CV | Domokos Meszéna, Ph.D.

Research Engineer and Neuroscientist

Date of birth, Status: 1989 (37 years old), Married (2017)
Lab sites: US: https://cashlab.mgh.harvard.edu | *HU:* http://www.ulbertlab.com/
Contact: meszena.domokos@ttk.hu, *Current Residency: Budapest, Hungary*

KEYWORDS

Electrophysiology, Neuropixels, Human intraoperative recordings in the OR, Development and testing of high-density electrodes, In vivo and in vitro recordings, Human brain slices, Two-photon microscopy, Patch-clamp, Optogenetics, Retina, Multi-electrode arrays (MEAs), Translational and human clinical research, Start-up & Biodesign process, Neurotechnology & Neuroengineering

PROFESSIONAL EXPERIENCE

2014 – (active) *(12 years)* **Postdoctoral Research Associate** (2020-) **@**István Ulbert's Lab**,** Integrative Neuroscience Group, Institute of Cognitive Neuroscience and Psychology, HUN-REN Research Centre for Natural Sciences (RCNS), Budapest, Hungary *(2014-2020: as Predoctoral Fellow)*
Fields: Combined electrophysiology and Multi-photon imaging, Neural interface development and testing, Human translational neuroscience and neurotechnology
Mentor: Prof. István Ulbert, MD, DSc *(Full professor, Director of the Institute)*

2025 – (active) *(1.5 year)* **University Lecturer**, **Research Associate,** Pázmány Péter Catholic University, Faculty of Information Technology and Bionics, Budapest, Hungary

2022 - 2024 *(2 years)* **Research Fellow @**Sydney Cash's Lab, Center for Neurotechnology and Neurorecovery (CNTR), Department of Neurology at Massachusetts General Hospital (MGH), Harvard Medical School, Boston, MA, USA *(still working on active collaborative projects)*
Fields: Human intraoperative, high-density Neuropixels recordings, Combined single-unit and LFP analysis
Mentor: Prof. Sydney S. Cash, MD, PhD *(Full professor, Division Chief)*

2012 - 2014 *(2 years)* **MSc Research Student**, Process Control Research Group (PCRG), Budapest, Hungary
Research area: Mathematical modelling of physiological control systems
Supervisor: Prof. Gábor Szederkényi, DSc *(Full professor)*

2011 - 2013 *(1.5 years)* **BSc Research Student**, Complex Systems and Computational Neuroscience Group (CSCNS) Wigner Research Centre for Physics, Hungarian Academy of Sciences, Budapest, Hungary
Research area: Statistical analysis of neocortical spike trains in primates
Supervisor: László Négyessy, PhD *(Senior research fellow)*

EDUCATION

2014 – 2020 Oct **PhD degree, Summa Cum Laude** *(Informatics, specialized in Neuroscience)*
Roska Tamás Multidisciplinary Doctoral School of Sciences and Technology, Pázmány Péter Catholic University, Faculty of Information Technology and Bionics, Budapest, Hungary
Supervisor: Prof. István Ulbert, MD, DSc
Thesis: (link) *"Advanced recording techniques for studying cellular-level neurophysiology"*

2013 - 2014 **MSc degree in Info-bionics Engineering,** PPCU, Budapest, Hungary
Qualification: Excellent, First-class honours degree
Supervisor: Prof. Gábor Szederkényi, DSc

2008 - 2012 **BSc degree in Molecular Bionics Engineering**, PPCU, Budapest, Hungary
Diploma: First-class honours degree
Supervisor: László Négyessy, PhD, Wigner Research Centre for Physics

2002 - 2008 **Nagy Lajos High School of the Cistercian Order**, Pécs, Hungary
Final Exams: **A+ Grade** *(with Lajos Nagy medal for excellence)*

PUBLICATIONS

** First author, ‡ Corresponding author*

Preprints and works in progress (selected)

- W. Muñoz*, R. Hardstone*, D. Meszéna*, L. Wittner, M. Halgren, O. Farkas, R. Bod, I. Ulbert, D. Fabó, Y. Kfir, B. Coughlin, M. Jamali, I. Caprara, A. Khanna, M. L. Mustroph, E. M. Trautmann, C. Windolf, E. Varol, D. J. Soper, S. D. Stavisky, M. Welkenhuysen, B. Dutta, K. V. Shenoy, P. Jones, G. Dunn, L. Erőss, L. R. Hochberg, J. S. Schweitzer, R. M. Richardson, Z. M. Williams, S. S. Cash, and A. C. Paulk. Identifying and mapping human neocortical laminar ensemble dynamics during arousal, task engagement and visual perception. *(Co-1st author, before submission)*
- D. Meszéna*, O. Farkas*, R. Hardstone, W. Munoz, I. Caprara, M. Jamali, B. Coughlin, C. Windolf, E. Varol, I. Ulbert, Z. M. Williams, S. S. Cash and A. C. Paulk. Spatiotemporal propagation profiles of human single units revealed by intraoperative high-density Neuropixels recordings. *(Co-1st author, In preparation)*
- A. Pak, A. I. Velea, T. Hosman, J. Wilson, R. Panskus, M. Seckel, P. de Anta Dardagan, R. Schmidt, D. Horváth, K. Tóth, D. Meszéna, A. Gollhardt, N. Bakhshaee Babaroud, B. Pahl, E. Zingkou, A. Kolianou, G. Sotiropoulou, S. Negi, F. Solzbacher, C. Kallmayer, I. Ulbert and V. Giagka. Thermoplastic polyurethane as a base material for soft, high-density neural interfaces, ***BioRxiv***, 755411, 2026. *DOI: 10.64898/2026.10.04.755411 (Preprint, Under review)*
- B. Hsueh, Y. J. Kim, A. Eranki, G. Ng, W. Muñoz, R. Hardstone, B. Coughlin, I. Das, E. Peng, T. Wilson, P. Hadar, B. Mash, D. Kellar, I. Caprara, D. Meszéna, B. Choi, D. P. Cahill, G. P. Dunn, J. Schweitzer, S. S. Cash, A. C. Paulk, M. Jamali, Z. M. Williams. Single-cellular functioning and speech encoding by neurons within human peritumoral cortex. *(Under submission)*

