

CURRICULUM VITAE

PERSONAL INFORMATION

Family name, First name: Hajos, Norbert

Researcher unique identifier(s) ORCID, 0000-0002-4582-2708; PublOn, U-2640-2019

Nationality: Hungarian

URL for web site: <http://hajoslab.koki.hu/>

• EDUCATION

- 2012 Doctor of Sciences (DSc), Hungarian Academy of Sciences, Budapest, Hungary
“Cellular mechanisms underlying the generation of hippocampal gamma oscillations and their control by cannabinoids”
- 1998 PhD, Semmelweis University, Budapest, Hungary
“The structural basis of local GABAergic and septal cholinergic modulation of hippocampal inhibitory circuits”
- 1994 MSc, Eötvös Loránd University, Budapest, Hungary
“Morphological investigation of identified interneurons in hippocampal CA3 region”

• CURRENT POSITION

- 2021 – present Professor, Department of Psychological and Brain Sciences
Jack and Linda Gill Chair, Gill Center for Biomolecular Science
Indiana University, Bloomington, IN
- 2021 – present Scientific Advisor, Laboratory of Network Neurophysiology, Institute of Experimental Medicine, Budapest, Hungary

• PREVIOUS POSITIONS

- 2009 – 2021 Head of the Laboratory of Network Neurophysiology, Institute of Experimental Medicine, Budapest, Hungary
- 2020 Professor, University of Helsinki, Finland
- 2013 Visiting Researcher (6 months)
Department of Cognitive Neurobiology, Medical University Vienna, Austria (Prof. Thomas Klausberger)
- 2005 – 2011 Wellcome Trust International Senior Research Fellow
Department of Cellular and Network Neurobiology, Institute of Experimental Medicine, HAS, Budapest, Hungary
- 2003 – 2005 Senior Research Fellow
Department of Cellular and Network Neurobiology, Institute of Experimental Medicine, Hungarian Academy of Sciences (HAS), Budapest, Hungary
- 2004 Visiting Researcher (3 months)
Department of Physiology, Anatomy and Genetics, University of Oxford, UK (Prof. Ole Paulsen)
- 2001 Visiting Researcher (3 months)
Department of Molecular Biology, Max Planck Institute, Heidelberg, Germany (Prof. Hannah Monyer)
- 1998 – 2002 Postdoctoral Researcher
Department of Cellular and Network Neurobiology, Institute of Experimental Medicine, HAS, Budapest, Hungary. Supervisor: Prof. Tamás F Freund
- 1996 – 1998 Research Associate
Department of Neurology, UCLA, School of Medicine, CA. Supervisor: Prof. István Mody

1994 – 1996 PhD Student
Department of Cellular and Network Neurobiology, Institute of Experimental Medicine,
HAS, Budapest, Hungary. Supervisor: Prof. Tamás F Freund

• **FELLOWSHIPS AND AWARDS**

2012 – 2017 ‘Momentum’ Programme of the Hungarian Academy of Sciences, Hungary
2005 - 2011 Wellcome Trust International Senior Research Fellowship, The Wellcome Trust, UK
2004 Cortical Explorer Price, Krieg Cortical Kudos of the Cajal Club, USA
2004 NATO Science Fellowship
2003 – 2005 Bolyai Scholarship, Hungarian Academy of Sciences, Hungary
2002 Award of Hungarian Academy of Sciences for young scientists, Hungary
1999 – 2002 Bolyai Scholarship, Hungarian Academy of Sciences, Hungary
1998 Award of Hungarian Electron Microscopic Society, Hungary
1998 Award of “ifj. Farkas Zsolt emlékére” Foundation, Hungary
1994 Student Researcher Award of Hungarian student meeting
1993 Student Researcher Award of Eotvos Lorand University

• **ORGANISATION OF SCIENTIFIC MEETINGS**

2020 IBRO Workshop, Szeged, Hungary, Organizing Committee member
2017 FENS Regional Meeting, Pécs, Hungary, Symposium Organizer

• **INSTITUTIONAL RESPONSIBILITIES**

2005 – present Faculty member, Institute of Experimental Medicine, HAS, Hungary
2003 – present Graduate Student Advisor, Institute of Experimental Medicine, HAS, Hungary

