POLISH NATIONAL AGENCY FOR ACADEMIC EXCHANGE

STER PROGRAMME

name of the unit:

DEPARTMENT OF MICROELECTRONICS AND COMPUTER SCIENCE,

Lodz University of Technology

symbol:

K-22

http://www.dmcs.p.lodz.pl

head of the unit:	potential promoters:	contact person:
Wojciech Tylman Ph.D., D.Sc., Assoc. Prof. Lodz University of Technology	Professor Mariusz Zubert, Ph.D., D.Sc., Assoc. Prof. Lodz University of Technology	Mariusz Zubert phone: 42-631-27-27 mariusz.zubert@p.lodz.pl

scope of activities:

The main fields of research interests cover the following items:

• The interdisciplinary research including Electronics, Informatics, Physics, Mathematics and Medicine.

• The dedicated silicon integrated systems (ASICs) and Micro-Electro-Mechanical-Systems (MEMS) design and multi-domain simulations.

• The medical systems based in image processing, non-invasive diagnosis.

Especially:

• The real-time monitoring system of high voltage power lines. • The heat transfer phenomena at nanoscale. • The counterparts of complex analysis in differential equations, geometry and in physical application. • The automatic translation of multi-physical problems described by Partial Differential Algebraic Equations to Hardware Description Languages. • The electro-thermal modelling of ASIC and power modules (e.g. SiC PiN Schottky Diodes). • Modelling of Electromagnetic Interactions in Modern (More-Than-Moore) 3-D Integrated Semiconductor Structures". •The image processing in diagnosis of neurodegenerative diseases (e.g. BSE, Alzheimer, CJ, vCJD) and basic research of florid plaque reconstruction. •The 3D ultrastructural amyloid plaque reconstruction and proliferation model using. • The biometric systems. • Analysis and design of low- and mid/high-voltage application specific integrated circuits (ASIC). • Implementation of current-mode function blocks in integrated circuits (IC), including high-voltage smart power systems.

present activities:

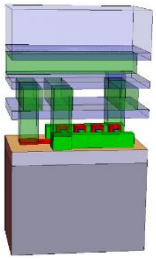
• The heat transfer phenomena at nanoscale.

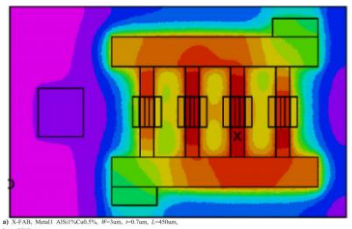
• The medical systems based in image processing, non-invasive diagnosis.

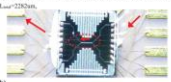
• Molecular Nanoengines.

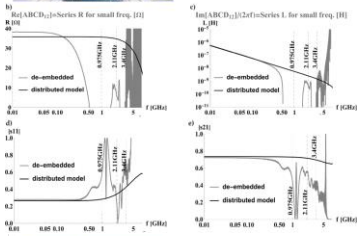
• Design, analysis and measurements of an ASIC comprising a set of mid/high-voltage analog function blocks based on both voltage- and current-mode signal processing principles.

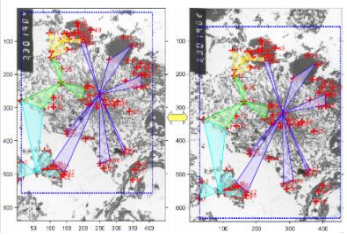
graphic material











Future activities: Molecular Nanoengines, Quantum computations. Progress of works on low- and high-voltage integrated systems.
Publications/patents, awards, projects: https://doi.org/10.1016/j.microrel.2018.07.141; https://doi.org/10.3390/en14154425; doi: 10.1049/iet-pel.2017.0415www.ietdl.org; https://doi.org/10.1016/S0026-2692(00)00092-6; DOI: 10.1109/ACCESS.2021.3086852; DOI: 10.1109/ACCESS.2021.3081353; https://doi.org/10.3390/s21217298; DOI: 10.3390/en15010023; Polish Patent Office, "Voltage buffer Circuit," WYN: (11) 212837;
Keywords: MEMS, ASIC, heat transfer, multi-domain simulations, medical diagnosis, biometric systems, PDE, DAE, Power lines, smart power systems, current-mode signal processing;
List of internship proposal in this research team: Hardware & Software codesign.