Peer-Reviewed Journal Publications

2026

19. K. A. Katlowitz, E. R. Cole, E. A. Mickiewicz, S. Shah, M. C. Franch, J. Adkinson, J. L. Belanger, R. K. Mathura, D. Meszéna, M. McGinley, W. Muñoz, G. P. Banks, S. S. Cash, C. Hsu, A. C. Paulk, N. R. Provenza, A. Watrous, Z. Williams, A. M. Goldman, V. Krishnan, A. Maheshwari, S. R. Heilbronner, R. Kim, N. Rungratsameetaweemana, B. Y. Hayden, S. A. Sheth. Plasticity and language in the anesthetized human hippocampus. ***NATURE***, 654, 714–723, 2026. *(IF: 48.5, Q1/D1, Preprint available on é, DOI: 10.1038/s41586-026-10448-0*
18. D. Meszéna*, W. Fadel, R. Tóth, A. C. Paulk, D. J. Kellar, M. Jamali, S. Cash, Z. Williams, T. Kiss, M. Stippinger, L. Wittner, R. Fiáth, and Z. Somogyvári. Optimal inter-electrode distances for maximizing single unit yield per electrode in neural recordings. ***MICROSYSTEMS & NANOENGINEERING***, 12, 41, 2026. *(IF: 9.9, Q1/D1, Preprint available on BioRxiv) DOI: 10.1038/s41378-025-01115-x*

2025

17. A. Kaszás*, D. Meszéna*, R. Fiáth, A. Slézia, I. Ulbert and G. Katona. Capturing the electrical activity of all cortical neurons: Are solutions within reach? ***ADVANCED SCIENCE***, 12, 32, e062252025, 2025. *(IF: 14.3, Q1/D1) DOI: 10.1002/advs.202506225*
16. R. Szabó, D. Szepesi-Kovács, D. J. Kiss, E. Nazafat, A. D. Tóth, J. M. Santamaria, M. I. Loza, D. Meszéna, L. Wittner, I. Ulbert, L. Hunyady and Gy. M. Keserű. Design, synthesis, and evaluation of a new fluorescent ligand for the M2 muscarinic acetylcholine receptor. ***ACS MEDICINAL CHEMISTRY LETTERS***, 16, 4, 552–559, 2025. *(IF: 3.5, Q1) DOI: 10.1021/acsmedchemlett.4c00592*
15. C. Windolf, H. Yu, A.C. Paulk, D. Meszéna, W. Muñoz, J. Boussard, R. Hardstone, I. Caprara, M. Jamali, Y. Kfir, D. Xu, J. E Chung, K. K. Sellers, Z. Ye, J. Shaker, A. Lebedeva, M. Raghavan, E. Trautmann, M. D. Melin, J Couto, S. Garcia, B. Coughlin, M. Elmaleh, D. Christianson, J.D.W. Greenlee, C. Horváth, R. Fiáth, I. Ulbert, M.A Long, J. A. Movshon, M. N. Shadlen, M. M. Churchland, , A. K. Churchland, N. A. Steinmetz, E. F. Chang, J. S. Schweitzer, Z. M. Williams, S. S. Cash, L. Paninski and E. Varol. DREDge: robust motion correction for high-density extracellular recordings across species. ***NATURE METHODS***, 22, 788–800, 2025. *(IF: 36.1, Q1/D1) DOI: 10.1038/s41592-025-02614-5*
14. K Nanbakhsh, MV Gompel, R Ritasalo, A Gollhardt, D Horváth, K Tóth, D Meszéna, I Ulbert, W Serdijn and V Giagka. An in vivo biostability evaluation of ALD and Parylene-ALD multilayers as micro-packaging solutions for small single-chip implants. ***SMALL***, 21, 2410141, 2025. *(IF: 13.0 Q1/D1) DOI: 10.1002/smll.202410141*
13. K. Nanbakhsh, A. Idil, C. Lamont, C. Ducso, Ö. Akgun, D. Horváth, K. Tóth, D. Meszéna, I. Ulbert, F. Mazza, T. Constandinou, W. Serdijn, A. Vanhoestenberghe, N. Donaldson and V. Giagka. On the longevity and inherent hermeticity of Silicon-ICs: Evaluation of Bare-Die and PDMS-Coated ICs after accelerated aging and implantation studies. ***NATURE COMMUNICATIONS***, 16, 12, 2025. *(IF: 14.7, Q1/D1) DOI: 10.1038/s41467-024-55298-4*

2024

12. A. R. Khanna, W. Muñoz, Y. J. Kim, Y. Kfir, A. C. Paulk, M. Jamali, J. Cai, M. Mustroph, I. Caprara, M. Mejdell, D. Meszéna, A. Zuckerman, J. Schweitzer, S. S. Cash and Z. M. Williams. Single-neuronal prefrontal components of speech production in humans. ***NATURE***, 626 (7999), 603-610, 2024. *(IF: 50.5, Q1/D1) DOI: 10.1038/s41586-023-06982-w*

2023

11. B. Coughlin, W. Muñoz, Y. Kfir, M Young, D. Meszéna, M. Jamali, I. Caprara, R. Hardstone, A. Khanna, M. L. Mustroph, E. M. Trautmann, C. Windolf, E. Varol, D. J. Soper, S. D. Stavisky, M. Welkenhuysen, B. Dutta, K. V. Shenoy, L. R. Hochberg, R. M. Richardson, Z. M. Williams, S. S. Cash, and A. C. Paulk. Modified Neuropixels probes for recording human neurophysiology in the operating room. ***NATURE PROTOCOLS***, 18, 2927-2953, 2023. *(IF: 13.1, Q1/D1) DOI: 10.1038/s41596-023-00871-2*
10. D. Meszéna*‡, A. Barlay, P. Boldog, K. Furuglyás, D. Cserpán, L. Wittner, I. Ulbert and Z. Somogyvári‡. Seeing beyond the spikes: reconstructing the complete spatiotemporal membrane potential distribution from paired intra- and extracellular recordings. ***JOURNAL OF PHYSIOLOGY***, 601.15, 3351–3376, 2023. *Spec. Issue for the 70th Anniversary. of the HH-model equations. Editor's Choice. (IF: 6.23, Q1/D1) DOI: 10.1113/JP283550*

