

Curriculum Vitae

Tania Rinaldi Barkat

Basel University
Department of Biomedicine
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Research Experience

Basel University

Department of Biomedicine

Tenure-track Assistant Professor in Neurophysiology

Studying the functions of neuronal circuits in the central auditory system

- Applying *in vivo* electrophysiology, functional imaging, optogenetics, molecular and anatomical techniques and cochlear implants in behaving mice
- Supervising six postdocs and four PhD students since February 2014

Basel, Switzerland
from January 2015

Copenhagen University

Institute of Neurosciences and Pharmacology

Assistant Professor

Copenhagen, Denmark
March 2013- Dec 2014

Harvard University

Takao Hensch Laboratory, Center for Brain Science

Postdoctoral research fellow

Studied functional circuits involved in critical periods in the developing auditory system

- Applied voltage sensitive dye imaging, electrophysiology, molecular and anatomical techniques in mouse acute thalamocortical slices in genetic and environment-based mouse models
- Applied *in vivo* multi-electrode recording in anesthetized mouse auditory system
- Taught and supervised thesis works of undergraduate students

Cambridge, MA, USA
2008-2013

Harvard University

Junior Fellow at the Harvard Society of Fellows

Cambridge, MA, USA
2008-2011

Swiss Federal Institute of technology (EPFL)

Laboratory of Neural Microcircuitry, Brain Mind Institute

PhD student, supervised by Prof. Henry Markram

Studied altered neocortical microcircuitry in the VPA rat model of autism

- Applied *in vitro* electrophysiology, *in vivo* intrinsic imaging, morphological reconstruction, western blotting, rat treatment, and computer programming for electrophysiological use
- Wrote a patent application for a possible treatment for autism spectrum disorders
- Taught undergraduate and graduate students

Lausanne, Switzerland
2002-2007

University of Lausanne

Institute of Physiology

Research assistant, supervised by Prof. A. Villa

Practiced extracellular recordings in behaving rats

Lausanne, Switzerland
2002 (6 months)

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| CERN (ISOLDE, EP Division) | Geneva, Switzerland |
| Research student | 2001 (2 months) |
| Studied negative surface ionization source for the production of radioactive isotope | |
| EPFL | Lausanne, Switzerland |
| Laboratory of photonic , Physical Chemistry Department | 2001 (6 months) |
| Master student | |
| Studied femtosecond spectroscopy in condensed matter | |

Education

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| Swiss Federal Institute of Technology (EPFL) | Lausanne, Switzerland |
| PhD degree in the doctoral program <i>Neuroscience and the Developmental Neurobiology</i> | 2003-2006 |
| RIKEN Brain Science Institute | Tokyo, Japan |
| Summer school <i>Neurobiology of mental Disorders and the Mind</i> (received a grant) | June 2005 |
| Hebrew University of Jerusalem | Jerusalem, Israel |
| Jerusalem Spring School of Dendrites (received a grant) | April 2005 |
| Swiss Federal Institute of Technology (EPFL) | Lausanne, Switzerland |
| Master of Science in chemical engineering, specialized in physical chemistry | 1996-2001 |
| McGill University | Montreal, Canada |
| Exchange student (received a grant) | 1998-1999 |
| Collège de la Royale Abbaye | St-Maurice, Switzerland |
| High-school | 1991-1996 |

Awards and Fellowships

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| ERC Starting Grant (changed into an SNSF Transfer grant in 2016) | 2014 |
| For up-and-coming research leaders to establish a proper research team and to start conducting independent research in Europe | |
| Subject: Studying the developing auditory cortex to dissect neural circuit functions | |
| Lundbeck Foundation Fellowship | 2013 |
| For researcher to develop their own research group, €1.34 mio for 5 years | |
| Subject: Development and function of auditory circuits | |
| Swiss National Science Foundation | 2011 |
| Fellowship for advanced researchers, CHF90'000 for 18 months | |
| Subject: Control of plasticity and neuronal connectivity in the developing mouse auditory system | |
| Harvard University | 2010 |
| William F. Milton Fund, \$40'000 for 24 months | |
| Subject: Dissecting the rules governing neuronal connectivity during a critical period in the auditory system | |
| Harvard Society of Fellows | 2008 |
| Fellowship for Junior Fellow, \$210'000 for 36 months | |
| Subject: Active modification of altered connectivity in the mouse auditory cortex | |

