Botond Sánta
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Profile: A dedicated experimental physicist with experience gained from academic and industrial research. Skilled in advanced data acquisition techniques, electrical transport measurements, clean-room processes, laser micromachining, electronics, and optics. Passionate about science communication, actively involved in public outreach, sharing knowledge with broader audiences and inspiring the next generation of scientists.

Work experience

Postdoctoral Research Associate
2023 – 2025

Aerospace and Mechanical Engineering
University of Notre Dame, IN, USA

- Fabricated low-reflectance, absorbent samples by applying femtosecond laser pulses upon metal and dielectric surfaces for advanced material applications
- Implemented 3D micromachining of fused silica with selective laser-induced etching (SLE) and created molds for thermoforming and casting polymers with mesoscopic feature sizes
- Explored the synthesis of chemical surface reaction (TiN and Si_3N_4) by femtosecond laser irradiation to yield thin-layer coatings
- Developed a novel measurement technique by utilizing femtosecond laser pulses to characterize thermoelectrically coupled nanoantennas (TECNAs)

Scientific Advisor
2020 – 2023

HELORO s.r.o.
Komarno, Slovak Republic

- Designed, programmed and assembled a microcontroller-based, custom-built DC-DC converter unit with maximum power-point tracking algorithm used for charging Li(Y)FePO4 batteries with thermoelectric generators
- Established and tested an energy harvesting prototype system by using thermoelectric generators in an industrial environment
- The built prototype was patented by the Industrial Property Office of the Slovak Republic under PUV 50018-2023

Assistant Research Fellow
2016 – 2023

Department of Physics
Budapest University of Technology and Economics, Hungary

- Studying resistive switching devices with noise spectroscopy, exploring the switching speed with ultrafast (sub-nanosecond) measurements

Scholarship Program
2013 – 2015

Furukawa Electric Institute of Technology
Budapest, Hungary

- Electronic characterization of lead-acid based car batteries

Education

Physics PhD — **Budapest University of Technology and Economics**
2016 – 2021
- Supervisor: Prof. András Halbritter
- Topics: resistive switching devices (memristors) noise spectrocopy (1/f-noise), scanning tunneling microscopy (STM), high-frequency characterization, electronic transport measurements

Applied Physics MSc — **Budapest University of Technology and Economics**
2016 – 2018
- Supervisor: Prof. András Halbritter
- Topics: scanning tunneling microscopy (STM), low-temperature measurements, nanolithography

Physics BSc — **Budapest University of Technology and Economics**
2013 – 2016
- Supervisor: Dr. György Hárs
- Topics: improving the efficiency of a Tesla coil

Publications

Google Scholar profile: https://scholar.google.com/citations?user=j9FGe30AAAAJ

Highlighted publications

A. Sheardy, B. Sánta, S. Neretina, J. Krantz, M. Zhukovskyi, E. Kinzel, K. Matous, A. Mukasyan, Formation of Silicon Nitride by High-Fluence Femtosecond Laser Treatment, submitted to ACS Applied Materials & Interfaces (2025)

B. Sánta, Z. Balogh, A. Gubicza, L. Pósa, D. Krisztián, G. Mihály, M. Csontos and A. Halbritter, Universal 1/f type current noise of Ag filaments in redox-based memristive nanojunctions. Nanoscale, **11**(11), 4719-4725 (2019).

Language skills

English: Proficient, B2
German: Intermediate, B1
Hungarian: Native

IT skills

Origin Pro, IGOR Pro, LabVIEW, C#, Matlab, LaTeX, Microsoft Office, G-code

Science communication

Beyond my university studies, I was the co-founder and group leader of the Physical Experiment Group at the Eugene Wigner College of Advanced Studies (Wigner Jenő Szakkollégium). Our main focus was the development of experimental demonstration tools and their presentation for public outreach at various events such as The Capital of Sciences, Researchers' Night, and university open days.