

Dr. Rabab Benotsmane

Ph.D. in Robotics

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EDUCATION

- Ph.D. in Robotics 2017 – 2021 - *University of Miskolc (UoM), Miskolc, Hungary*
- Master's degree in Control Systems and Industrial Data Processing 2015 – 2017 - *USTO, Oran, Algeria*
- Bachelor's degree in Automation and Control Industrial Systems 2012 – 2015 - *USTO, Oran, Algeria*

Work Experience

- **Associate Professor** October 2025 - Present
- Assistant Professor and Researcher October 2021 – October 2025
University of Miskolc, Miskolc, Hungary
Institute of Automation and Info-Communication
 - **Teaching subjects:** AI and Machine Learning for Process Industry. Architectures and Embedded Systems. Control Systems Engineering. DCS-based Process Control. Robotics and Intelligent Control. Safety Control Systems. Industrial Communication and SCADA Systems, Applied Programming. Communication Theory. Advanced Intelligent Control Systems.
 - **Supervision:** PhD, MSc, BSc.
 - **Research:** Multi-agent control, Energy optimization, Predictive maintenance, Advanced sensing, and embedded AI platforms, Robotics, Industry 4.0.

EXPERTISE AND SKILLS

- **Modeling and control of dynamic systems**, with applications in renewable energy, robotics, and industrial processes.
- **Multi-agent systems** for intelligent coordination and control of distributed energy resources (DERs).
- **Optimization of energy consumption** using AI-driven and model-based control for PV systems, wind energy, and hybrid microgrids.
- **Sensor development, integration, and real-time data acquisition** to support adaptive control and optimization.
- **AI and machine learning implementation** for predictive maintenance, intelligent energy management, and autonomous system optimization.
- **Real-time control platforms** (MATLAB/Simulink, embedded systems) and **multi-criteria decision-making** for resilient and efficient renewable energy systems.
- **Softwares:** MS Office, Latex, MATLAB/Simulink, VIVADO/Vitis, FPGA, DeltaV and YOKOGAWA DCS Systems, PLCs, SolidWorks, Visual Components, CoppeliaSim, Tecnomatix Plant, Automod, ROS.
- **Programming Languages:** C/C++, MATLAB, Python, VHDL, Verilog, CAD design, G-code, Ladder, ST, FBD, SFC, IL.

PUBLICATIONS: Articles, Books and Theses

1. Benotsmane, R., Mohammed, A., Al-Jaal, M., Al Obaidi, A., Stayanova, K. (2025). "Machine Learning-Based Predictive Maintenance for Flow Instrumentation in DCS and SCADA Systems." In 2025 26th International Carpathian Control Conference (ICCC), Starý Smokovec, High Tatras, Slovakia, 2025, pp. 1-6. doi: 10.1109/ICCC65605.2025.11022817.
2. Ameen, F., Trohák, A., Siddiq, A., Benotsmane, R. (2024). "Enhancing Photovoltaic Array Performance under Partial Shading through Dynamic Reconfiguration and Layer Equalization Algorithm." In 2024 25th International Carpathian Control Conference (ICCC), Krynica Zdrój, Poland, 2024, pp.1-6. doi: 10.1109/ICCC62069.024.10569654.
3. Ameen, F., Siddiq, A., Trohák, A., & Benotsmane, R. (2023). A Scalable Hierarchical Dynamic PV Array Reconfiguration under Partial Shading. *Energies*, 17(1), 181. <https://doi.org/10.3390/en17010181>.
4. Vásárhelyi, J., Salih, O. M., Rostum, H. M., & Benotsmane, R. (2022). An Overview of Energies Problems in Robotic Systems. *Energies*, 16(24), 8060. <https://doi.org/10.3390/en16248060>.
5. Benotsmane, R.; Kovács, G. Optimization of Energy Consumption of Industrial Robots Using Classical PID and MPC Controllers. *Energies* 2023, 16(8), 3499. <https://doi.org/10.3390/en16083499>.
6. Benotsmane, R.; Vásárhelyi, J. Towards Optimization of Energy Consumption of Tello Quad-Rotor with Mpc Model Implementation. *Energies* 2022, 15, 9207. <https://doi.org/10.3390/en15239207>.
7. Benotsmane, R.; Dudás, L.; Kovács, G., Newly Elaborated Hybrid Algorithm for Optimization of Robot Arm's Trajectory in Order to Increase Efficiency and Provide Sustainability in Production, *Sustainability*, 2020, 13(15), pp. 1–23.
8. Benotsmane, R.; Dudás, L.; Kovács, G. Trajectory Optimization of Industrial Robot Arms Using a Newly Elaborated “Whip-Lashing” Method. *Appl. Sci.* 2020, 10, 8666.
9. Benotsmane, R., Dudás, L., Kovács, G., Economic, Social Impacts and Operation of Smart Factories in Industry 4.0 Focusing on Simulation and Artificial Intelligence of Collaborating Robots, *Soc. Sci.* 2019, 8, 143.