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| Swiss National Science Foundation Fellowship for prospective researchers, CHF57'400 for 12 months Subject: Active modification of altered connectivity in the mouse auditory cortex | 2008 |
| EPFL Dimitri Chorafas Award for outstanding PhD thesis | 2007 |
| EPFL Alliance Award for the patent <i>Methods for Treating and/or Preventing Pervasive Developmental Disorders in a Subject</i> . | 2007 |
| EPFL Award for outstanding progress in PhD studies | 2004 |
| McGill University Award for outstanding results in Quantum Physics | 1998 |
| EPFL Louis Pelet Award for best grades at the propedeutic examinations I & II | 1998 |

Teaching experience

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| Basel University, Department of Biomedicine and Biozentrum Teaching undergraduate and graduate students in neuroscience and kidney | Basel, Switzerland from 2015 |
| Copenhagen University , Department of Neuroscience and Pharmacology Taught physiology to undergraduate students | Copenhagen, Denmark 2013-2014 |
| Harvard University , Center for Brain Science Taught and supervised thesis works of undergraduate students | Cambridge, MA, USA 2008-2012 |
| Swiss Federal Institute of technology (EPFL) , Brain Mind Institute Taught electrophysiology to undergraduate and graduate students Taught a class on Animal Models of Autism to undergraduate students | Lausanne, Switzerland 2002-2007 |

Publications

- Kalish BT*, **Barkat TR***, Diel EE, Zhang EJ, Greenberg ME, Hensch TK. *Single-nucleus RNA sequencing of mouse auditory critical period plasticity*. (under review)
- Navntoft CA, **Barkat TR**, Marozeau JD. *Ramped pulse shapes are more efficient for cochlear implant stimulation in an animal model*. (under review)
- Bhumika S, Nakamura M, Valerio P, Solyga M, Linden H, **Barkat TR** (2019). *A late critical period for plasticity in the mouse auditory system*. Cerebral Cortex, bhz262.
- Christensen RK, Linden H, Nakamura M, **Barkat TR** (2019). *White noise background improves tone discrimination by suppressing cortical tuning curves*. Cell Reports, 29:1-13.
- Solyga M, **Barkat TR** (2019). *Distinct processing of tone offset in two primary auditory cortices*. Scientific Reports, 9.9581.

- Navntoft CA, Marozeau JD, **Barkat TR** (2019). *Cochlear Implant Surgery and Electrically-Evoked Auditory Brainstem Response Recordings in C57BL/6 Mice*. J. Vis. Exp. (143), e58073, doi:10.3791/58073.
- Favre MR; **Barkat TR**; LaMendola D; Khazen G; Markarm H; Markram K (2013). *General developmental health in the VPA-rat model of autism*. Front Behav Neurosci, 7 (88): 1-7.
- Barkat TR**, Polley DB, Hensch TK (2011). *A critical period for auditory thalamocortical connectivity*. Nat Neurosci, 14(9):1189-1194.
- Hackett TA*, **Barkat TR***, O'Brien BJ, Hensch TK, Polley DB (2011). *Linking topography to tonotopy in the mouse auditory thalamocortical circuit*. J. Neuroscience, 31(8):2983-2995.
- Silva G, Le Bé J, Riachi I, **Rinaldi T**, Markram K, Markram H (2009). *Enhanced long term microcircuit plasticity in the valproic acid animal model of autism*. Front. Syn. Neurosci, 1:1-9.
- Rinaldi T**, Perrodin C, Markram H (2008). *Hyper-connectivity and hyper-plasticity in the medial prefrontal cortex in the valproic acid animal model of autism*. Front Neural Circuits, 2(4):1-7.
- Rinaldi T**, Silberberg G, Markram H (2008). *Hyperconnectivity of local neocortical microcircuitry induced by prenatal exposure to valproic acid*. Cerebral Cortex, 18:763-770.
- Markram K, **Rinaldi T**, La Mendola D, Sandi C, Markram H (2008). *Abnormal fear conditioning and amygdala processing caused by prenatal exposure to valproic acid*. Neuropsychopharmacology, 33:901-912.
- Markram H, **Rinaldi T**, Markram K (2007). *The Intense World Syndrome – an alternative hypothesis for autism*. Frontiers in Neuroscience, 1:77-96.
- Rinaldi T**, Kulangara K, Antonello K, Markram H (2007). *Elevated NMDA receptor levels and enhanced postsynaptic long-term potentiation induced by prenatal exposure to valproic acid*. Proc. Natl. Acad. Sci., 104:13501-13506.
- Köster U, Bergmann UC, Carminati D, Catherall J, Cederkäll J, Correia JG, Crepieux B, Dietrich M, Elder K, Fedoseyev VN, Fraile L, Franchoo S, Fynbo H, Georg U, Giles T, Joinet A, Jonsson OC, Kirchner R, Lau Ch, Lettry J, Maier HJ, Mishin VI, Oinonen M, Peräjärvi K, Ravn HL, **Rinaldi T**, Santana-Leitner M, Wahl U, Weissman L (2003). *The ISOLDE Collaboration. Oxide fiber at ISOLDE*. Nuclear Instruments and Methods in Physics Research B, 204:303-313.