2022

9. R. Bod, J. Rokai, D. Meszéna, R. Fiáth, I. Ulbert and G. Márton. From end to end: gaining, sorting and employing high-density neural single unit recordings. *Review.* ***FRONTIERS IN NEUROINFORMATICS***, 16:851024, 2022. *(IF: 4.76, Q1) DOI: 10.3389/fninf.2022.851024*

2021

data set G. Dimitriadis, J. P. Neto, A. Aarts, *[...]* G. Marton, D. Meszéna, S. Mitra, *[...]* B. Raducanu, P. Ruther, T. Schroeder, W. Singer, P. Tiesinga, I. Ulbert, S. Wang, M. Welkenhuysen, and A. R Kampff. Functional limits of CMOS electrophysiology probes. Are we there yet? *(Published Data set).* ***EBRAINS***, 2021. *DOI: 10.25493/1YN8-1J4*

8. D. Szepesi Kovács, I. Hajdu, G. Mészáros, L. Wittner, D. Meszéna, E. Zs. Tóth,, Z. Hegedűs, I. Ranđelović, J. Tóvári, T. Szabó, B. Szilágyi, M. Milen, Gy. M. Keserű and P. Ábrányi-Balogh. Synthesis and characterization of new fluorescent boro-β-carboline dyes. ***RSC ADVANCES***, 11 (21), 12802-12807, 2021. *(IF: 3.12, Q1) DOI: 10.1039/D1RA02132J*
7. R. Fiáth, D. Meszéna, Z. Somogyvári, M. Boda, P. Barthó, P. Ruther and I. Ulbert. Recording site placement on planar silicon-based probes affects neural signal quality: edge sites enhance acute recording performance. ***SCIENTIFIC REPORTS***, 11, 2028, 2021. *SciRep Top 100 Neuroscience paper in 2021 (IF: 5.52, Q1/D1) DOI: 10.1038/s41598-021-81127-5*
6. T. Marek, G. Orbán, D. Meszéna, G. Márton, I. Ulbert, G. Mészáros and Zs. Keresztes. Optimization Aspects of Electrodeposition of Photoluminescent Conductive Polymer Layer onto Neural Microelectrode Arrays. ***MATERIALS CHEMISTRY AND PHYSICS***, 260, 124163, 2021. *(IF: 3.41, Q2) DOI: 10.1016/j.matchemphys.2020.124163*

2020

5. G. Márton, E. Z. Tóth, L. Wittner, R. Fiáth, D. Pinke, G. Orbán, D. Meszéna, I. Pál, E. L. Győri, Z. Bereczki, Á. Kandrács, K. T. Hofer, A. Pongrácz, I. Ulbert and K. Tóth. The neural tissue around SU-8 implants: a quantitative *in vivo* biocompatibility study. ***MATERIALS SCIENCE AND ENGINEERING C****, 112C, 110870, 2020. (IF: 4.96, Q1/D1) DOI: 10.1016/j.msec.2020.110870*

2019

4. G. Orbán, D. Meszéna, K. R. Tasnády, B. Rózsa, I. Ulbert and G. Márton. Method for spike detection from microelectrode array recordings contaminated by artifacts of simultaneous two-photon imaging. ***PLOS ONE***, 14(8): e0221510, 2019. *(IF: 2.78, Q1) DOI: 10.1371/journal.pone.0221510*
3. D. Meszéna*, B. P Kerekes, I. Pál, G. Orbán, R. Fiáth, T. Holzhammer, P. Ruther, I. Ulbert and G. Márton. A silicon-based spiky probe providing improved cell accessibility for in vitro brain slice recordings. ***SENSORS & ACTUATORS B – CHEMICAL****, 297C,* 126649, 2019. *(IF: 7.1, Q1/D1) DOI: 10.1016/j.snb.2019.126649*
2. Zátonyi, G. Orbán, R. Modi, G. Márton, D. Meszéna, I. Ulbert, A. Pongrácz, M. Ecker, W. E. Voit, A. Joshi-Imre, and Z. Fekete. A softening laminar electrode for recording single unit activity from the rat hippocampus. ***SCIENTIFIC REPORTS****,* 9(1), 1-13, 2019. *(IF: 3.99, Q1/D1) DOI: 10.1038/s41598-019-39835-6*

2018

preprint G. Dimitriadis, J. P. Neto, A. Aarts, *[...]* G. Marton, D. Meszéna, S. Mitra, *[...]* B. Raducanu, P. Ruther, T. Schroeder, W. Singer, P. Tiesinga, I. Ulbert, S. Wang, M. Welkenhuysen, and A. R Kampff. Why not record from every channel with a CMOS scanning probe? *(Preprint,* ***BIORXIV,*** *DOI: 10.1101/275818)*

2017

1. D. Cserpán, D. Meszéna, L. Wittner, K. Tóth, I. Ulbert, Z. Somogyvári and D. Wójcik. Revealing the Distribution of Transmembrane Currents along the Dendritic Tree of a Neuron with Known Morphology from Extracellular Recordings. ***eLIFE***; 6: e29384, 2017. *(IF: 7.73, Q1/D1) DOI: 10.7554/eLife.29384*

Patent application

I. Ulbert, G. Márton, D. Meszéna, B. P. Kerekes, G. Orbán, K. R. Tasnády, D. Pinke. A design of an ionic conductance-based multi-electrode system for mitigating photoelectric artefacts. Hungarian Patent Application, *Registration number: 45B01FEF1C, File number: P1700527, Date: 15th December 2017. (link)*

