

Tímea Nóra Török

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1121 Budapest, Konkoly-Thege Miklós út 29., 29.
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Education:

2014 – 2017

Budapest University of Technology and Economics

BSc in Physics

Supervisor: Dr. Miklós Csontos

BSc thesis (in Hungarian):

Nb₂O₅ nanokontaktusok memrisztív kapcsolási jelenségeinek kísérleti vizsgálata
[Experimental study of memristive switching phenomena in Nb₂O₅ nanojunctions]

2017 – 2019

Budapest University of Technology and Economics

MSc in Physics

Supervisor: Prof. András Halbritter

MSc thesis (in Hungarian):

Rezisztív kapcsolási jelenség vizsgálata Nb₂O₅ pontkontaktusokban
[Investigation of the resistive switching phenomenon in Nb₂O₅ point-contact devices]

2019 –

Budapest University of Technology and Economics

Doctoral School of Physical Sciences

PhD in Physical Sciences

Supervisor: Prof. András Halbritter

PhD thesis:

Development and investigation of ultra-small on-chip resistive switching memory devices

Professional experience:

2020 –

Institute of Technical Physics and Materials Science,

Nanosensors Laboratory

Assistant research fellow

2023 –

Budapest University of Technology and Economics,

Institute of Physics

Assistant research fellow

MTMT:

<https://m2.mtmt.hu/qui2/?type=authors&mode=browse&sel=authors10070037>

Google Scholar:

<https://scholar.google.com/citations?user=hh1KpikAAAAJ&hl=hu&oi=ao>

List of Publications:

- [1] Molnár Dániel, Török Tímea Nóra, Santa Botond, Gubicza Ágnes, Magyarkuti András, Hauer Roland, Kiss Gábor, Halbritter András, Csontos Miklós
In situ impedance matching in Nb/Nb₂O₅/PtIr memristive nanojunctions for ultra-fast neuromorphic operation.
Nanoscale 2018, 10, 19290-19296
(IF in 2019: 6,895)
- [2] Török Tímea Nóra, Csontos Miklós, Makk Péter, Halbritter András
Breaking the quantum PIN code of atomic synapses.
Nano Letters 2020, 20, 2, 1192-1200
(IF in 2020: 11,62)
- [3] Santa Botond, Balogh Zoltán, Pósa László, Krisztián Dávid, Török, Tímea Nóra, Molnár Dániel, Sinkó Csaba, Hauer Roland, Csontos Miklós, Halbritter András
Noise tailoring in memristive filaments.
ACS Applied Materials & Interfaces 2021, 13, 7453-7460
(IF in 2019: 8,758)
- [4] Török Tímea Nóra, Fehérvári János Gergő, Mészáros Gábor, Pósa László, Halbritter András
Tunable, Nucleation-Driven Stochasticity in Nanoscale Silicon Oxide Resistive Switching Memory Devices.
ACS Applied Nano Materials 2022, 5, 5, 6691-6698
(IF in 2021: 5,64)
- [5] László Pósa, Péter Hornung, Tímea Nóra Török, Sebastian Werner Schmid, Sadaf Arjmandabasi, György Molnár, Zsófia Baji, Goran Dražić, András Halbritter, János Volk
Interplay of Thermal and Electronic Effects in the Mott Transition of Nanosized VO₂ Phase Change Memory Devices.
ACS Applied Nano Materials 2023, 6, 11, 9137-9147
(IF in 2022: 6,14)
- [6] Török Tímea Nóra, Makk Péter, Balogh Zoltán, Csontos Miklós, Halbritter András
Quantum Transport Properties of Nanosized Ta₂O₅ Resistive Switches: Variable Transmission Atomic Synapses for Neuromorphic Electronics.
ACS Applied Nano Materials 2023, 6, 22, 21340-21349
(IF in 2022: 6,14)
- [7] Dániel Molnár, Tímea Nóra Török, Roland Kövecz, László Pósa, Péter Balázs, György Molnár, Nadia Jimenez Olalla, Juerg Leuthold, János Volk, Miklós Csontos, András Halbritter
Autonomous neural information processing by a dynamical memristor circuit. 2023.
Available: <https://arxiv.org/abs/2307.13320>
- [8] János Gergő Fehérvári, Zoltán Balogh, Tímea Nóra Török, András Halbritter
Noise tailoring, noise annealing and external noise injection strategies in memristive Hopfield neural networks
Available: <https://arxiv.org/abs/2307.12111>
Manuscript accepted on January 1, 2024, at *APL Machine Learning*.

