

# Curriculum Vitae

## Personal information

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## Academic career

- 2017- Group Leader, Research Group for Implantable Microsystems, Faculty of Information Technology & Bionics (ITK), Pázmány Péter Catholic University (PPCU)
- 2015-2017 Group Leader, Research Group for Implantable Microsystems, Institute for Technical Physics & Material Science, Centre for Energy Research, Hungarian Academy of Sciences
- 2014-2015 Alexander von Humboldt Postdoctoral Fellow, Microsystem Materials Laboratory, Department of Microsystem Engineering (IMTEK), University of Freiburg, Germany (12 months)
- 2009 - 2014 Research Fellow, Research Centre for Natural Sciences, Hungarian Academy of Sciences

## Industrial career

- 2021. Project consultant at ONGO Vettech Ltd. (11 months)
- 2018. Development Engineer at Microfluidlabs Ltd. (4 months)
- 2016. Co-founder of Neuromicrosystems Ltd.
- 2013. Development Engineer at Norma Diagnostics Ltd. (6 months)

## Education & Degrees

- 2022. Habilitation in Electrical Engineering at the Faculty of Information Technology & Bionics, Pázmány Péter Catholic University
- 2013. PhD in Electrical Engineering, Budapest University of Technology & Economics
- 2009. Msc in Electrical Engineering, Budapest University of Technology & Economics

## Research Projects as Principal Investigator

2023-2024	Validation of high-precision in vivo drug delivery with integrated piezoelectric micropump in freely moving rodents (Group Linkage Program of the Alexander von Humboldt Foundation, Germany), funding: 55 kEUR
2022-2026	Intracortical infrared neuromodulation in freely behaving rodents: a stable, implantable platform for translational research, NAP2022-I-8/2022, appr. 273 kEUR
2020-2024	Improving functionalities of microscale brain-machine interfaces using integrated upconverting nanoparticles, project ID: NKFIH FK 134403, appr. 115 kEUR
2020-2022	Human translational neuroMEMS research aided by artificial intelligence, Thematic Excellence Program, ID: TKP2020-NKA-11, 240 kEUR
2020-2021	Application of softening polymers to map cortical activity, project ID: 2019-2.1.11-TÉT-2019-00002, 10 kEUR
2019-2020	Human translational neuroMEMS research, Thematic Excellence Program TUDFO/51757-1/2019-ITM, 120 kEUR
2018-2021	In vivo characterization of multimodal microdevices for infrared neural stimulation, 2017_1.2.1-NKP-2017-00002, 300 kEUR
2017.	Acquisition of process and characterization equipment for micro- and nanomachining, KTIA_NAP_13-2-2017-0008, 80 kEUR
2016-2020	Investigation of novel implant materials for high-resolution, multiparametric imaging of cortical activity, NKFIH 120143, 156 kEUR
2015-2017	Optical stimulation of hippocampus and deep brain regions using novel micro- and nanomachining approaches, National Brain Research Program, KTIA NAP B 13-2-2015-0004, 300 kEUR
2015-2018	Understanding the impact of nanostructuring to control neural cell - solid surface interactions at brain-machine interfaces, OTKA NN 116550 – senior researcher / co-PI, 93 kEUR
2013-2015	Development of MEMS based measurement system for testing pharmacons in freely moving rodents (industrial R&D project funded by Gedeon Richter Plc), 65 kEUR

## **Supervision of students**

21 Master & Bachelor students; 5 PhD students (3 with successfully thesis defense)

## **Teaching**

- 2016 - BioMEMS: miniaturized biosensors, postgraduate course at the University of Óbuda (course leader)
- 2016 - Technology & applications of polymer based bionic interfaces, postgraduate course at the University of Óbuda (course leader)
- 2019 - Applications of Neural Microsystems course for the Info-bionics Engineering Msc at PPCU (course leader)

## **Editorial roles in international scientific journals**

Open Engineering (de Gruyter), Editorial Board Member  
Sensors (MDPI), Topic Editor

## **Ad hoc reviewer for international journals**

Sensors & Actuators A:Physical, Sensors & Actuators B:Chemical, Sensors (MDPI), Journal of Micromechanics & Microengineering , Scientific Reports, Nanoscale, J Neural Engineering, Lab on a Chip, Nature Communication, Small, Advanced Materials, Acta Biomaterialia, Advanced Science

