WIRELESS SENSOR APPLICATIONS

Contact details

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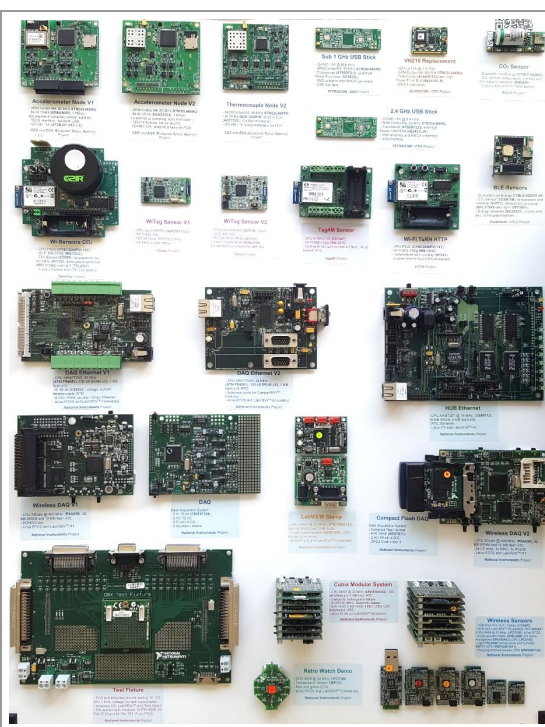
Areas of expertise

Embedded systems design: The design and development of embedded systems based on microcontrollers, having sensor measurement and wireless transmission capabilities (Wi-Fi, BLE or 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 software applications for environment monitoring (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 based on LabVIEW™ graphical programming.

Team

Prof. Dr. Eng. Silviu Folea, Asoc. Prof. Dr. Eng. George Moiș, Assist. Prof. Dr. Eng. Teodora Sanislav,
PhD Student Eng. Ionuţ Dobra, PhD Student Eng. Vlăduţ Dobra, PhD Student Eng. Muscan Andreea.

Representative projects

"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.
"Power Harvesting Ambient Beacon for the IoT", Accenture Industrial Software Solutions (AISS), Grant - Industrial Internet of Things (IIoT), no. 8678/2016.
"WAIST: Wireless Applications for Satellite Assembly Integration and Testing Applications", nr. 4000108133, Control Data Systems SRL (CDS) and Thales Alenia Space France (TAS-F), contract with European Space Agency (ESA) no. AO7169, (2015-2016).

Significant results

The most representative publications of the past 5 years:
1. T. V. Sântejudean, G. Dan 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.
2. 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.
3. 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.

4. 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.
5. G. Moiş, H. Hedeşiu, S. Folea (2020), "*Digital Design Laboratory using LabVIEW*", Mediamira, Cluj-Napoca, ISBN 978-973-713-353-3.
6. 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.
7. R. Miron, M. Hulea and S. Folea, "Food Allergens Monitoring System Backed-up by Blockchain Technology," *2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR)*, 2020, pp. 1-4, doi: 10.1109/AQTR49680.2020.9130006.
8. 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.
9. 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.
10. 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.
11. G. Mois, S. C. Folea and T. Sanislav, "Analysis of Three IoT-Based Wireless Sensors for Environmental Monitoring," in *IEEE Transactions on Instrumentation and Measurement*, vol. 66, Issue: 8, Pages: 2056-2064, Aug 2017.

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. A. Aştilean, T. Leţia, S. Folea, C. Avram, M. Hulea, R. Miron, E. Ciupan, „*Secured System and Method of Communication Between Fixed and Mobile Devices*", Brevet RO 127706 A2, nr. UTC-N 1000003415.
2. M. Ghercioiu, H. Hedesiu, S. Folea, G. Crisan, C. Ceteras, I. Monoses, "*Compact modular embedded device*", United States Patent 7860582B2, 12/28/2010
3. M. Ghercioiu, H. Hedesiu, S. Folea, G. Crisan, C. Ceteras, I. Monoses, "*Deployment and execution of a graphical program on an embedded device from a PDA*", United States Patent 7647562B2, 01/12/2010

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. 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.
Consulting	Consulting activities for the development of IoT solutions.
Training	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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