Conference presentations:

- International Conference on Memristive Materials, Devices & Systems (MEMRISYS) 2019.
<https://www.iee.et.tu-dresden.de/mem2019/>
Oral presentation: *Single-atom filamentary resistive switching in Nb₂O₅ memristor junctions*
- International Conference on Memristive Materials, Devices & Systems (MEMRISYS) 2021.
<https://www.nims.go.jp/memrisys2021/>

Oral presentation: *Superconducting subgap spectroscopy of transition metal oxide memristors*

3. 16th International Conference of Nanostructured Materials (NANO 2022)
<https://nano2022.org.es/>
Oral presentation: *Quantum transport phenomena in transition metal oxide memristors*
4. 15th International Conference on Modern Materials and Technologies (CIMTEC 2022)
<http://2022.cimtec-congress.org/>
Oral presentation: *Quantum transport phenomena in transition metal oxide memristors*
5. International Conference on Memristive Materials, Devices & Systems (MEMRISYS) 2023.
<https://memrisys2023.polito.it/>
Oral presentation: *Applying neurodynamic behavior of Mott insulators for auditory sensing*

Participation in research projects:

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|--------------|---|
| NKFI K112918 | Töltésdinamika nanoszerkezetekben
[Charge dynamics in nanostructures] |
| NKFI K119797 | Atomi méretű memóriák vizsgálata
[Towards atomic-scale memories] |
| NKFI K128534 | Nanométeres skálájú rezisztív kapcsoló memóriaeszközök fejlesztése
[Development of nanometer scale resistive switching memory devices] |
| NKFI K143169 | Információfeldolgozás rezisztív kapcsoló memóriákkal
[Information Processing with Resistive Switching Memories] |

Awards, scholarships:

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| 2016 | 1st prize and Rector's special award at the TDK |
| 2017 | 2nd prize at the OTDK
3rd prize at the TDK |
| 2018 | New National Excellence Program (UNKP-18-2)
2nd prize at the TDK
Dénes Gábor Grant for TDK students |
| 2019 | 2nd prize at the OTDK
New National Excellence Program (UNKP-19-3) |
| 2020 | New National Excellence Program (UNKP-20-3)
Cooperative Doctoral Programme Doctoral Scholarship (KDP-2020)
Supervisor: Prof. András Halbritter
Industrial advisor: Dr. János Volk |
| 2023 | 1st prize, BMe Research Grant
Experimental study and neuromorphic applications of memristors |

Teaching

▪ Supervisory activity

1. János Gergő Fehérvári. *Nanométerű fázisváltó memóriák időskáláinak kísérleti vizsgálata [Experimental study of time scales in nanoscale phase change memories]*. TDK thesis (2020)
2. János Gergő Fehérvári. *Sztochasztikus jelenségek rezisztív kapcsoló memóriákban [Stochastic phenomena in resistive switching memories]*. BSc thesis (2021)

3. Antal Roland Kövecss. *Neurális dinamikával rendelkező memrisztor alapú detektoráramkör megvalósítása [Realization of a memristor-based detector circuit with neurodynamical behavior]*. TDK thesis (2022)
 4. Antal Roland Kövecss. *Memrisztor-alapú jelfeldolgozó egység tervezése cochleáris implantátumokhoz [Designing a memristor-based signal processing unit for cochlear implants]*. BSc thesis (2023)
 5. Zsigmond Pollner. *Ultragyors, memrisztív oszcillátor-áramkörök fejlesztése [Development of ultrafast, memristive oscillator circuits]*. TDK thesis (2023)
- **Teaching physics laboratory courses to BSc and MSc students** (since 2019)
 - **Nobel prize experiments for high school students**, annual laboratory course
 - **lab responsible** (*Superconductivity, Atomic contacts*; since 2017)
 - **organizer** (since 2021)