• **REVIEWING ACTIVITIES**

2021 – present Frontiers in Neural Circuits, Reviewing Editor
2020 Polish National Science Center, Member of the Neuroscience Panel
2019 – 2020 Clinical Neuroscience, Hungary, Advisory Board Member
2019 – 2021 Hungarian Academy of Sciences, Council Member of Bolyai Scholarship
2014 – 2016 Hungarian Academy of Sciences, Reviewer for Bolyai Scholarship
2018 – 2021 Neuroscience committee of the Hungarian Academy of Sciences, Vice-chair
2015 – 2018 Neuroscience committee of the Hungarian Academy of Sciences, Committee Member
2013 – 2015 Hungarian Scientific Research Fund, Review Panel Member
2015 – 2020 Hungarian Scientific Research Fund, Chair of the Neuroscience Panel
2013 – present European Journal of Neuroscience, Reviewing Editor

• **MEMBERSHIPS OF SCIENTIFIC SOCIETIES**

2019 – 2022 Hungarian Academy of Sciences, Member of the General Assembly
2019 – 2022 Hungarian Academy of Sciences, Member of the Governing Board
1998 – 2005 American Physiological Society, Member
1998 – present Society for Neurosciences, Member
1998 – present Federation of European Neuroscience Societies, Member
1993 – present Hungarian Neuroscience Society, Member

• **MAJOR COLLABORATIONS**

Dr Andrew Holmes (NIAAA, Rockville, USA): Investigation of the role of distinct interneuron types in amygdala functions
Prof Francesco Ferraguti (Innsbruck Medical University, Austria): Circuit mapping of neurons controlling amygdala output
Prof Gabor Szabo (IEM HAS, Hungary): Identifying transgenic mouse lines for amygdala research
Prof Jose Miguel Blasco-Ibanez (University of Valencia, Spain): Subcortical control of amygdala operation

- **GRANT REVIEWING**

Agence Nationale de la Recherche, France; Deutsche Forschungsgemeinschaft, Germany; Dutch Research Council, The Netherlands, National Research, Development and Innovation Fund, Hungary; Hungarian Academy of Sciences, Momentum Program, Hungary; Hungarian Brain Research Program, Hungary; Medical Research Council, UK; Polish National Science Center, Poland; Swiss National Science Foundation, Switzerland; The Wellcome Trust, UK

- **RESEARCH GRANTS**

- National Research, Development and Innovation Office (Hungary), K 119742, “Control of amygdala-dependent fear learning by defined neuronal populations”, 2016-2020.
- National Brain Research Program 2.0, Consortium, “Critical roles of perisomatic inhibitory interneurons in associative fear learning”. 2017-2021.
- Semmelweis University, PhD Student Program, , 2017-2021.

Selected completed grants:

- Hungarian Academy of Sciences, Momentum Programme, “Function of GABAergic inhibitory cells in associative learning” 2012-2017.
- National Office for Research and Technology. ERC_HU_08 “A novel signaling cascade of gaseous and lipophilic messengers at inhibitory synapses: the role of nitric oxide and endocannabinoids in the plasticity of GABAergic transmission.” 2010-2014.
- Wellcome International Research Fellowship (076416). “Mechanisms of endocannabinoid signaling and its role in the regulation of synaptic communication”. 2005-2011.
- Collaborative Research Initiative Grant of the Wellcome Trust (075664). Co-applied with Prof. Ole Paulsen (Oxford University). “Contribution of distinct types of GABAergic interneuron to hippocampal gamma oscillations.” 2005-2007.

- **SELECTED PUBLICATIONS**

Hájos N. Interneuron Types and Their Circuits in the Basolateral Amygdala. **Front Neural Circuits.** 15:687257. doi: 10.3389/fncir.2021.687257

Rhomberg T, Rovira-Esteban L, Vikór A, Paradiso E, Kremser C, Nagy-Pál P, Papp OI, Tasan R, Erdélyi F, Szabó G, Ferraguti F, Hájos N. VIP-immunoreactive interneurons within circuits of the mouse basolateral amygdala. **J Neurosci** 38:6983-7003. (2018) doi: 10.1523/JNEUROSCI.2063-17.2018

Andrási T, Veres J, Rovira-Esteban L, Kozma R, Vikór A, Gregori E, Hájos N. Differential Excitatory Control of Two Parallel Basket Cell Networks in Amygdala Microcircuits. **PLOS Biology** e2001421. doi: 10.1371/journal.pbio.2001421. (2017)