## **Evaluator of scientific proposal**

National Research, Development & Innovation Office (HU),  
European Committee (H2020, Horizon Europe)

## **Awards**

- 2013 Postdoctoral Fellowship, Hungarian Academy of Sciences
- 2013 Prize of the Memorial Foundation of György Ferenczi
- 2014 Postdoctoral Fellowship of the Alexander von Humboldt Foundation, Germany
- 2015 Return Fellowship of the Alexander von Humboldt Foundation, Germany
- 2016 Reviewer of the Year at Journal of Micromechanics & Microengineering, IOP Pub.
- 2017 Outstanding Reviewer at Journal of Micromechanics & Microengineering, IOP Pub.
- 2018 János Bolyai Scholarship of the Hungarian Academy of Sciences
- 2019 New National Excellence Program Scholarship of the Ministry of Human Capacities
- 2019 Publication Award for Senior Scientists, PPCU
- 2020 New National Excellence Program Scholarship of the Ministry of Innov. & Techn.
- 2020 Reviewer of the Year, Journal of Neural Engineering, IOP Pub.
- 2020 Publication Award for Senior Scientists, PPCU
- 2021 New National Excellence Program Scholarship of the Ministry of Innov. & Techn.
- 2022 Certificate for Outstanding work in János Bolyai Scholarship, Hungarian Acad. of Sci.

## Scientometrics

Number peer-reviewed scientific articles: 44 (29 as first/corresponding author)

Cumulative impact factor: 183.359

Number of independent citations: 671

Hirsch-index: 16

## List of publications in peer-reviewed international journals

[44] M. i Soler, C. Hidalgo, Z. Fekete, L. Zalanyi, ISM Khalil, M. Yeste, V. Magdanz, Bundle Formation of Sperm: Influence of Environmental Factors, FRONTIERS IN ENDOCRINOLOGY 13 (2022) 957684, IF: 6.055, Q1

[43] Á Szabó, M Madarász, Zs. Lantos, A. Záttonyi, V. Danda, L. Spurgin, C. Manz, B. Rózsa, Z. Fekete, Transparent thiol-ene/acrylate based microECoG devices used for concurrent recording of fluorescent Calcium signals and electrophysiology in awake animals, ADVANCED MATERIALS INTERFACES 9 (2022) 2200729, IF: 6.389, D1/Q1

[42] Á. Cs. Horváth, S. Borbély, F. Mihók, P. Fürjes, P. Barthó, Z. Fekete, Histological and electrophysiological evidence on the safe operation of a sharp-tip multimodal optrode during infrared neuromodulation of the rat cortex, SCIENTIFIC REPORTS 12 (2022) 11434, IF: 4.996, D1/Q1

[41] E. Ismaiel, A. Záttonyi, Z. Fekete, Dimensionality Reduction and Prediction of Impedance data of Biointerface Based on Novel Approach, SENSORS, 22(11), 4191. IF: 3.847, Q1

[40] F. Z. Fedor, M. Madarász, A. Záttonyi, Á. Szabó, T. Lőrincz, V. Danda, L. Spurgin, C. Manz, B. Rózsa, Z. Fekete, Soft, thiol-ene/acrylate based electrode array for long-term recording of intracranial EEG signals with improved biocompatibility in mice, ADVANCED MATERIALS TECHNOLOGIES 7 (2022) 2100942, IF: 8.856, D1/Q1

[39] B. Csernyus, Á. Szabó, R. Fiáth, A. Záttonyi, Cs. Lázár, A. Pongrácz, Z. Fekete, A multimodal, implantable sensor array and measurement system to investigate the suppression of focal epileptic seizure using hypothermia, JOURNAL OF NEURAL ENGINEERING 18 (2021) 0460c3, IF: 5.043, Q1

[38] Á. Szabó, Hanna Liliom, Z. Fekete, K. Schlett, A. Pongrácz, SU-8 microstructures alter the attachment and growth of glial cells in vitro, MATERIALS TODAY COMMUNICATIONS 27 (2021) 102336, IF: 3.662, Q2

