
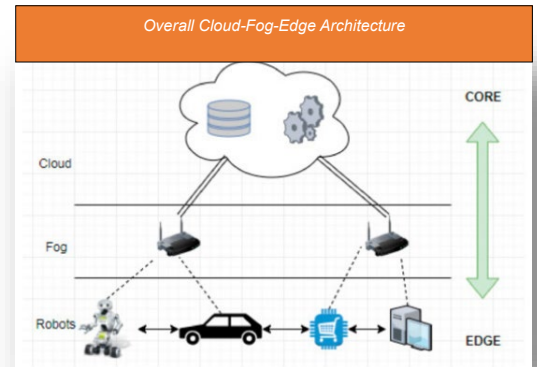


## DEPENDABLE SYSTEMS - DeSy

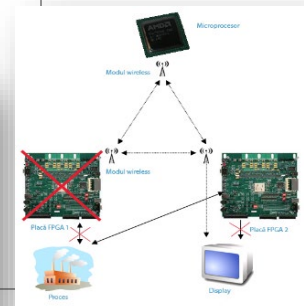
### Contact details

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Acronym	DeSy
Logo	
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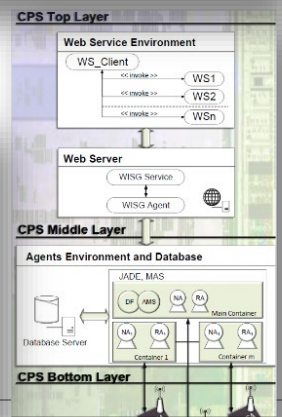
### Block schemas elaborated by the DESY group, over time



Blockchain application cases in the fight against COVID-19



Dependability Through Hardware Reconfiguration



CPS 3 Layers Based Architecture

### Areas of expertise

**Dependability. Security** ► Development of intelligent techniques for dependability (availability, reliability, safety, security, integrity and maintainability), security (confidentially) and testing of information systems; ► Analysis, design, implementation and testing of information systems with dependability properties used in various fields (e.g. critical infrastructure - energy, water, environment, transport; medicine). **Cyber – Physical Systems (CPSs)** ► Development of abstractions, models, architectures and tools to allow implementation of reliable CPSs (including areas as cloud- fog-edge architectures) made from unsafe components and resistant CPSs at cyber or physical attacks; ► Development of the semantic basics for heterogeneous models' composition and for modelling languages that describe various physical processes of a CPS and their associated logic. **Intelligent Systems** ► Analyses, design, implementation and testing of intelligent real-time control and monitoring systems using artificial intelligence techniques (intelligent agents, fuzzy logic, machine learning, decision support systems, etc.).

### Team

**Prof. Eng. Liviu MICLEA, PhD;** Prof. Eng. Honoriu VĂLEAN, PhD; Prof. Eng. Silviu FOLEA, PhD; Assoc. Prof. Eng. ENYEDI Szilard, PhD; Assoc. Prof. Eng. Ovidiu STAN, PhD; Lecturer Eng. Iulia ȘTEFAN, PhD; Lecturer Eng. Dan GOTA, PhD; Assist. Eng. Adela POP, PhD; Assist. Eng. Alexandra FANCA, PhD; Assist. Eng. Cosmina Corcheș, PhD; Assist. Eng. Marius MISAROȘ ► **PhD students** Eng. Ionut Cătălin DONCA, Eng. Andrei-Mihai VĂDAN, Vlad BUCUR, Eng. Andrei SCURTU, Eng. Rareș COSTE, Tudor POP

### Representative projects

#### The most representative projects in the last 10 years

► 2021- 2023 - **The Innovative European University of Technology (Inno-EU+)**, a HEI Initiative project aiming to enhance the innovation and entrepreneurial capacity of a new European University Alliance, the European University of Technology (EU+) ► 2018-2020 - **ROBIN – “Robots and Society: Cognitive Systems for Personal Robots and Autonomous Vehicles”**, PCCDI2018 ► 2014-2017 - **F2S, “SCADA Federation, Collaborative Instrument for Water Management – Somes River Pilot Application”**, National PN2-Partnerships project, <http://193.226.5.107/f2s/pagina/>, ► 2013-2016 - **“Use of commercial drones for autonomous maintenance services in railways”**, cooperation with Siemens company ► 2014-2015 - **“Cluj-Napoca: Next Generation Brained City - Software design for service monitoring at the level of the medical network, through innovative solution integration”**, Sectoral Operational Programme “Increase of Economic Competitiveness” (POSCCE) project, [http://clujit.ro/ro/#Next\\_Generation\\_Brained\\_City](http://clujit.ro/ro/#Next_Generation_Brained_City), ► 2013-2017 - **ProSEco, “Collaborative environment for design of Aml enhanced product-services integrating highly personalised innovative functions with minimal ecological footprint along life cycle and of their production processes based on collaborative environments”**, European FP7 project, [http://cordis.europa.eu/projects/rcn/109191\\_en.html](http://cordis.europa.eu/projects/rcn/109191_en.html), ► 2013-2014 - **CyCloSe, “Designing Cloud-based Self-healing Cyber-Physical Systems”**, Ro-It Bilateral Cooperation with Politecnico di Torino,