Veres JM, Nagy GA, Hájos N. Perisomatic GABAergic synapses of basket cells effectively control principal neuron activity in amygdala networks. **eLife.** 6. pii: e20721. doi: 10.7554/eLife.20721. (2017)

Hájos N, Karlócai MR, Németh B, Ulbert I, Monyer H, Szabó G, Erdélyi F, Freund TF and Gulyás AI. Input-output features of anatomically identified CA3 neurons during hippocampal sharp wave/ripple oscillation in vitro. **J Neurosci.** 33:11677-91. (2013) doi: 10.1523/JNEUROSCI.5729-12.2013

Gulyás AI, Szabó GG, Ulbert I, Holderith N, Monyer H, Erdélyi F, Szabó G, Freund TF, Hájos N. Parvalbumin-containing fast-spiking basket cells generate the field potential oscillations induced by cholinergic receptor activation in the hippocampus. **J Neurosci.** 30:15134-45. (2010) doi: 10.1523/JNEUROSCI.4104-10.2010.

Hájos N, Ellender TJ, Zemankovics R, Mann EO, Exley R, Cragg SJ, Freund TF, Paulsen O. Maintaining network activity in submerged hippocampal slices: importance of oxygen supply. **Eur J Neurosci.** 29:319-27. (2009) doi: 10.1111/j.1460-9568.2008.06577.x.

- Hájos N, Pálhalmi J, Mann EO, Németh B, Paulsen O and Freund TF (2004) Spike timing of distinct types of GABAergic interneurons during hippocampal gamma oscillations *in vitro*. **J. Neurosci.** 24:9127-37. (2014) doi: 10.1523/JNEUROSCI.2113-04.2004
- Hájos N, Katona I, Naiem SS, MacKie K, Ledent C, Mody I, Freund TF. Cannabinoids inhibit hippocampal GABAergic transmission and network oscillations. **Eur J Neurosci.** 12: 3239-49. (2000) doi: 10.1046/j.1460-9568.2000.00217.x
- Nusser Z, Hájos N, Somogyi P, Mody I. Increased number of synaptic GABA(A) receptors underlies potentiation at hippocampal inhibitory synapses. **Nature** 395: 172-7. (1998) doi:10.1038/25999

Summary of publication activity

Peer-reviewed papers: 61
 Citations (Google Scholar): 9319
 h-index (Google Scholar): 42

<https://scholar.google.com/citations?user=D3D261oAAAAJ&hl=en>

Invited talks

International meetings

- 2021 Segerfalk Symposium, Lund University, Sweden, Symposium speaker
- 2018 ION-KOKI Joint Symposium on Neuroscience, Institute of Neuroscience, Shanghai, China, Symposium speaker
- 2017 FENS Regional meeting, Symposium “*Distributed neural circuits controlling fear state and related learning*”, Pécs, Hungary, Symposium organizer and speaker
- 2016 2nd Central European Biomedical Congress, Symposium “*Learning the emotions with the help of the amygdala*”, Krakow, Poland, Invited speaker
- 2015 “*Rhythmogenesis, mechanisms, modes, modulation, coding*”, Symposium at Berlin-Brandenburgische Akademie der Wissenschaften, Berlin, Germany, Invited speaker. Organizers: Profs Uwe Heineman, Hans Christian Pape
- 2014 IBRO Workshop, Symposium “*Dissecting fear circuits in rodents*”, Debrecen, Hungary, Invited speaker
- 2012 Janelia Conferences, “*Neuron types in the hippocampal formation*”, HHMI Janelia Research Campus, Ashburn, VA, USA, Invited speaker
- 2012 ESF-HAS Conferences, “*Brain oscillations in health and disease*”, Budapest, Hungary, Invited speaker
- 2012 ENI-Net Meeting, Barcelona, Spain, Invited speaker
- 2011 FENS Regional meeting, Symposium “*Amygdala networks and regulation of fear*” SINAPSA Neuroscience Conference’11, Ljubljana, Slovenia, Invited speaker
- 2009 CNCR Symposium “*Synaptic plasticity in neuronal networks*” Vrije University, Amsterdam, Nederland, Invited speaker
- 2009 Inhibition in the CNS, Gordon Research Conferences, Colby College, ME, Invited speaker
- 2008 6th FENS Forum, Geneva, Switzerland, Invited speaker
- 2007 17th Neuropharmacology Conference, San Diego, CA, Invited speaker
- 2007 Inhibition in the CNS, Gordon Research Conference, Colby College, ME, Invited speaker
- 2007 11th Conference of Hungarian Neuroscience Association, Szeged, Hungary, Invited speaker
- 2003 9th Conference of Hungarian Neuroscience Association, Balatonfüred, Hungary, Invited speaker
- 2002 22nd European Winter Conference on Brain Research, Arc 1800, France, Invited speaker
- 2001 21st European Winter Conference on Brain Research, Arc 1800, France, Invited speaker
- 2000 3rd Congress of Neuropsychopharmacology Tihany, Hungary, Invited speaker
- 2000 Joint meeting of the British and the Hungarian Physiological Societies, Budapest, Hungary, Invited speaker