[37] N. Ebrahimi, C Bi, D J Cappelleri, G. Ciuti, A. T. Conn, D. Faivre, N. Habibi, A. Hošovský, V. Iacovacci, I. S. M. Khalil, V. Magdanz, S. Misra, C. Pawashe, R. Rashidifar, P. Rodriguez, M. Sitti, Z. Fekete, A. Jafari, Magnetic Actuation Methods in Bio/Soft Robotics, ADVANCED FUNCTIONAL MATERIALS 31 (2021) 2005137, IF: 19.924, D1/Q1

[36] F.Z. Fedor, A. Záttonyi, D. Cserpán, Z. Somogyvári, Z. Borhegyi, G. Juhász, Z. Fekete\*, Application of a flexible polymer microECoG array to map functional coherence in schizophrenia model, METHODSX 7 (2020) 101117, SC: 1.8

- [35] F.Z. Fedor, C. Paraczký, L. Ravasz, Z. Borhegyi, Z. Somogyvári, G. Juhász, Z. Fekete, Electrophysiological and behavioral properties of 4-aminopyridine-induced epileptic activity in mice. *BIOLOGIA FUTURA* 71 (2020) 427–434
- [34] Z. Fekete\*, Á. C. Horváth, A. Zátanyi, Infrared neuromodulation: a neuroengineering perspective, *JOURNAL OF NEURAL ENGINEERING* 17 (2020) 051003, IF: 5.379, Q1
- [33] B. Csernyus, Á. Szabó, A. Zátanyi, R. Hodován, Cs. Lázár, Z. Fekete\*, L. Eröss, A. Pongrácz, Recent antiepileptic and neuroprotective approaches of brain cooling, *SEIZURE: EUROPEAN JOURNAL OF EPILEPSY* 82 (2020) 80-90, IF: 3.184, Q2
- [32] Á. C. Horváth, Ö. C. Boros, L. Komáromi, S. Borbély, P. Koppa, P. Barthó, Z. Fekete\*, Infrared neural stimulation and inhibition using an implantable silicon photonic microdevice, *MICROSYSTEMS & NANOENGINEERING* 6 (2020) 44, IF: 7.127, D1/Q1
- [31] A. Zátanyi, M. Madarász, Á. Szabó, T. Lőrincz, R. Hodován, B. Rózsa, Z. Fekete\*, Transparent, low-autofluorescence microECoG device for simultaneous Ca<sup>2+</sup> imaging and cortical electrophysiology in vivo, *JOURNAL OF NEURAL ENGINEERING* 17 (2020) 016062, IF: 5.379, Q1
- [30] M. Csernai, S. Borbély, K. Kocsis, D. Burka, Z. Fekete, V. Balogh, S. Káli, Z. Emri, P. Barthó, Dynamics of sleep oscillations is coupled to brain temperature on multiple scales, *THE JOURNAL OF NEUROPHYSIOLOGY* 597 (2019) 4069-4086, IF: 4.547, D1/Q1
- [29] H. Liliom, P. Lajer, Zs. Bérces, B. Csernyus, Á. Szabó, D. Pinke, P. Lőw, Z. Fekete, A. Pongrácz, K. Schlett, Comparing the effects of uncoated nanostructured surfaces on primary neurons and astrocytes, *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH: PART A* 107 (2019) 2350-2359, IF: 3.525, Q1
- [28] Ö. C. Boros, Á. C. Horváth, S. Beleznai, Ö. Sepsi, D. Csósz, Z. Fekete, P. Koppa, Optimization of an optrode microdevice for infrared neural stimulation *APPLIED OPTICS* 58 (2019) 3870-3876, IF: 1.961, Q1
- [27] F. Larramendy, S. Yoshida, D. Maier, Z. Fekete\*, S. Takeuchi, O. Paul, 3D arrays of microcages by two-photon lithography by spatial organization of living cells, *LAB ON A CHIP* 19 (2019) 875-884, IF: 6.774, D1/Q1
- [26] A Zátanyi, G. Orbán, R. Modi, G. Márton, D. Meszéna, I. Ulbert, A. Pongrácz, M. Ecker, W.E. Voit, A. Joshi-Imre, Z. Fekete\*, A softening laminar electrode for recording single unit activity from the rat hippocampus, *SCIENTIFIC REPORTS* 9 (2019) 37237, IF: 3.998, D1/Q1
- [25] Zs. Bérces, J. Pomothy, Á. Cs. Horváth, T. Kóhidi, É. Benyei, Z. Fekete\*, E. Madarász, A. Pongrácz, Effect of nanostructures on anchoring stem cell-derived neural tissue to artificial surfaces, *JOURNAL OF NEURAL ENGINEERING* 15 (2018) 056030, IF: 4.551, D1/Q1
- [24] Ö.C. Boros, Á.C. Horváth, S. Beleznai, Ö. Sepsi, S. Lenk, Z. Fekete, P. Koppa, Optical and thermal modeling of an optrode microdevice for infrared neural stimulation, *APPLIED OPTICS* 57 (2018) 6952-6957, IF: 1.973, Q1
- [23] A. Zátanyi, F. Fedor, Zs. Borhegyi, Z. Fekete\*, In vitro and in vivo stability of black-platinum coatings on flexible, polymer microECoG arrays, *JOURNAL OF NEURAL ENGINEERING* 15 (2018) 0453003, IF: 4.551, D1/Q1