GRANTS and AWARDS

2025-2026 **EKÖP Fellowship,** University Research Scholarship Programme, PPCU FITB *(Young Researcher II. category, 12 months, $7.2k)*

2025 **Waiver and Travel Grant** from the Templeton World Charity Foundation, Inc. for the **CIFAR Neuroscience of Consciousness Winter School**, Montebello, QC, Canada

2024 **Falling Walls Lab Hungary** 2nd place, elevator pitch competition, national finals, Budapest, Hungary

2024 **Trainee Professional Development Award**, Society for Neuroscience, Chicago, USA *($2.5k prize)*

2023 **Start-up pitch competition 1st place**, **Cleveland Neurodesign Entrepreneurs Workshop** (CNEW), Case Western Reserve University, Cleveland, OH, USA. *($2k prize for a team of four)*

2023-2026 **Research Grant** from the **OTKA postdoctoral excellence programme** (Grant No. PD143582)**,** Hungarian National Research, Development and Innovation Office (NRDI), Hungary, Title: "*Co-localized and simultaneous intra- and extracellular recordings for ground-truthing cellular-level neurophysiology*" *(71.2k EUR, 36 months, as Principal Investigator)*

2022 **FENS-IBRO/PERC Travel Award** to FENS FORUM 2022, Paris, France

2022 **Travel Grant** to EMBO Dendrites 2022 Workshop: Dendritic anatomy, molecules and function, Heraklion, Crete, Greece

2020 **Full Scholarship** from OIST to Computational Neuroscience Course (OCNC2020-21), Okinawa, Japan *(The 3-week course was later cancelled two times by the organizer due to the COVID-19 pandemic)*

2019 **Annual Institute Publication Award** (pre-doctoral category), RCNS, ICNP

2019 **FENS-SfN Stipend,** complete fee waiver at the Summer School on Neurotechnology, Bertinoro. Italy

2018 **UNKP Scholarship,** New National Excellence Program of the Ministry of Human Capacities *(9.75k EUR, 10 months, doctoral candidate level)*

2017 **Young Researcher Scholarship, HAS** *(Hungarian Academy of Sciences)*

2016 **Travel Grant** from the **Human Brain Project**, Obergurgl, Austria

2016 **Best Presentation Award**, Annual PhD Conference of the Doctoral School, PPCU

2016 **EMBO Travel Grant** *(and complete fee waiver)* from the British Marine Biological Association, UK

2015-2016 **PhD Excellence Scholarship**, PPCU Multidisciplinary Doctoral Program

2015 **OTDK Special Award**, Scientific Students' Association Conference, National Competition Finals, *(Applied Informatics section)*

2014 **Scholarship** of the Honored Man Foundation - in memory of Charles Simonyi *(1.3k EUR)*

2013-2014 **Scholarship for Scientific and Campus Activities**

2013 **TDK 1st place**, Scientific Students' Association Conference, Campus round, *(Systems Biology section)*

2010 - 2014 **Academic Scholarship**, *(for the excellent grade point averages)*

2008 **Lajos Nagy Medal** *(for excellence in secondary education)*

OTHER SCIENTIFIC ACTIVITIES

2026 **Internet Hungary, Speaker and Panelist**, Siófok, Hungary. (*link*)

2026 **NeurON Podcast, Interview** on Human Neuropixels and Future Neurotech. (*link*)

2026 **Magyar Kultúra Magazin**, **Interview** on Human Neuropixels and Future Neurotech. *(link and print)*

2026 **Talk** at **Adaptér Pub-lications Series** on neurotech basics and reseach directions *(link)*

2026 (5 days) **Gordon Research Conference** (GRC) on Neuroelectronic Interfaces 2026 participant, **Lucca, Italy.**

2025 (3 d) **CIFAR Neuroscience of Consciousness Winter School** selected participant, **Montebello, QC, Canada.**

2025 (2 d) **Human Single Neuron Meeting** participant**, Caltech, Pasadena, CA, USA**.

2025 (3 d) **NANS Neural Interfaces 2025 Meeting** participant, **Arlington, VA, USA.**

2025 (4 d) **ECNP Workshop on Applied Neuroscience**, Experimental and Clinical Neuroscience, **Nice, France.**

2024 (2 d) **Panelist**, **EU Brain Health Conference**: "Towards a strengthened European cooperation in Brain health research conference under the Hungarian Presidency of the Council of the European Union", organized by NKFIH / European Commission, Budapest, Hungary (*NKFIH link).*

2024 (3 d) **Invited researcher**, **INSERM, Institut du Fer à Moulin**, Jean-Christophe Poncer Lab, **Paris, France.**

2024 **Invited speaker**, **Magyar Tudomány Ünnepe (MTÜ)**, HUN-REN Research Centre for Natural Sciences (TTK), Budapest, Hungary (*link*).

2024 **Invited speaker**, **Young Scientists Network**, HUN-REN Institute of Experimental Medicine (KOKI), Budapest, Hungary.

2024 **Interview** on Neurotech and the Future of BCI at **MVM Future Talks** *(YouTube documentary, over 415k views currently, in Hungarian with English subtitles, link).*

2024 (2 d) **NIH NeuroTech Course Workshop** selected participant *(with travel grant)***, Minneapolis, MN, USA.**

2024 (1 d) **HealthTech Biodesign Workshop, Harvard Medical School** selected participant**, Boston, MA, USA.**

2023, 2024 **Interviews** on Neurotech updates in the US, **RTL.hu** and **Reggeli** (in Hungarian, *link1, link2, link3*).

2023 (4 d) **Cleveland Neurodesign Entrepreneurs, Start-up Workshop** selected participant *(all-inclusive plus travel grant)***,** Case Western Reserve University, **Cleveland, OH, USA**.

