CV | Domokos Meszéna, Ph.D.

Engineer and Neuroscientist

Date of birth, status: 1989 (36 years old), Married (2017)
Lab sites: HU: http://www.ulbertlab.com/ *US:* https://cashlab.mgh.harvard.edu
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) *(11 years)*
Postdoctoral Research Scientist @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 a 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 *(Director of the Institute)*

2025 – (active) *(2 months)*
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 modeling 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, specializing 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 *(Full professor)*
Thesis: (link) *"Advanced recording techniques for studying cellular-level neurophysiology"*

2013 - 2014
MSc degree in Info-bionics Engineering, PPCU, Budapest, Hungary
Diploma: Excellent, First-class honors degree
Supervisor: Prof. Gábor Szederkényi, DSc *(Full professor)*

2008 - 2012
BSc degree in Molecular Bionics Engineering, PPCU, Budapest, Hungary
Diploma: First-class honors 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)

- D. Meszéna*, A. C. Paulk, W. Munoz, I. Caprara, M. Jamali, B. Coughlin, C. Windolf, E. Varol, F. Richárd, Z. Somogyvári, I. Ulbert, Z. M. Williams, and S. S. Cash. Spatiotemporal propagation profiles of human single units revealed by intraoperative high-density Neuropixels recordings. *(1st author, in preparation)*
- W. Muñoz*, R. Hardstone*, D. Meszéna*, L. Wittner, R. Bod, M. Halgren, I. Ulbert, D. Fabo, J. Szabó, 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, 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*, 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. *(1st author, under review, Preprint available on **BIORXIV**) DOI: 10.1101/2025.04.11.648355*
- K. A. Katlowitz, S. Shah, M. C. Franch, J. Adkinson, J. L. Belanger, R. K. Mathura, D. Meszéna, E. A. Mickiewicz, M. McGinley, W. Muñoz, G. P. Banks, S. S. Cash, C-W. L. Hsu, A. C. Paulk, N. Provenza, A. Watrous, Z. Williams, S. R. Heilbronner, R. Kim, N. Rungratsameetaweemana, B. Y. Hayden and S. A. Sheth. Learning and language in the unconscious human hippocampus. *(Co-author, under review, Preprint available on **BIORXIV**) DOI: 10.1101/2025.04.09.648012*

Peer-Reviewed Journal Publications

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, Preprint available on **AUTHOREA**) DOI: 10.22541/au.173645459.93977919/v1*
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. *Special 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 applications

2024

M. Abraham, J. Lam, D. Meszéna and M. McKinnon. Surface grid electrode for neural activity recording and stimulation in traumatic brain injury patients. Provisional US Patent Application, 2024. *(in preparation)*

2017

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)*

SCHOLARSHIPS, AWARDS, and GRANTS

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

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 program** (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 €, 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 **Scholarship** from OIST to Computational Neuroscience Course (OCNC2020-21), Okinawa, Japan *(The 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 €, 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

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

2025 (3 days) **Human Neuropixels & Human Single Neuron Meeting** participant**, Caltech, Pasadena, CA, USA**.

2025 (3 days) **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**, **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 *(all-inclusive)***, Minneapolis, MN, USA**

2024 **HealthTech Biodesign Workshop, Harvard Medical School** 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 days) **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** participant, **Galveston, TX, USA**
	Topic: Beyond Feasibility - Bridging the Gap in Neuroelectronic Interfaces
2018 (2 w)	**Invited Research Student**, University of Oxford, Department of Pharmacology, Medical Science Division, **Oxford, UK** Host: Prof. Peter Somogyi *(1st '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 Code, Jupyter Notebooks) *(Intermediate),* GitHub *(Basic),* **LaTeX** *(Advanced),* Overleaf, Mendeley, Microsoft Excel, Adobe Photoshop, CorelDRAW, Canva.

