WIRELESS SENSOR APPLICATIONS

Contact details

Name	**Wireless Sensor Applications**	
Acronym	**WS-App**	
Logo		
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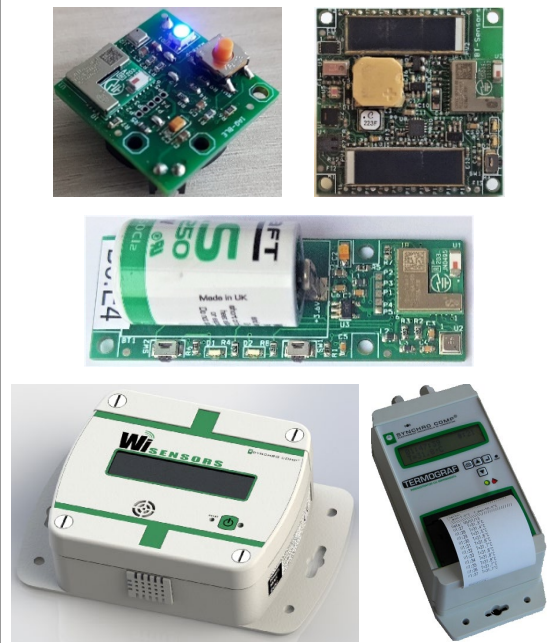
Areas of expertise

Embedded systems design: The design and development of embedded systems based on microcontrollers, SoCs, and FPGAs, having sensor measurement and wireless transmission capabilities (Wi-Fi, BLE, LoRa).
Power harvesting: The evaluation of energy harvesting mechanisms which provide energy autonomy for prolonged periods of time and offer the advantage of miniaturization.
IoT applications implementation: The development of IoT hardware&software applications (i.e., air quality) and power consumption evaluation.
Process monitoring and testing: The development of monitoring and testing systems on industrial real-time platforms including FPGA chips or programmable automation controllers; LabVIEW^{TM} graphical programming.

Team

Assoc. Prof. Eng. George Moiș, PhD; Lecturer Eng. Teodora Sanislav, PhD.; Assist. Eng. Ionuţ Dobra, PhD.; Eng. Denis Adrian Șipoș; Eng. Tudor Călin Rădoni; Specialist referent Ionuţ Iancu

Representative projects

"Intelligent System for Detecting the Degree of Food Freshness/Alteration based on an Electronic Nose Device", Contract no. 4/2024, GNaC ARUT 2023 (2024-2025).
"Thermal printer, Bluetooth low energy and microSD data logger", Contract no. 65CI/2017, PN III (2017).
"Evaluation of Power Harvesting Elements in Wireless Sensors", Contract no. 1998/12.07.2017, TUCN internal grant.
"Sub 1 GHz ISA100 technology for low cost and low power consumption embedded systems", TETRACOM – 3rd Call for TTP Proposals (FP7), Partial Funding for Academia-Industry Technology Transfer Projects in Computing Systems, Technology Transfer in Computing Systems, no. 609491/2016.

Significant results

The most representative publications of the past 5 years:
1. Sanislav, T., Mois, G. D., Zeadally, S., Folea, S., & Hedesiu, H. (2024). A Smart Platform for Monitoring and Managing Energy Harvesting in Household Systems. *Energies (19961073)*, *17*(23), 2024.
2. T. Sanislav, D. A. Sipos, G. Mois and S. Folea, "Intelligent System for Coffee Odor Identification and Classification," *The 32th Telecommunications Forum (TELFOR)*, 2024, doi: 10.1109/TELFOR63250.2024.10819190.
3. G. Mois, R. Etz, T. Sanislav and S. Folea, "Open Source in Embedded Systems Development", *2024 13th Mediterranean Conference on Embedded Computing (MECO)*, 2024, doi: 10.1109/MECO62516.2024.10577814.
4. I. M. Dobra, V. A. Dobra, A. A. Dobra, G. Harja, S. Folea and V. D. Gavra, "Long-Range Network of Air Quality Index Sensors in an Urban Area," *Sensors* 2023, *23*, 9001.
5. I. M. Dobra, A. A. Dobra, V. A. Dobra, V. D. Gavra, and S. Folea, "Air Quality Analysis in the Surrounding Environments Using a Lora Network," *Acta Technica Napocensis - Series: Applied Mathematics, Mechanics, and Engineering*, *66*(1S), 2023.
6. T. V. Sântejudean, G. D. Mois, T. Sanislav and S. C. Folea, "Edge Computing in Wireless Sensing Applications," *2022 11th Mediterranean Conference on Embedded Computing (MECO)*, 2022, pp. 1-4, doi:

10.1109/MECO55406.2022.9797161.