2023 **Invited speaker**, Hungarian Science Club of Boston, CCNR & Barabási Lab: Northeastern University, Network Science Institute, **Boston, MA, USA.**

2022 (2 d) **Human Single Neuron Meeting** participant, UCLA, **Los Angeles, CA, USA.**

2019 (1 week) **FENS-SfN Summer School** – Brain reading and writing: new perspectives of neurotechnology, **Bertinoro, Italy**

2018 (1 w) **Gordon Research Conference** on Neuroelectronic Interfaces, participant, **Galveston, TX, USA.**

2018 (2 w) **Invited Research Student**, University of Oxford, Department of Pharmacology, Medical Science Division, **Oxford, UK.** Host: Prof. Peter Somogyi *('Brain Prize' Laureate, 2011)*

2016 (1 w) **3rd Human Brain Project School**, Obergurgl University Centre, **Obergurgl, Austria.**

2016 (2 w) **EMBO Practical Course** in Advanced Optical Microscopy, British Marine Biological Association, **Plymouth, UK.**

2015 (1 w) **3rd Baltic-Nordic Summer School** on Neuroinformatics, **Tartu, Estonia.**

2015 (2 w) **Short research trip**, University of Notre Dame**, South Bend, IN, USA.**

Host: Prof. Gregory Timp, PhD *(Director of the Systems Biology Lab)*

2014 (1 w) **NWG Course** "Analysis and Models in Neurophysiology", Bernstein Center for Computational Neuroscience, **Freiburg, Germany.**

2014 (1 w) **Advanced Course** on Neural Data Analysis, 6th Winter Course of the German Neuroinformatics Node (G-Node) **Munich, Germany.**

2013 (2 w) **International Summer School** on Principles-Oriented Systems Biology, BIOCANT Innovation Center, **Cantanhede**, **Portugal.**

2012 (2 w) **International Summer School AACIMP**: 'Achievements and Applications of Contemporary Informatics, Mathematics and Physics', Kyiv Polytechnic Institute (KPI), **Kiev, Ukraine.**

OTHER SKILLS and LANGUAGES

MATLAB *(Advanced),* LabView *(Basic),* C++ *(Basic),* **Python** *w/* Visual Studio, Jupyter Notebooks *(Intermediate),* GitHub *(Basic),* **LaTeX** *(Advanced),* Overleaf, Mendeley, Microsoft Excel, PowerPoint, Adobe Photoshop, Corel Draw, Canva.

Application specific software: SpikeInterface, KiloSort-Phy (2.0), NWB, CellSens, ImageJ, NeuroScan 4.5, Femtonics, Multiclamp, pClamp10, INTAN RHD2000, Neurolucida, Open Ephys, SpikeGLX, Allen Institute ECEPHYS pipeline, etc.

2024 **MRI Safety Level 2 - Operating Room**, Certificate from MGH, Boston, MA, USA

2023 **Aseptic technique training II** for research technicians in the OR, MGH, Boston, MA, USA

2022 **Biomedical Research Investigators and Key Personnel, Human Research** *(ID: 50528688)*
CITI Program (online), MGH, Boston, MA, USA.

2015 **Certificate for Animal Experiments** *(Advanced level)*
Semmelweis Medical University of Budapest, Hungary

2024 **US Driving license**, Class D (passenger vehicle), Boston, MA

2007 **HU Driving license**, B category (frequent user)

Hungarian - Native proficiency, ***English*** **- Professional working proficiency** *(ECL B2 Complex Language Exam, 2012), Italian* - Limited working proficiency *(TELC B2 Complex Language Exam, 2008), German* - Limited working proficiency *(ÖSD B2 Complex Language Exam, 2006)*

TEACHING EXPERIENCES

2026-	Applications of Neural Microsystems, PPCU FITB, MSc course *(in **English**)*
2025-	Human-Machine Interfaces, University of Pécs (PTE), Biomedical Engineering MSc course *(in **English**)*
2025-	History of Brain Research, PPCU FITB BSc-MSc course *(in Hungarian)*
2020, 2024-	Basics of Neurobiology, BSc course *(in **English**)*
2020-21, 2024-	Neuroscience Preparatory course, MSc course *(in **English**)*
2017	Discrete Mathematics, BSc course *(in Hungarian)*
2015-2016	AFM and STM Microscopy - *Hands-on Lab*, BSc course *(in Hungarian)*
2014-2015	MATLAB Programming - *Computer Lab,* BSc course *(in Hungarian)*
2013	Electrophysiology I-II, BSc course *(in Hungarian)*
2011-2013	Introduction to Functional Neurobiology I-II, BSc course *(in Hungarian)*

STUDENT MENTORING

2026-	Anikó Vitos	(PPCU, Bionics Eng. BSc)	*(BSc 6th semester, ongoing)*
	Dóra Debreczeni	(PPCU, Bionics Eng. BSc)	*(BSc 6th semester, ongoing)*
2025-	Ádám Fedor	(PPCU, Bionics Eng. BSc)	*(BSc 6th semester, ongoing)*
	Orsolya Farkas	(PPCU, Bionics Eng. BSc)	*(BSc thesis, first-class honours)*
2024-	Álmos Polyhos	(PPCU, Bionics Eng. BSc)	*(BSc 6th semester, ongoing)*
	András Tamás Kovács	(PPCU, Bionics Eng. BSc)	*(BSc thesis, first-class honours)*
	Ádám Mayer	(PPCU, Bionics Eng. BSc)	*(BSc thesis, first-class honours)*
2022	Balázs Szabó	(PPCU, Info-Bionics Eng. MSc)	*(MSc thesis, first-class honours)*
2021	Levente Balázsi	(PPCU, Info-Bionics Eng. MSc)	*(MSc thesis, first-class honours)*
2021	Felícia Gyöngyvér Szabó	(PPCU, Medical. Biotech. MSc)	*(MSc thesis, first-class honours)*
2021	Balázs Szabó	(PPCU, Bionics Eng. BSc)	*(BSc thesis, first-class honours)*
	Rebeka Stelcz	(PPCU, Bionics Eng. BSc)	*(BSc thesis, first-class honours)*
2020	Mihály Boda	(PPCU, Bionics Eng. BSc)	*(BSc thesis, first-class honours)*
2019	Levente Balázsi	(PPCU, Bionics Eng. BSc)	*(BSc thesis, first-class honours)*
2018	Mariam Majida Shokoya	(PPCU, Bionics Eng. BSc)	*(BSc thesis, first-class honours)*

