

Curriculum Vitae

Tania Rinaldi Barkat

Basel University
Department of Biomedicine
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Research Experience

Basel University

Department of Biomedicine

Associate 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
- Head of the Brain and Sound Lab

Basel, Switzerland
from August 2020

Basel University

Department of Biomedicine

Tenure-track Assistant Professor in Neurophysiology

Basel, Switzerland
Jan 2015 – Aug 2020

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)

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

Swiss Federal Institute of Technology (EPFL) Lausanne, Switzerland
PhD degree in the doctoral program *Neuroscience and the Developmental Neurobiology* 2003-2006

RIKEN Brain Science Institute Tokyo, Japan
Summer school *Neurobiology of mental Disorders and the Mind* (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

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

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

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

- Nakamura M, Valerio P, Bhumika S, **Barkat TR** (2020). Sequential organization of critical periods in the mouse auditory system. *Cell Reports*,
- Kalish BT*, **Barkat TR***, Diel EE, Zhang EJ, Greenberg ME, Hensch TK (2020). *Single-nucleus RNA sequencing of mouse auditory critical period plasticity*. *Proc. Natl. Acad. Sci.*, 117(21):11744-11752.
- Navntoft CA, Marozeau JD, **Barkat TR (2020)**,. *Ramped pulse shapes are more efficient for cochlear implant stimulation in an animal model*. *Scientific Reports*, 10.3288..
- 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

FENS Forum 2020	Virtual Forum July 2020
Bench to Bedside Symposium	Basel, Switzerland February 2020
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
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