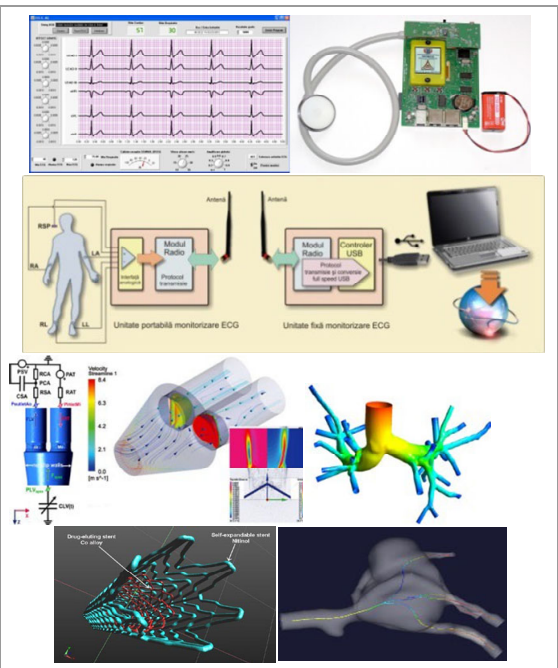


MEDICAL ENGINEERING RESEARCH GROUP

Contact details

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Areas of expertise

Laboratory of **Biomedical instrumentation, Applied medical electronics, Clinical engineering, Digital biosignal processing, Biometry**

Laboratory of **Biomedical Signal Processing, Biomedical Measurements, Biomedical Data Transmission, Medical Physics, Physiological modelling, Reverse engineering of cardiovascular devices, Medical Image Analysis**

Team

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Assoc. Prof. Med. Elena Gligor, Senior Researcher Dr. Eng. Stefan Gergely, Dr. Eng. Vasile Pompas, Dr. Eng. Ciprian Mugurel Fort

Representative projects

" **Artificial Intelligence and Multi-Scale Modelling for Clinical Decision Support and Interventional Planning for CTEPH patients**", PN-III-P1-1.1-PD-2021-0601, <https://modai-cteph.utcluj.ro/> (2022-2024)

"**COST Action MyWAVE CA17115**", www.cost.eu/COST_Actions/ca/CA17115?management (2018-2023)

"**Scaun Rulant Pentru Persoane cu Dizabilități Locomotorii**", (2019-2021)

"**Burse doctorale si postdoctorale pentru cercetare de excelenta**", POSDRU/159/1.5/S/134378 UTCN, (2014-2015)

"**VIPRO Platform**", PN-II-PT-PCCA-2013-4-2009, (2013-2016)

"**Advancing University Education in Biomedical Engineering and Health Management in Kyrgyzstan**", KyrMedu MeDDiCA, "Medical Devices Design in Cardiovascular Applications", European FP7 project, www.meddica.eu

"**Sensors and equipment for the quality control of various food supplies**", PN II, (2007-2013)

"**Complex architecture for monitoring and medical data transmission**, Exploratory research project, (2009-2012)

Significant results

The most representative publications of the past 5 years:

1. M. K Grzeszczyk, T. Satawa, **Lungu, A.** Swift, A. Narracott, R. Hose, T. Trzcinski, A. Sitek, *Noninvasive Estimation of Mean Pulmonary Artery Pressure Using MRI*, Computer Models, and Machine Learning, , International Conference on Computational Science, pp 14-27, 2022
2. DR Hose, PV Lawford, I Halliday, **D Rafiroiu, A Lungu**, *Challenges and progress in the application of physiological models for clinical decision support in cardiovascular medicine*, IOP Conference Series: Materials Science and Engineering, vol. 1254, issue 1, 2022
3. Alina S. Danciu, **Simona Vlad**, Marius Leordeanu, "Automatic Liver and Hepatic Tumors, Segmentation in CT Images using Convolutional Neural Networks", 7th International Conference on Advancements of Medicine and Health Care through Technology; 13–15 October 2020, Cluj-Napoca, Romania.
4. **Rafiroiu D**, I Molnar, **A Lungu**, *Error Analysis in Patient-Specific Blood Flow Modelling of Coronary Artery Disease*. In Proc. of 2019 11th International Symposium on Advanced Topics in Electrical Engineering (ATEE), Bucharest, (2019)
5. Kiely, DG; Levin, DL; Hassoun, PM; Ivy, D; Jone, PN; Bwika, J; Kawut, SM; Lordan, J; **Lungu, A**; Mazurek, JA; Moledina, S; Olschewski, H ; Peacock, AJ ; Puri, GD ; Rahaghi, FN ; Schafer, M; Schiebler, M ; Screaton, N; Tawhai, M; van Beek, EJ; Vonk-Noordegraaf, A; Vandepool, R; Wort, SJ; Zhao, L; Wild, JM ; Vogel-Claussen, J; Swift, AJ, .*Statement on imaging and pulmonary hypertension from the Pulmonary Vascular Research Institute (PVRI)*. Pulmonary Circulation. 2019
6. **Munteanu M.S.**, Magda A., Ciorap R., Rusu C. and Vladareanu L. – "EOG Signal processing algorithm used in eye movement detection", Proceedings of Modern Power System Conference 2019
7. Farago P., Băbțan A-M., Galatus R., Groza R., **Roman N.M.**, Feurdean C.N., Ilea A. „A Side-Polished Fluorescent Fiber Sensor for the Detection of Blood in the Saliva”, IFMBE Proceedings, volume 71, pp. 23-28, 2018, Springer International Publishing, ISBN 978-981-13-6206-4, ISSN 1680-0737
8. Iudean, D., Laze, P., Munteanu, R., **Munteanu, M.**, Mercea, V. – "Pilot -study of a low-cost iontophoresis device" 2019 7th E-Health and Bioengineering Conference, EHB 2019, Iasi, Romania
9. M.-M. Frațilă, V. Vlădăreanu, V.-A. Grosu, M. S. **Munteanu**, Y. Feng - *Autonomous mobile robot navigation based on fuzzy logic control*, în Acta Electrotehnica, vol. 60, nr. 1-2, p. 153-158, 2019
10. Mureșan V., **Roman N.M.**, Coloși T., Abrudean M., Stan O.P., Bunta O. „Numerical Simulation of the Temperature Propagation in Superposed Biological Media with Applications in Dental Treatment”, IFMBE Proceedings, volume 71, pp. 123-130, 2018, Springer International Publishing, ISBN 978-981-13-6206-4, ISSN 1680-0737
11. Ancău D., **Roman N.M.**, Ancău M., „ Evaluating a Method of Offline Detection of P₃ Waves”, IFMBE Proceedings, volume 71, pp. 139-143, 2018, Springer International Publishing, ISBN 978-981-13-6206-4, ISSN 1680-0737