## Significant results

### The most representative publications of the past 5 years

► A. Pop, A. Fanca, D. Gota, H. Valean, **Monitoring and Prediction of Indoor Air Quality for Enhanced Occupational Health**, Intelligent Automation & Soft Computing, Vol.35, No.1, pp. 925-940, 2023, DOI:10.32604/iasc.2023.025069, ISSN: 2326-005X, published June 2022, <https://www.techscience.com/iasc/v35n1/48113> ► Donca, Ionut-Catalin, Ovidiu Petru Stan, Marius Misaros, Dan Gota, and Liviu Miclea. **Method for Continuous Integration and Deployment Using a Pipeline Generator for Agile Software Projects** Sensors 22, no. 12: 4637. <https://doi.org/10.3390/s22124637> ► Alexandru G Berciu, Eva H Dulf, Iulia A Stefan, **Flexible Augmented Reality-Based Health Solution for Medication Weight Establishment**, 2022, Processes, vol. 10, issue 2, page 219, Special Issue Empowering Pharma4.0: Continuous Monitoring and Optimization of Pharmaceutical Processes, ► A. Ciobotariu, D. Gota, A. Pop, O. Stan, A. Fanca, C. Domuta, H. Valean, L. Miclea. **Demographic Attributes Classification via Convolutional Neural Networks: A Proposed Solution**. Proc. of 2022 International Conference on Electrical, Computer and Energy Technologies (ICECET), 2022, Prague, pp. 1-6, Czech Republic, ISBN:978-1-6654-7087-2, DOI: 10.1109/ICECET55527.2022.9872818 ► Cosmina Corches, Mihai Daraban, Liviu Miclea, **Availability of a RFID Object Identification System in IoT Environment**, Sensors, ISSN 1424-8220, special issue "Smart Sensors for Remotely Operated Robots", Vol 21, Issue 18, article number: 6226, DOI: 10.3390/s21186220, Published: SEP 2021, ► H. Patel, D.S. Rajput, O. P. Stan, L. C. Miclea, **A New Fuzzy Adaptive Algorithm to Classify Imbalanced Data**, CMC-Computers, Materials & Continua, ISSN / eISSN: 1546-2218 / 1546-2226, Special Issue: Emerging Applications of Artificial Intelligence, Machine Learning and Data Science, Vol.70, No.1, pp. 73-89, 2022, DOI:10.32604/cmc.2022.017114, Accepted: APR 2021 ► Cristina Muresan, Isabela Birs \*, Eva Dulf, Dana Copot, Liviu Miclea, **A Review of Recent Advances in Fractional Order Sensing and Filtering Techniques**, Sensors, ISSN 1424-8220, special issue: "Fractional Sensor Fusion and its Applications", vol. 21, Issue 17, article number: 5920, doi: 10.3390/s21175920, published SEP 2021 ► Stan, O.P.; Enyedi, S.; Corches, C.; Flonta, S.; Stefan, I.; Gota, D.; Miclea, L. **Edge environment** Sensors 2021, 21, 4714. ► C. Corches, M. Daraban, O. Stan, Szilárd Enyedi, L. Miclea, **Interconnection of Systems with Cloud-Fog-Edge architectures: Concept and Challenges**, Control Engineering And Applied Informatics, vol 23, issue 1, pp.60-71, 2021 ► I. Ștefan, L. Miclea and H. Vălean, **Towards Testing Considerations Of Experimental Decision Support System Design**," 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 2020, pp. 1-6, doi: 10.1109/AQTR49680.2020.9129954, ► I. Muntean, G. D. Mois, S. C. Folea, **Development and Analysis of a Low-Cost IoT Sensor for Urban Environmental Monitoring**, International Journal of Computers Communications & Control, Vol. 16, No. 5, doi:10.15837/ijccc.2021.5.4260, 2021. <https://univagora.ro/jour/index.php/ijccc/article/view/4260> ► Gota, DI , Puscasiu, A, Fanca, A, Valean, H Miclea, L, **Human-Computer Interaction using hand gestures**, 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 2020, pp. 195-199, ► A. Scurtu, C. Dehelean, S. Enyedi and L. Miclea, **Using Cognitive Services within CPS/SCADA Systems Federations - Concepts, Research Areas and Challenges**," 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), Cluj-Napoca, Romania, 2020, pp. 1-4, doi: 10.1109/AQTR49680.2020.9129910 ► V. Bucur, O. Stan, L. Miclea, **Data Loss Prevention and Data Protection in Cloud Environments based on Authentication Tokens**, 2019 22nd International Conference on Control Systems and Computer Science (CSCS), Bucharest, Romania May 28-30, 2019, pp. 720-725, DOI: 10.1109/CSCS.2019.00128 ► O. Stan, L. Miclea, **New Era for Technology in Healthcare Powered by GDPR and Blockchain**, 6th International Conference on Advancements of Medicine and Health Care through Technology (MediTech), Cluj Napoca, ROMANIA, OCT 17-20, 2018, Book Series: IFMBE Proceedings, Volume: 71, Pages: 311-317, ► Stefan, I.; Enyedi, Sz.; Scurtu, A.; et al., **Using the WaterML Standard Information Model, in a SCADA Federation Web Service**, Control Engineering And Applied Informatics Volume: 20, Issue: 1, Pages: 119-127, 2018 ► Bucur, V., Dehelean, C., Miclea, L., **Object storage in the cloud and multi-cloud: State of the art and the research challenges**, 2018 IEEE International Conference on Automation, Quality and Testing, Robotics, AQTR 2018 - THETA 21st Edition, Proceedings, pp. 1-6 ► S. Enyedi, **Electric cars — Challenges and trends**," 2018 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), Cluj-Napoca, Romania, 2018, pp. 1-8, doi: 10.1109/AQTR.2018.8402776. ► T. Sanislav, G. Mois, L. Miclea, **An Approach to Model Dependability of Cyber-Physical Systems**, *Microprocessors and Microsystems*, vol. 41, pp. 67-76, March 2016, ISSN: 0141-9331, DOI: 10.1016/j.micpro.2015.11.021 ► S. Folea, G. Moiş, C. Muresan, L. Miclea, R. De Keyser, M. Cirstea, **A Portable Implementation on Industrial Devices of a Predictive Controller Using Graphical Programming**, IEEE Transactions on Industrial Informatics, April 2016, Q1 Automation & Control Systems)