MEMBERSHIPS

2025-	*(MKNFT)*	Hungarian Society of **Clinical Neurophysiology**
2021-	*(MTA KT)*	Public body member of the Hungarian Academy of Sciences
2019-	*(IEEE brain)*	IEEE Brain Community,
2018-	*(SfN)*	**Society for Neuroscience**,
2017-	*(PS)*	IEEE Photonics Society,
2016-	*(EMBS)*	**IEEE Engineering in Medicine and Biology Society**,
2016-	*(IBE)*	Hungarian Info-Bionics Association,
2016	(*HBP)*	The Human Brain Project visiting student,
2015-	*(FENS)*	**Federation of European Neuroscience Societies**,
2015-	*(MITT)*	Hungarian Neuroscience Society

JOURNAL AND GRANT REVIEWS and EDITORIAL ACTIVITIES

2026	*Spec Issue **Editor***	Frontiers in Human Neuroscience *(Front Human Neuro)*	*(Frontiers)*
2026-	*Reviewer*	Cell Reports Methods *(CellRep Met)*	*(Cell Press)*
2026-	*Reviewer*	Advanced Science *(AdvSci)*	*(Wiley)*
2025	*PhD Reviewer*	Ph.D. Doctoral thesis reviewer and public defense committee member, PPCU Faculty of Information Technology and Bionics, Budapest, Hungary	
2025	*PhD Reviewer*	Ph.D. Doctoral thesis reviewer and public defense committee member, Semmelweis University, Faculty of Medicine, Budapest, Hungary	
2023	*Review **Panel Member***	**NSF Accelerating Research Translation** (ART) Grants 2023, USA	*(NSF)*
2023-	*Review **Editor***	Frontiers in Computational Neuroscience *(Front Comp Neuro)*	*(Frontiers)*
2022-	*Grant Reviewer*	OTKA postdoctoral excellence programme, grant reviewer, Hungarian National Research, Development and Innovation Office	*(NRDI)*
2021-	*Reviewer*	Scientific Reports *(SciRep)*	*(Nature)*
2021-	*Reviewer*	Journal of Neural Engineering *(JNE)*	*(IOP Science)*
2021-	*Reviewer*	Journal of Neuroscience Methods *(JNM)*	*(Elsevier)*

Conference talks and papers in proceedings

2026 **Bernstein** Conference Satellite Workshop on **Exotic Extracellular Waveforms**, Frankfurt, Germany. *(Talk)*
2026 **International Neuroscience Conference** of the Hungarian Neuroscience Society *(INC)*, Budapest, 2026. *(Talk)*

2025 **50th Congress of the Hungarian Society of Clinical Neurophysiology** *(MKNFT)*, Budapest, 2026. *(2 Talks)*
2025 **XXVI. European Society for Stereotactic and Functional Neurosurgery** *(ESSFN)*, Budapest, 2025. *(Talk)*
2024 **Nanosymposium talk** at SfN Neuroscience 2024, Chicago, IL, US, 2024. *(Talk)*
2023 C. Windolf, A. C. Paulk, Y. Kfir, E. Trautmann, S. Garcia, D. Meszéna, W. Muñoz, I. Caprara, M. Jamali, J. Boussard, Z. M. Williams, S. S. Cash, L. Paninski and E. Varol. Robust online multiband drift estimation in electrophysiology data, ***IEEE ICASSP*** *International Conference on Acoustics, Speech and Signal Processing (ICASSP),* Rhodes Island, Greece, 2023. *(IF: 4.88, Q1) DOI: 10.1109/ICASSP49357.2023.10095487*
2021 **MiCEnt Integrative Biology Symposium**, Hasselt University (UHasselt), Belgium, 2021. *(Virtual talk)*
2020 **Symposium talk at HunDoc 2020** PhD Student Conference, Szeged, Hungary, 2020. *(Talk)*
2014 Sensitivity analysis and parameter estimation of a human blood glucose regulatory system model. *11th International Workshop on Computational Systems Biology,* TISCP 64, pp. 28, Lisbon, Portugal, 2014. *(Talk and proceedings)*
2013 E. Lakatos, D. Meszéna and G. Szederkényi. Identifiability analysis and improved parameter estimation of a human blood glucose control system model. ***LECTURE NOTES IN COMPUTER SCIENCE***, A. Gupta and T.A. Henzinger (Eds.): LNBI 8130 Springer, pp. 248-249, 2013. *(IF: 1.12, Q2) DOI: 10.1007/978-3-642-40708-6*
2012 L. Négyessy, J. Minich, D. Meszéna, A. Buzás, B. Jákli, M. Bányai, E. Procyk, P. Barone and F. Bazsó. From Neuronal Communication to the Flow of Information in the Cerebral Cortex. *10th Digital Speech and Image Processing*, Kovacica, Serbia, 2012. *(Talk and proceedings)*

Poster presentations

D. Meszéna, O. Farkas, R. Hardstone, W. Muñoz, B. Coughlin, M. Jamali, I. Caprara, D. J. Kellar, I. Ulbert, Z. M. Williams, A. C. Paulk and S. S. Cash. Cell-type-specific spatiotemporal propagation profiles of single-units in the human neocortex. *SfN Neuroscience 2026*, Washingon, DC, US, 2026.

D. Meszéna, W. Fadel, R. Tóth, A. C. Paulk, D. J. Kellar, M. Jamali, S. Cash, Z. Williams, T. Kiss, M. Stippinger, L. Wittner, R. Fiáth, and Z. Somogyvári. Optimal inter-electrode distances for maximizing single unit yield per electrode in neural recordings. *Gordon Research Conference on Neuroelectronic Interfaces*, Lucca, Italy, 2026.