- [22] A. Zátonyi, Zs. Borhegyi, M. Srivastava, D. Cserpán, Z. Somogyvári, Z. Kisvárday, Z. Fekete\*, Functional brain mapping using optical imaging of intrinsic signals and simultaneous high-resolution cortical electrophysiology with a flexible, transparent microelectrode array, *SENSORS & ACTUATORS B-CHEMICAL* 273 (2018) 519-526, IF: 6.393, D1/Q1
- [21] Á. Cs. Horváth, Ö. Cs. Boros, Sz. Beleznai, Ö. Sepsi, P. Koppa, Z. Fekete\*, A multimodal microtool for spatially controlled infrared neural stimulation in the deep brain tissue, *SENSORS & ACTUATORS B-CHEMICAL* 263 (2018) 77-86, IF: 6.393, D1/Q1
- [20] Z. Fekete\*, M. Csernai, K. Kocsis, Á. Cs. Horváth, A. Pongrácz, P. Barthó, Simultaneous in vivo recording of local brain temperature and electrophysiological signals with a novel neural probe, *JOURNAL OF NEURAL ENGINEERING* 14 (2017) 034001, IF: 3.92, Q1
- [19] Z. Fekete\*, A. Pongrácz, Multifunctional soft implants to monitor and control neural activity in the central and peripheral nervous system: a review, *SENSORS & ACTUATORS B-CHEMICAL* 243 (2017) 1214-1223, IF: 5.667, D1/Q1
- [18] Zs. Bérces, K. Tóth, G. Márton, I. Pál, B. Kováts-Megyesi, Z. Fekete, I. Ulbert, A. Pongrácz, Neurobiochemical changes in the vicinity of a nanostructured neural implant. *SCIENTIFIC REPORTS* 6 (2016) 35944, IF: 4.259, D1/Q1
- [17] G. Márton, P. Baracska, B. Cseri, B. Plósz, G. Juhász, Z. Fekete, A. Pongrácz: A silicon-based microelectrode array with a microdrive for monitoring brainstem regions of freely moving rats, *JOURNAL OF NEURAL ENGINEERING* 13 (2016) 026025, 2016, IF: 3.465, D1/Q1
- [16] Z. Fekete\*, E. Pálfi, G. Márton, M. Handbauer, Zs. Bérces, I. Ulbert, A. Pongrácz, L. Négyessy, Combined in vivo recording of neural signals and iontophoretic injection of pathway tracers using a hollow silicon microelectrode, *SENSORS & ACTUATORS B-CHEMICAL* 236 (2016) 815-824, IF: 5.401, D1/Q1
- [15] M. Kiss, P. Földesy, Z. Fekete\*, Optimization of a Michigan-type silicon microprobe for infrared neural stimulation, *SENSORS & ACTUATORS B: CHEMICAL* 224 (2016) 676-682, IF: 5.401, D1/Q1
- [14] Z. Fekete\*, Recent advances in silicon-based neural microelectrodes and microsystems, *SENSORS & ACTUATORS B: CHEMICAL* 2015 (2015) 300-315, IF: 4.758, D1/Q1
- [13] I. Rajta, R. Huszánk, ATT Szabó, GUL Nagy, S. Szilasi, P. Fürjes, E. Holczer, Z. Fekete, G. Járvas, M. Szigeti, L. Hajba, J. Bodnár, A. Guttman, Tilted pillar array fabrication by the combination of proton beam writing and soft lithography for microfluidic cell capture: Part 1 Design and feasibility, *ELECTROPHORESIS* 37 (2015) 498-503, IF: 2.482, Q2
- [12] Z. Fekete\*, A. Németh, G. Márton, I. Ulbert, A. Pongrácz, Experimental study on the mechanical interaction between silicon neural microprobes and rat dura mater during insertion, *JOURNAL OF MATERIAL SCIENCE: MATERIALS SCIENCE IN MEDICINE* 26 pp. 70 (2015) IF: 2.272, Q2
- [11] Z. Fekete\*, Technology of ultralong deep brain fluidic microelectrodes combined with etching-before-grinding, *MICROSYSTEM TECHNOLOGIES* 21 (2015) 341-344, IF: 0.974, Q2
- [10] P. Fürjes, EG Holczer, E. Tóth, K. Iván, Z. Fekete, D. Bernier, F. Dortu, D. Giannone, PDMS microfluidics developed for polymer based photonic biosensors, *MICROSYSTEM TECHNOLOGIES* 21:(3) pp. 581-590. (2015), IF: 0.974, Q2

