - The project aims at creating a Research and Didactic Lab, named "Lean and Sustainability", by using and developing enterprise games to physically simulate the processes of an enterprise, focusing on lean and sustainability concepts. The two concepts, considered together, unitary and complementary, propose a modern approach to the strategy of eliminating all the losses of any organization, being an interdisciplinary topic research.
Laboratory activities that will be proposed / developed will help students understand these concepts more easily (using the business games method), which are also modern tools used by enterprises where they will be hired as graduates. Laboratory activities will be used in existing disciplines but also in new courses to be proposed under the new master / license programs.
It is proposed to research enterprises needs to determine the issues related to the use of lean / sustainability tools and to create a new tool combining the benefits of both concepts.
"Lean and Sustainability" is a generous research theme that can be approached and developed within the "Economic Engineering Research Center".

Domain - Humanities, Social Sciences, Physical Education
**SIMON Simona-Cristina**
Project Title - Multilingual explanatory dictionary of educational terms (Romanian, English, German, French)
Abstract - The research aims at compiling an explanatory dictionary of the most frequently used educational terms that will be defined in Romanian, and translated into English, German, and French as well, thus supporting the internationalisation of UPT.