O. Farkas, W. Munoz, R. Hardstone, B. Coughlin, I. Caprara, M. Jamali, I. Ulbert, Z. M. Williams, S. S. Cash, A. C. Paulk and D. Meszéna. High-density spatiotemporal single-unit activity profiling and cell-type identification in the human neocortex. *International Neuroscience Conference*, Budapest, Hungary, 2026. *(co-senior author)*

D. Meszéna, W. Fadel, R. Tóth, A. C. Paulk, D. J. Kellar, M. Jamali, S. Cash, Z. Williams, T. Kiss, M. Stippinger, L. Wittner, R. Fiáth, and Z. Somogyvári. Optimal inter-electrode distances for maximizing single unit yield per electrode in neural recordings. *SfN Neuroscience 2025*, San Diego, CA, US, 2025.

W. Muñoz*, R. Hardstone*, D. Meszéna*, D. J. Kellar, R. Jain, B. Mash, E. Esposito, B. Hsueh, I. Das, L. Wittner, R. Bod, I. Ulbert, D. Fabó, L. Erőss, M. Halgren, B. Coughlin, M. Jamali, D. Cahill, J. S. Schweitzer, Z. M. Williams, A. C. Paulk and S. S. Cash. Identifying and mapping human neocortical laminar ensemble dynamics during arousal, task engagement, and visual perception. *Human Single Neuron Meeting 2025*, Caltech, Pasadena, CA, US, 2025. *(* equal contributions)*

D. Meszena, A. Paulk, W. Munoz, M. Jamali, I. Caprara, B. Coughlin, C. Windolf, E. Varol, I. Ulbert, Z. Williams and S. Cash. Human single neural and columnar dynamics recorded by intraoperative high-density penetrating electrodes *ECNP Workshop on Applied Neuroscience, Experimental and Clinical Neuroscience*, Nice, France, 2025. (Proceedings at *Neuroscience Applied*, 4, 105433, 2025) *(IF: 1.88 Q3) DOI: 10.1016/j.nsa.2025.105433*

D. Meszéna*, P. Boldog*, K. Furuglyás, K. Tóth, L. Wittner, I. Ulbert and Z. Somogyvári. Unraveling the individual membrane current components and local microcircuit states of CA1 pyramidal cells using ground-truth recordings. *SfN Neuroscience 2024*, Chicago, IL, US, 2024. *(* equal contributions)*

P. Boldog*, D. Meszéna*, K. Furuglyás, L. Wittner, I. Ulbert and Z. Somogyvári. Deciphering Neuronal Dynamics: Unraveling Active, Passive, and Capacitive Current Components. *Hungarian Neuroscience Society's Annual International Neuroscience Conference*, Pécs, Hungary, 2024. *(* equal contributions)*

D. Meszéna, A. C. Paulk, W. Munoz, I. Caprara, M. Jamali, B. Coughlin, C. Windolf, E. Varol, Z. M. Williams, and S. S. Cash. Spatiotemporal backpropagation patterns of human single unit waveforms revealed by intraoperative high-density Neuropixels recordings. *SfN Neuroscience 2023*, Washington, DC, US, 2023.

W. Munoz, R. Hardstone, D. J. Kellar, A. Paulk, M. Jamali, I. Caprara, D. Meszéna, Y. Kfir, S. Cash and Z. Williams. Single-neuronal and laminar computations in the human prefrontal cortex during speech production. *SfN Neuroscience 2023*, Washington, DC, US, 2023.

I. Caprara, M. Jamali, B. Mash, M. Mustroph, B. L. Grannan, W. Munoz Miranda, D. Meszéna, A. Paulk, S. S. Cash, R. Báez-Mendoza and Z. Williams. Mapping semantic representations in animals and humans at single-cell resolution. *SfN Neuroscience 2023*, Washington, DC, US, 2023.

C. Windolf, A. Paulk, Y. Kfir, E. Trautmann, S. Garcia, D. Meszéna, W. Muñoz, R. Hardstone, I. Caprara, M. Jamali, J. Boussard, Z. Williams, S. S. Cash, L. Paninski and E. Varol. Robust registration of high-density electrophysiology data with DREDge. *SfN Neuroscience 2023*, Washington, DC, US, 2023.

D. Meszéna, A. Barlay, P. Boldog, K. Furuglyás, D. Cserpán, L. Wittner, I. Ulbert and Z. Somogyvári. Seeing beyond the spikes: reconstructing the complete spatiotemporal membrane potential distribution from paired intra- and extracellular recordings. *Joint Meeting of the Hungarian Neuroscience Society (MITT) and the Austrian Neuroscience Association (ANA)*, Budapest, Hungary, 2023.

D. Meszéna, A. Barlay, D. Cserpán, K. Tóth, L. Wittner, I. Ulbert and Z. Somogyvári. Spatio-temporal membrane potential and resistive current reconstruction from parallel multielectrode array and intracellular measurements in single neurons. *FENS Forum of Neuroscience*, Paris, France, 2022.

D. Meszéna, A. Barlay, D. Cserpán, K. Tóth, L. Wittner, I. Ulbert and Z. Somogyvári. Spatio-temporal membrane potential and resistive current reconstruction from parallel multielectrode array and intracellular measurements in single neurons. *EMBO Workshop Dendrites 2022: Dendritic anatomy, molecules and function*, Heraklion, Crete, Greece, 2022.

G. Orbán, D. Meszéna, P. Ruther, I. Ulbert and G. Márton. Noise filtering and data analyzing method for simultaneous in vivo electrophysiology and two-photon imaging, Bernstein Conference, 2020.

M. Rácz, R. Fiáth, D. Meszéna, I. Ulbert and G. Márton. Convolutional neural networks for spike sorting in paired electrophysiological recordings, *FENS Forum of Neuroscience (virtual)*, 2020.

D. Meszéna, G. Orbán, K. R. Tasnády, I. Ulbert and G. Márton. Towards co-localised microelectrode array recordings and two-photon microscopy. *IBRO Workshop*, Szeged, Hungary, 2020.

R. Fiáth, D. Meszéna, M. Boda, P. Barthó and I. Ulbert. Do edge recording sites on high-density silicon probes provide better recording quality than center sites? *IBRO Workshop*, Szeged, Hungary, 2020.