- [9] G Márton, I Bakos, Z Fekete, I Ulbert, A Pongrácz, Durability of high surface area platinum deposits on microelectrode arrays for acute neural recordings, J MATER SCI MATER MED. 25 (2014) 931-940, IF: 2.587, Q2
- [8] Z. Fekete\*, Á Cs Horváth, Zs. Bérces, A. Pongrácz: Black poly-silicon: a nanostructured seed layer for sensor applications, SENSORS AND ACTUATORS A: PHYSICAL 216 (2014) 277-286, IF: 1.903, Q1
- [7] G Márton, Z Fekete, R Fiáth, P Baracska, I Ulbert, G Juhász, G Battistig, A Pongrácz: In vivo measurements with robust silicon based multielectrode arrays with extreme shaft lengths, IEEE SENSORS JOURNAL 13:(9) (2013) 3262, IF: 1.8, Q1
- [6] Z Fekete\*, Z Hajnal, G Márton, P Fürjes, A Pongrácz: Fracture analysis of silicon microprobes designed for deep-brain stimulation, MICROELECTRONIC ENGINEERING 103 (2013) 160-166, IF: 1.338, Q1
- [5] A Pongrácz, Z Fekete, G Márton, Zs Bérces, I Ulbert, P Fürjes: Deep-brain silicon multielectrodes for simultaneous neural recording and drug delivery, SENSORS & ACTUATORS B-CHEMICAL 189 (2013) 97-105, IF: 3.840, D1/Q1
- [4] Z Fekete\*, A Pongrácz, P Fürjes, G Battistig: Improved process flow for buried channel fabrication in silicon, MICROSYSTEM TECHNOLOGIES 18 (2012) 353-358, IF: 0.86, Q2
- [3] Z Fekete\*, P Nagy, G Huszka, F Tolner, A Pongrácz, P Fürjes: Performance characterization of micromachined particle separation system based on Zweifach-Fung effect, SENSORS AND ACTUATORS B-CHEMICAL 162 (2012) 89-94, IF: 3.535, D1/Q1
- [2] Z Fekete\*, B Sinkovics, I Rajta, G A B Gál, P Fürjes, Characterization of the end-of-range geometric effects in complex 3D silicon micro-components formed by proton beam writing, JOURNAL OF MICROMECHANICS AND MICROENGINEERING 20: p. 064015. (2010), IF: 2.27, Q1
- [1] Rajta I, Szilasi SZ, Fürjes P, Fekete Z, Dücső Cs, Si micro-turbine by proton beam writing and porous silicon micromachining, NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION B-BEAM INTERACTIONS WITH MATERIALS AND ATOMS 267:(12-13) pp. 2292-2295. (2009), IF: 1.156, Q2