Neuroscience seminars

2020	Dept. Psych & Brain Sci., Indiana University Bloomington, IN, <i>Host:</i> Prof. William Hetrick
2018, 2019	Aarhus University, Aarhus, Denmark, <i>Host:</i> Prof. Marco Capogna
2018	University of Helsinki, Helsinki, Finland, <i>Host:</i> Prof. Kai Kaila
2018	Debrecen University, Debrecen, Hungary (2018) <i>Host:</i> Prof. Janos Szollosi
2017	Brain Mind Institute, Lausanne, Switzerland, <i>Host:</i> Prof. Carl Petersen, Prof. Carmen Sandi
2016	Szentágotthai Research Center, Pécs, Hungary (2016) <i>Host:</i> Prof. Istvan Abraham
2015	CIN, University of Tübingen, Tübingen, Germany, <i>Host:</i> Dr. Ingrid Ehrlich
2015	Cajal Institute, Madrid, Spain, <i>Host:</i> Prof. Liset Menendez de la Prida
2009	University of Valencia, Valencia, Spain, <i>Host:</i> Prof. Juan Nacher
2008	Institute of Neurophysiology, Charite, Berlin, Germany (2008) <i>Host:</i> Dr. Tengis Gloveli

Prizes

2004	Cortical Explorer Prize, Krieg Cortical Kudos of the Cajal Club, USA
2002	Award of Hungarian Academy of Sciences for young scientist, Hungary
1998	Award of “ifj. Farkas Zsolt emlékére” Foundation, Hungary
1998	Award of Hungarian Electron Microscopic Society, Hungary
1994	Student Researcher Award of Hungarian Student Researcher Meeting, Hungary
1993	Student Researcher Award of Eötvös Loránd University, Hungary

Teaching and Supervision

I participated in teaching at different courses held at three different universities in Budapest. At Pazmany Peter Catholic University, I taught basic cellular neuroscience for MSc students. At Eotvos Lorand University, I gave lectures for BSc students about the emotional brain and organized an MSc course titled “Neurophysiology”. At the Semmelweis University, I taught postgraduate courses. Furthermore, I gave annually a lecture about neural circuits in a PhD course organized by Prof. Marco Capogna at the Aarhus University, Denmark.

In addition, I supervised BSc, MSc and PhD students as well as students from gymnasium. Under my supervision, 4 and 17 BSc and MSc diploma works, respectively, have been accomplished. So far, 5 PhD students have defended their thesis under my supervision. Currently, I supervise the research study of a BSc student and 7 PhD students. Eight of my students have been awarded in Student Researcher Competition that is organized for university students both at local and statewide levels.

Major contribution to the early careers of excellent researchers

Dr Ede Rancz	Undergraduate student 1999-2002, now Group leader of Cortical Circuit Laboratory, The Francis Crick Institute, London, UK
Dr Rita Zemankovics	Undergraduate and graduate student 2003-2007, Graduate student 2007-2010, worked at University of Bern, Switzerland, now in maternity leave
Dr Gergely Szabó	Graduate student 2006-2012, now works at Stanford University, CA, USA
Dr Tamás Szikra	Postdoc 2006-2007, now works at Institute of Molecular and Clinical Ophthalmology, Basel, Switzerland
Dr Noemi Holderith	Postdoc 2007-2009, now works at IEM HAS, Hungary
Dr Felix Benninger	Undergraduate student 2008-2009, now works at Rabin Medical Center, Tel Aviv, Israel
Dr. Laura Rovira-Esteban	Postdoc 2015-2020, now works in Heidelberg, Microscopy Center