7. G. D. Mois, T. Sanislav and S. Folea, "An Internet of Things-Enabled Sound Level Meter Using Off-the-Shelf Components," *2022 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR)*, 2022, pp. 1-4, doi: 10.1109/AQTR55203.2022.9802013.

8. 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*, Oct2021, Vol. 16 Issue 5, p1-14. 14p.

9. T. Sanislav, G. D. Mois, S. Zeadally and S. C. Folea, "Energy Harvesting Techniques for Internet of Things (IoT)," in *IEEE Access*, vol. 9, pp. 39530-39549, 2021, doi: 10.1109/ACCESS.2021.3064066.

10. T. Santejudean, S. Folea and G. Mois, "Analysis of Low-Power Operation for an Environmental Monitoring Beacon," *2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR)*, 2020, pp. 1-5, doi: 10.1109/AQTR49680.2020.9129917.

11. S.C. Folea, G.D. Mois, "Lessons Learned from the Development of Wireless Environmental Sensors," in *IEEE Transactions on Instrumentation and Measurement*, vol. , pp. 1-1, DOI: 10.1109/TIM.2019.2938137, 28 Aug 2019.

12. T. Sanislav, S. Zeadally, G.D. Mois, S.C. Folea, "Wireless energy harvesting: Empirical results and practical considerations for Internet of Things," in *Journal of Network and Computer Applications*, vol. 121, pp. 149-158, ISSN 1084-8045, https://doi.org/10.1016/j.jnca.2018.08.002, 2018.

13. G.D. Mois, T. Sanislav, S.C. Folea, S. Zeadally, "Performance Evaluation of Energy-Autonomous Sensors Using Power-Harvesting Beacons for Environmental Monitoring in Internet of Things (IoT)," *Sensors*, Vol. 18, Issue: 6, Article Number: 1709, doi:10.3390/s18061709, http://www.mdpi.com/1424-8220/18/6/1709.

Significant solutions:

IoT devices with energy harvesting capabilities for environment monitoring.
Wireless sensors based on Wi-Fi Low Power, BLE (Bluetooth Low Energy) or LoRA.

Products and technologies:

Electronic equipment design, dedicated solutions. Hardware and software implementation.
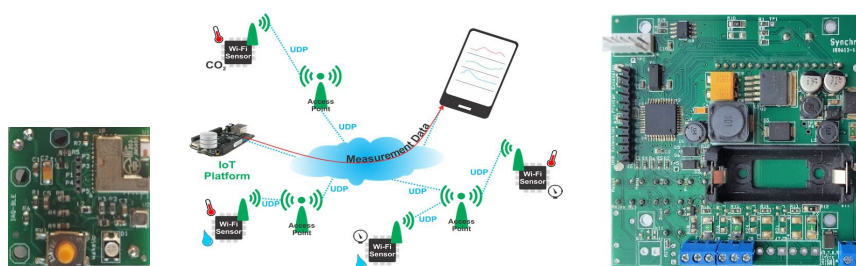
Patents:

1. METHOD FOR DYNAMICALLY MODIFYING FREQUENCY IN AN ARITHMETIC UNIT BASED ON ONLINE ERROR DETECTION - OSIM PATENT NO. RO130282-B1 / 30.03.2018

The offer addressed to the economic environment

Research & development	The development of hardware equipment and of software products for new structures of data acquisition and communication, based on microcontrollers, SoCs, and FPGAs. The testing of hardware equipment and of software products developed for data acquisition, wireless communication, and power harvesting. The development and testing of measurement systems and their implementation on industrial equipment for the evaluation of operating conditions and power consumption. The development and testing of IoT hardware&software applications and Cyber-Physical Systems. The development and use of Big Data techniques in Cyber-Physical Systems and IoT applications.
Consulting	Consulting activities for the development of embedded systems and IoT solutions.
Training	C and LabVIEW™ courses and introduction to digital design using LabVIEW™, Multisim, and VHDL. Electronic equipment design. Firmware development. IoT software applications implementation. Embedded systems testing and evaluation.

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