Cs. Horváth, D. Meszéna, L. Balázsi, R. Fiáth and I. Ulbert. Two-photon guided neurovascular reconstruction to reduce vascular damage caused by neural probe insertion. *IBRO Workshop*, Szeged, Hungary, 2020.

Z. Somogyvári, D. Meszéna, D. Cserpán, L. Wittner and I. Ulbert. Spatio-temporal membrane potential and resistive current reconstruction from parallel multielectrode array and intracellular measurements in single neurons. *10th IBRO World Congress of Neuroscience,* Daegu, Korea, 2019.

G. Orbán, D. Meszéna, K. R. Tasnády, I. Ulbert and G. Márton. Towards simultaneous microelectrode array recordings and two-photon microscopy. *XVI Meeting of the Portuguese Society for Neuroscience*, Lisbon, Portugal, 2019.

R. Fiáth, D. Meszéna, M. Boda, P. Barthó and I. Ulbert. Impact of the recording site location on the recording performance of silicon probes in acute experiments. *FENS Regional Meeting*, Belgrade, Serbia, 2019.

E. Z. Tóth, D. Meszéna, A Dublecz, D.Pálfi, K. Tóth, B. Rózsa, L. Erőss, A. Bagó, D. Fabó, I. Ulbert and L. Wittner. Back-propagating action potentials in human neocortical pyramidal cells and interneurons: A preliminary study. *Gordon Research Conference: Dendrites*, Ventura, CA, US, 2019.

D. Meszéna, I. Pál, B. P. Kerekes, G. Marton, K. Tóth, L. Wittner, Z. Somogyvári and I Ulbert. Simultaneous intra- and linear extracellular recordings with corresponding morphology: towards a ground-truth data for multichannel electrodes. *SfN Neuroscience 2018*, San Diego, CA, US, 2018.

K. Tóth, E. Z. Tóth, L. Wittner, R. Fiáth, D. Meszéna, I. Pál, E. L. Győri, D. Pinke, Z. Bereczki, G. Orbán, A. Pongrácz, I. Ulbert and G. Márton. Biocompatibility of the SU-8 in the central nervous system. *SfN Neuroscience 2018*, San Diego, CA, US, 2018.

D. Meszéna, I. Pál, B. P. Kerekes, G. Marton, K. Tóth, L. Wittner, Z. Somogyvári and I Ulbert. Targeted and simultaneous investigation of intra- and extracellular neural signals and their relationship. *11th FENS Forum of Neuroscience*, Berlin, Germany, 2018.

G. Orbán, T. Marek, D. Meszéna, B.P. Kerekes, K.R. Tasnády, I. Ulbert, G. Mészáros, Zs. Keresztes and G. Márton. Fluorescent conductive polymer coating on implanted microelectrodes for visualization under two-photon microscopes. *11th FENS Forum of Neuroscience*, Berlin, Germany, 2018.

D. Meszéna, B. P. Kerekes, I. Pál, T. Holzhammer, P. Ruther, I. Ulbert and G. Márton. A novel, silicon-based spiky probe providing improved cell accessibility for in vitro brain slice recordings. *Gordon Research Conference: Neuroelectronic Interfaces*, Galveston, Texas, US, 2018.

D. Meszéna, I. Pál, B. P. Kerekes, G. Márton, Z. Somogyvári and I. Ulbert. Towards a better understanding of intra- and extracellular neural signals and their relationships. *FENS Regional Meeting*, Pécs, Hungary, 2017.

B. P. Kerekes, I. Pál, KT. Hofer, K. Tóth, D. Meszéna, V. Matusz, D. Zsíros, D. Dávid, FA Kader and I. Ulbert. A microsurgical method to modulate the spontaneous population activity and interictal-like activity in rat brain hippocampus slices. *FENS Regional Meeting*, Pécs, Hungary, 2017.

K. Tóth, L. Wittner, R. Fiáth, D. Meszéna, I. Pál, E. L. Győri, D. Pinke, Z. Bereczki, G. Orbán, A. Pongrácz, I. Ulbert and G. Márton. Biocompatibility of the SU-8 in the central nervous system. *FENS Regional Meeting*, Pécs, Hungary, 2017.

D. Cserpán, D. Meszéna, L. Wittner, K. Tóth, I. Ulbert, Z. Somogyvári and D. Wójcik. Revealing the Distribution of Transmembrane Currents along the Dendritic Tree of a Neuron with Known Morphology from Extracellular Recordings. *2nd Nencki Symposium*, Warsaw, Poland, 2017.

D. Meszéna, I. Pál, B. P. Kerekes, G. Márton, Z. Somogyvári and I. Ulbert. Integrative experimental design for simultaneous electrophysiology and two-photon calcium imaging in the rat hippocampus, in vitro, *10th FENS Forum of Neuroscience*, Copenhagen, Denmark, 2016.

HOBBIES AND EXTRACURRICULAR ACTIVITIES

Harvard Medical Postdoctoral Affiliation (HMPA) **Joint Mentorship Program mentee** (2023, 2024), Organizer/Lead at Boston Hungarian Science Club (2022-2024) at Barabasi Lab (Northeastern Univ), **Member of the Student Government, elected delegate for doctoral candidates** *(PPCU FITB, 2018-2021),* Playing on guitar *(since the age of 7, classical and jazz music),* Community and charity activities *(e.g., organizing summer child camps),* Hiking, climbing, 'via ferrata' *(in the Dolomites, IT),* Sailing *(Lake Balaton, HU and Adriatic Sea, HR),* Long-distance Running *(multiple successful Half Marathons, currently preparing for Marathon in 2027)*

SCIENTIFIC PROFILES, IDs *(with links)*

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LinkedIn: @dmeszena
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MTMT (HU)**:** 10047398
MTA Köztestület: 10059866
RCNS (HUN-REN)
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ResearchGate: domokos-meszena
WoS (ResearcherID): U-3696-2017
Loop Profile: 499106
ScholarGPS
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