**Patents**

► J. Figueras, L. Miclea, G. Moiş, **Method for the dynamic voltage scaling in an arithmetic-logic unit based on on-line error detection**, no. OSIM: 130282/30.03.2018 ► L. Miclea, Szilard Enyedi, I. Stefan, O. Stan, I. Stoian, D. Capatina, O. Ghiran, M. Matreata, G. Bolos, R. Jucan, Z. Kope, A. Moldovan, **Method of interoperability of data from SCADA-type systems through the constitution of a federated structure**, no. OSIM A/10061/2017.

### The offer addressed to the economic environment

**Research & development** ► Abstractions definition, architectures design and tools implementation to achieve the development of highly dependable and secure CPSs; ► Expansion of artificial intelligence techniques in order to implement some modelling and control applications.

► Analysis, design, implementation and validation of dependable CPSs used in water resources management, electrical power generation and transport, cloud-fog-edge infrastructure; ► Analysis, design, implementation and validation of information systems applied in various fields; ► Application of artificial intelligence techniques in energy production, medicine, food quality control.

**Consulting** ► Consulting, research, design, development of dependable information systems and intelligent systems for industrial and scientific environment.

**Applied engineering services** ► Computer testing services ► Programming and software and hardware consultancy services ► Intelligent systems design and implementation services.

**Training: Dependable basics:** availability, reliability, safety, integrity and maintainability; ► **CPS basics:** hardware and software architecture, physical devices development and programming, decision support, historical databases design and management, historical data pre- and post-processing; ► **Software testing techniques:** functional testing, structural testing, use of software testing frameworks; ► **Artificial intelligence techniques:** intelligent agents, multi-agent systems, machine learning.

Last updated: January 2023