* authors contributed equally to the work

Patent

Methods for Treating and/or Preventing Pervasive Developmental Disorders in a Subject. EPFL, Switzerland (2007)

Invited talks

Seminar at the Pasteur Institute

Paris, France

October 2019

Neurex symposium: "Excitatory-Inhibitory balance"

Basel, Switzerland

October 2019

Seminar at the Department of Fundamental Neuroscience

Lausanne, Switzerland

September 2019

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| Seminar at the “Blue Brain seminars in Neural Computation”, EPFL | Geneva, Switzerland June 2019 |
| Seminar at the Interdisciplinary Center for Neuroscience | Heidelberg, Germany February 2019 |
| Talk at the Swiss Society for Neuroscience Annual Meeting | Geneva, Switzerland February 2019 |
| Seminar at UNIC, CNRS | Gif-sur-Yvette, France June 8 2018 |
| Neurex symposium: “Auditory system dysfunction” | Basel, Switzerland May 2018 |
| FENS conference: “Computational Neuroscience of Prediction” | Rungstedgaard, Denmark April 2018 |
| Graduate Workshop: “Hippocampus and other neural systems” | Aarhus, Denmark December 2017 |
| ENCODS 2016 | Helsingør, Denmark June 2016 |
| Bench to Bedside Symposium | Basel, Switzerland February 2016 |
| DBM 15 th Anniversary Symposium | Basel, Switzerland August 2015 |
| Joern Hounsgaard Symposium | Copenhagen, Denmark June 2015 |
| FENS conference: “Controlling neurons, circuits and behaviour” | Rungstedgaard, Denmark April 2014 |
| INF Annual meeting, Copenhagen University | Helsingør, Denmark Jan 2014 |
| Synapse and Circuits Seminar, EPFL | Lausanne, Switzerland Dec 2013 |
| Danish Brain Research Laboratories Meeting | Copenhagen, Denmark June 2013 |
| Department of Neuroscience and Pharmacology, University of Copenhagen | Copenhagen, Denmark June 2012 |
| Symposium on Neurocircuits and Behavior, FMI | Basel, Switzerland Dec 2011 |
| Faculty of Medicine, University of Zürich | Zürich, Switzerland Nov 2011 |
| FM Kirby Neurobiology Center, Harvard Medical School | Boston, MA, USA Oct 2011 |
| CMU, University of Geneva | Geneva, Switzerland Oct 2011 |
| EMBO conference “The assembly and function of neuronal circuits” | Ascona, Switzerland Sept 2011 |
| DBCM, University of Lausanne | Lausanne, Switzerland Sept 2011 |
| French Society for Neuroscience | Marseille, France May 2011 |
| Society for Neuroscience Annual Meeting | San Diego, CA, USA Nov 2010 |
| Gordon Research Conference “Neural circuits and Plasticity” | Newport, RI, USA June 2010 |
| Department of Molecular and Cellular Biology, Harvard Medical School | Boston, MA, USA April 2007 |
| Neurobiology Lectures, IZN, University of Heidelberg | Heidelberg, Germany Feb 2007 |

Languages

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| French and Danish | bilingual |
| English | fluent |
| German | working knowledge |