12. Pop-Coman P., **Roman N.M.**, Steopan M., Ispas V., Bugnar S. „ *Voice Controlled Wheelchair for People With Disabilities* ”, IFMBE Proceedings, volume 71, pp. 255-260, 2018, Springer International Publishing, ISBN 978-981-13-6206-4, ISSN 1680-0737
13. Holonec R., **Vlad S.**, Roman A.I., Rápolti L. “*Monitoring of Obstructive Sleep Apnea Using Virtual Instrumentation Techniques*”, 6th International Conference on Advancements of Medicine and Health Care through Technology; 17–20 October 2018, *IFMBE Proceedings*, vol 71 (2019), ISBN 978-981-13-6206-4, pp. 85-90. Springer, Singapore
14. Holonec R., **Vlad S.**, Rapolti L. “*Application for Detection of Epileptic Seizures*”, 6th International Conference on Advancements of Medicine and Health Care through Technology; 17–20 October 2018, Cluj-Napoca, Romania. *IFMBE Proceedings*, vol 71 (2019), ISBN 978-981-13-6206-4, pp. 91-96. Springer, Singapore
15. **Forț C. M.**, **Roman N. M.**, and **Gergely S.** “*Development of Bluetooth Enabled Pediatric Temperature Monitoring Device*” International Conference on Advancements of Medicine and Health Care through Technology; 17–20 October 2018, Cluj-Napoca, Romania, IFMBE, volume 71 DOI:10.1007/978-981-13-6207-1 pag.221-226,
16. **Gergely S.** and **Fort C.M.** “*Integrated computing unit for autonomous solar tracker with concentrated power*” 3th Bilateral meeting on green energy (12th ICPIM2019)

Significant solutions:

High efficiency solution for medical telemetry ECG. Proved method in pathological PCG analysis.

Efficient mathematical algorithms used in biomedical signal processing.

A data read algorithm based on ZACwire, the protocol for temperature precision sensor TSic 306

Development of portable biomedical instrumentation.

Smart solutions and low cost systems for medical and biomedical signal processing and transmission;

Smart solutions to assess the patient rehabilitation in post-traumatic periods;

High accuracy reconstruction of the 3D geometry of vessels, cavities and cardiovascular devices;

Development of a multiscale CFD-FSI double-valve model of the left ventricle to study the valve-valve interaction;

Experimental and computational study of the hemolytic and cavitation effects of bileaflet mechanical heart valves;

Computational analysis of thrombus absorption efficiency for different commercial catheter designs;

Computational assessment of high frequency electromagnetic (cell phone) field effects on implanted carotid stents;

Products and technologies:

Low consumption battery powered DSP devices for ECG and PCG signal analysis

The offer addressed to the economic environment

Research & development	Datronix Computer Ltd., Cluj-Napoca, www.datronix.ro National Institute for Research and Development of Isotopic and Molecular Technologies www.itim-cj.ro Military Emergency Hospital Dr. Constantin Papilian, Cluj-Napoca, www.smucluj.ro County Emergency Hospital Bistrita-Nasaud, http://spital.bistrita.ro/
Consulting	Consulting in the areas of medical signal measurements, medical signal processing and data transmission, medical image processing, FDA regulations of cardiovascular devices.
Training	CFD-FSI analysis, Multiphysics and multiscale modelling, Computational methods for cardiovascular devices design, Computational methods for electromagnetic dosimetry

Last updated: September 2021