Application-specific software: SpikeInterface, KiloSort-Phy, NWB, CellSens, ImageJ, NeuroScan 4.5, MES/MESc (Femtonics), MultiClamp, pClamp10, INTAN RHD2000, Neurolucida, OpenEphys, 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** CITI PROGRAM *ID: 50528688*, 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

2025	History of Brain Research, PPCU FITB BSc-MSc course *(in Hungarian)*
2025	Human-Machine Interfaces, University of Pécs (PTE), Biomedical Engineering MSc course *(in **English**)*
2020, 2024, 2025	Basics of Neurobiology, PPCU FITB BSc course *(in **English**)*
2020-21, 2024-25	Neuroscience Preparatory course, PPCU FITB MSc course *(online, in **English**)*
2017	Discrete Mathematics, PPCU FITB BSc course *(in Hungarian)*
2015-2016	AFM and STM Microscopy, PPCU FITB BSc course, *Hands-on Lab (in Hungarian)*
2014-2015	MATLAB Programming, PPCU FITB BSc course, *Computer Lab (in Hungarian)*
2013	Electrophysiology I-II, PPCU FITB BSc course *(in Hungarian)*
2011-2013	Introduction to Functional Neurobiology I-II, PPCU FITB BSc course *(in Hungarian)*

STUDENT MENTORING

2025 -	Ádám Fedor	(PPCU, Bionics Eng. BSc)	*(BSc 5th semester, ongoing)*
	Orsolya Farkas	(PPCU, Bionics Eng. BSc)	*(BSc 7th semester, ongoing)*
2024 -	Álmos Polyhos	(PPCU, Bionics Eng. BSc)	*(BSc 5th semester, ongoing)*
	András Tamás Kovács	(PPCU, Bionics Eng. BSc)	*(BSc 7th semester, ongoing)*
	Ádám Mayer	(PPCU, Bionics Eng. BSc)	*(BSc 7th semester, ongoing)*

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)*
	Felícia Gyöngyvér Szabó	(PPCU, Medical. Biotech. MSc)	*(MSc thesis, first-class honours)*
	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, GRANT, and OTHER REVIEW ACTIVITIES

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	*Grant **Panel Member***	**NSF Accelerating Research Translation** (ART) 2023, National Science Foundation, USA, Grant panel member *(NSF)*
2023-	*Review **Editor***	Frontiers in Computational Neuroscience *(Front Comp Neuro)* *(Frontiers)*
2022-	*Grant reviewer*	OTKA postdoctoral excellence program, Grant reviewer, Hungarian National Research, Development, and Innovation Office *(NRDI)*
2021-	*Journal Reviewer*	Scientific Reports *(SciRep, Springer Nature), PLOS One,* Journal of Neural Engineering *(JNE, IOP Science),* Journal of Neuroscience Methods *(JNM, Elsevier)*

OTHER PUBLICATIONS

Conference talks and papers in proceedings

D. Meszéna*, W. Muñoz*, R. Hardstone*, R. Jain, M. Halgren, C. Windolf, D.J. Kellar, B. Coughlin, M. Jamali, I. Caprara, L. Wittner, R. Bod, I. Ulbert, D. Fabo, B. Zs. Hajnal, J. P. Szabó, L. Erőss, L. R. Hochberg, J. S. Schweitzer, Z. M. Williams, S. S. Cash and A. C. Paulk. Probing laminar ensemble dynamics in the human neocortex using high-density intraoperative multielectrodes. *XXVI. European Society for Stereotactic and Functional Neurosurgery (ESSFN)*, Budapest, Hungary, 2025. *(talk)*

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. *Nanosymposium talk at SfN Neuroscience 2024*, Chicago, IL, US, 2024. *(* equal contributions)*

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,* Rhodes Island, Greece, 2023. *(IF: 4.88, Q1) DOI: 10.1109/ICASSP49357.2023.10095487*

D. Meszéna*. Ground-truth data generation for neurophysiology: combination of intra-, extracellular recordings with two-photon imaging and morphological reconstruction. *MiCEnt Integrative Biology Symposium,* Hasselt University (UHasselt), Belgium, 2021. *(virtual talk)*

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

D. Meszéna*, E. Lakatos and G. Szederkényi. 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.

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*

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.

Poster presentations

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.

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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.

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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 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. 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.

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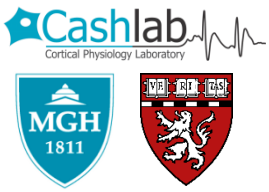

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