CV | Domokos Meszéna, Ph.D.

Engineer and Neuroscientist

Date of birth, Status: 1989 (34 years old), Married (2017)
Academic Emails: US: dmeszena@mgh.harvard.edu | *HU*: meszena.domokos@ttk.hu
Lab Websites: US: https://cashlab.mgh.harvard.edu | *HU:* http://www.ulbertlab.com/
Current Place of Residence: Boston, MA, USA

KEYWORDS

Electrophysiology, Development and testing of high-density electrodes, In vivo and in vitro recordings, Ex vivo human brain slices, Novel experimental design, Two-photon laser scanning microscopy, Patch-clamp, Optogenetics, Retina research, Model-based simulation, Ground-truth data, Translational and human clinical research, Intraoperative recordings, Neurotechnology & Neuroengineering

PROFESSIONAL EXPERIENCE

2022 Aug -
(1.5 year)
Postdoctoral Research Fellow @Sydney Cash's Laboratory, Center for Neurotechnology and Neurorecovery (CNTR), Department of Neurology at Massachusetts General Hospital (MGH) and Harvard Medical School (HMS), Boston, MA, USA
Fields: Human intraoperative, high-density Neuropixels recordings
Combined single-cell and LFP analysis
Lab head: Prof. Sydney S. Cash, MD, PhD

2014 Sep -
(9.5 years)
Research Associate @István Ulbert's Laboratory, Integrative Neuroscience Group, Institute of Cognitive Neuroscience and Psychology (ICNP), Research Centre for Natural Sciences (RCNS) Hungarian Research Network (HUN-REN), Budapest, Hungary *(2014-2020: predoctoral fellow)*
Fields: Combined electrophysiology and Multi-photon imaging,
Electrode development and testing, Optimal implantation strategies
Lab head: Prof. István Ulbert, MD, DSc *(Director of the Institute)*

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 *(full professor)*
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
Thesis: "Model-based analysis and parameter estimation of a Human blood glucose control system model"
Supervisor: Prof. Gábor Szederkényi, DSc *(Full professor)*

2008 - 2012 **BSc degree in Molecular Bionics Engineering**, PPCU, Budapest, Hungary
Diploma: First-class honours degree
Thesis: "Statistical analysis of neocortical spike trains in primates"
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, ‡ Co-corresponding author*

Preprints and works in progress

o   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. *(Under preparation)*

o   W. Muñoz*, D. Meszéna*, R. Hardstone, L. Wittner, M. Halgren, I. Ulbert, D. Fabo, 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. Human cortical layers exhibit consistent and mappable features revealed with high resolution recording electrodes. *(Under preparation)*

o   W. Fadel, D. Meszéna, R. Tóth, R. Fiáth, I. Ulbert, and Z. Somogyvári. Optimal inter-electrode distances for spike sorting in different brain regions. *(Under preparation)*

o   C. Windolf, H. Yu, A.C. Paulk, D. Meszéna, W. Munoz, 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, C. Horváth, R. Fiáth, I. Ulbert, 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: a robust motion estimation algorithm for high-density extracellular recordings, *BioRxiv*, 563768, 2023. *DOI: 10.1101/2023.10.24.563768 (Under review)*

Peer-Reviewed Journal Publications

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*, 2024. *(Accepted, in press, IF: 69.5, 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: 17.02, 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)*

SCHOLARSHIPS, AWARDS and GRANTS

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	**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 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

2024 (2 days)	**NIH NeuroTech Course Workshop** selected participant *(with travel grant)***, Minneapolis, MN, USA.**
2023 (4 d)	**Cleveland Neurodesign Entrepreneurs Workshop** (CNEW) 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**
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 *('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)*, L^A^T_EX *(Advanced)*, Overleaf, Mendeley, Microsoft Excel, PowerPoint, Adobe Photoshop, Corel Draw, Canva.
Application specific software: CellSens, ImageJ, NeuroScan 4.5, SpikeInterface, KiloSort-Phy (2.0), Femtonics MES-MESc, Multiclamp, pClamp10, INTAN RHD2000, Neurolucida, Open Ephys GUI 0.6.x, SpikeGLX, Allen Institute pipelines, 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
2007	**Driving license**, B category (frequent user)

Hungarian	Mother Tongue, 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

2020, 2021	Neuroscience Preparatory course *(online, in **English**)*	*(MSc, 1st semester)*
2020	Basics of Neurobiology *(online, in **English**)*	*(BSc, 5th semester)*
2017	Discrete Mathematics *(in Hungarian)*	*(BSc, 1st semester)*
2015-2016	AFM and STM Microscopy *- Hands-on Lab (in Hungarian)*	*(BSc, 7th semester)*
2014-2015	MATLAB Programming *- Computer Lab, (in Hungarian)*	*(BSc, 3rd semester)*
2013	Electrophysiology I-II. *(in Hungarian)*	*(BSc, 6th, 7th semesters)*
2011-2013	Introduction to Functional Neurobiology I-II *(in Hungarian)*	*(BSc, 5-6th semester)*

STUDENT MENTORING

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

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

2023	*Review **Panel Member***	**NSF Accelerating Research Translation** (ART) 2023, grant panel member	*(NSF)*
2023-	*Review **Editor***	Frontiers in Computational Neuroscience *(Front Comp Neuro)*	*(Frontiers)*
2022-	*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, Conference papers

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. *DOI: 10.1109/ICASSP49357.2023.10095487 (IF: 4.88, Q1)*

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 (virtual), 2021.

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.

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, <u>D. Meszéna</u> 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, <u>D. Meszéna</u>, 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*, <u>D. Meszéna</u>*, 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)*

<u>D. Meszéna</u>, 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, <u>D. Meszéna</u>, 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, <u>D. Meszéna</u>, 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, <u>D. Meszéna</u>, 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.

<u>D. Meszéna</u>, 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.

<u>D. Meszéna</u>, 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.

<u>D. Meszéna</u>, 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, <u>D. Meszéna</u>, 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, <u>D. Meszéna</u>, I. Ulbert and G. Márton. Convolutional neural networks for spike sorting in paired electrophysiological recordings, *FENS Forum of Neuroscience (virtual)*, 2020.

<u>D. Meszéna,</u> 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, <u>D. Meszéna</u>, 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, <u>D. Meszéna</u>, 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, <u>D. Meszéna</u>, 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, <u>D. Meszéna,</u> 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, <u>D. Meszéna</u>, 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.

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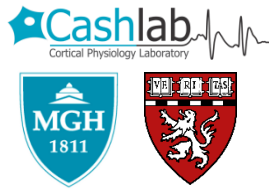**SCIENTIFIC PROFILES, IDs** *(with links)*

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HOBBIES AND EXTRACURRICULAR ACTIVITIES

Harvard Medical Postdoctoral Affiliation (HMPA) **Joint Mentorship Program 2023** participant,
Member of the Student Government, **elected delegate** for doctoral candidates *(PPCU FITB, 2018-2021),*
Playing on guitar *(since the age of 6, classical and jazz music),*
Community and charity activities (e.g., organizing summer child camps),
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