Nikolaos Karalis

Friedrich Miescher Institute for Biomedical Research
Maulbeerstrasse 66
4058, Basel, Switzerland

Website www.nikolaskaralis.gr
Email   nikolaskaralis@gmail.com
Tel.   +41 779 656 702

Current position

Research fellow
2018 - now   Friedrich Miescher Institute for Biomedical Research
             Group leader: Dr. Andreas Lüthi

Education

Ph.D. candidate in Neuroscience
2013 - 2018   Faculty of Medicine, Ludwig-Maximilians University Munich
Thesis   Oscillatory architecture of memory circuits
Advisor   Prof. Dr. Anton Sirota

M.Sc.   **Neurasmus Joint Master in Neuroscience**
2011-2012   Charité University Medicine, Berlin – Medical Neuroscience
2012-2013   University Bordeaux II – Neuroscience and Neuropsychopharmacology   Grade   18/20
Thesis   Neuronal signatures of fear memory -
               Oscillatory synchronization underlying fear memory expression   Ranking 1/5

B.Sc. & M.Sc.   **School of Applied Mathematics and Physical Sciences**
2004 – 2011   National Technical University of Athens (NTUA)   Grade   7.42/10
Majors   Computational Mathematics, Statistics
Thesis   EEG signal analysis methods for characterization of meditative states   Grade   10/10

Research methods

in vivo electrophysiology, high-dimensional data analysis, closed-loop optogenetics

Selected Publications (Citations: 315 ; h-index: 5 ; *: equal contribution)

ORCID: 0000-0002-1804-9756

1. Prefrontal-Periaqueductal Gray-Projecting Neurons Mediate Context Fear Discrimination
   Rozeske R, Jercog D, **Karalis N**, Chaudun F, Khoder S, Girard D, Winke N, Herry C
   Neuron, 2018

2. Prefrontal neuronal assemblies temporally control fear behavior.
   Dejean C*, Courtin J*, **Karalis N***, Chaudun F, Wurtz H, Thomas Bienvenu, Herry C
   Nature, 2016

3. 4 Hz oscillations synchronize prefrontal - amygdala circuits during fear behaviour.
   Karalis N, Dejean C, Chaudun F, Khoder S, Rozeske R, Wurtz H, Bagur S,
   Benchenane K, Sirota A, Courtin J, Herry C
   Nature Neuroscience, 2016

4. Prefrontal parvalbumin interneurons shape neuronal activity to drive fear expression.
   Courtin J, Chaudun F, Rozeske R, **Karalis N**, Gonzalez-Campo C, Wurtz H, Abdi A,
   Baufreton J, Bienvenu T, Herry C
   Nature, 2013

5. Persistence of amygdala gamma oscillations during extinction learning
   predicts spontaneous fear recovery.
   Courtin J, **Karalis N**, Gonzalez-Campo C, Wurtz H, Herry C
   Neurobiology of Learning and Memory, 2013

6. Effects of Himalayan tradition meditation during a SSVEP study.
   Karalis N, Karanasiou I, Uzunoglu N, & Braboszcz C
   Neuroscience Letters, 2011

Invited Talks

2017	Neuronal synchrony and oscillatory coupling	Coupling & Causality in Complex Systems
	Neuronal correlates of breathing	Bernstein Conference PhD Symposium
	Respiratory entrainment of memory circuits	Harvard-LMU Young Scientists' Forum
	Respiratory entrainment of prefrontal circuits	Japan Neuroscience Society meeting
	Prefrontal oscillatory mechanisms of fear behavior	British Neuroscience Association meeting
2016	Oscillatory circuit organization during fear behavior	LMU lecture series
	Neuronal signatures of fear behavior	Neurizons – Young Investigator Talks
2015	High-density characterization of network activity	German Neuroscience Society
2014	Neurophysiological correlates of rodent communication	Animal Communication Workshop
2013	Neuronal signatures of fear memory	Neurasmus Workshop
	Neuronal signatures of fear memory	Neurasmus Orientation Week
2011	SSVEP effects of Himalayan tradition meditation	Breaking Convention
2007	Novel graph invariants for fast graph isomorphism	Mitacs Industrial Math Summer School
	Combinatorial and statistical analysis of keno game	Canadian Undergraduate Mathematics Conference

Research Experience

2013 – 2018   **PhD candidate**   **Ludwig-Maximilians-Universität München**   Faculty of Medicine
Mechanisms of memory consolidation across hippocampal and cortical circuits
Advisor: Prof. Dr. Anton Sirota

2012 – 2013   **M.Sc. Thesis**   **Neurocenter Magendie, Bordeaux**   INSERM
Neuronal signatures of fear memory
Supervisor: Dr. Cyril Herry

2009 – 2011   **M.Sc. Thesis**   **National Technical University of Athens**   Electrical Engineering Dept.
EEG Analysis of the neurophysiological effects of meditation on visual evoked potentials
Supervisors: Dr. Irene Karanasiou & Dr. Nikolaos Uzunoglou

2005 – 2009   **Research assistance**   **National Technical University of Athens**   High Energy Physics Dept.
CERN Grid Computing infrastructure - Network development and administration

Scholarships and Grants

2014 – 2017	Ludwig-Maximilians-Universität München
2013 – 2014	Centre for Integrative Neuroscience (CIN) - University of Tübingen
2011 – 2013	Erasmus Mundus scholarship for the Neurasmus Joint Master degree program in Neuroscience
2010	University of Pennsylvania Grant
2009	Erasmus scholarship (Research exchange)
2007	MITACS scholarship

Awards

2010   "*Thomaideio Award*" for conference presentation from National Technical University of Athens for the presentation "Short term effects of Vipassanā meditation in a single subject SSVEP study"

2008   "*Thomaideio Award*" for best journal publication from National Technical University of Athens for the publication "Effect of meteorological variables on the incidence of lower urinary tract infections"

Experimental Techniques

Electrophysiology	*in vivo* extracellular recordings (tetrodes, silicon probes, ECoG) in freely behaving & head-fixed rodents high-dimensional neural data analysis, human EEG recordings
Imaging	calcium imaging in freely-behaving mice (miniscope), fiber photometry
Circuit manipulation	closed-loop optogenetics, pharmacogenetics & pharmacology
Programming	Matlab, Python, Julia, Java, C++
Electronics	circuit design and implementation, electrophysiology and behavioral equipment setup, 3D printing
Lab techniques	stereotaxic neurosurgeries, behavioral analysis, immunohistochemistry, microscopy, cell cultures

Workshops and summer schools

2017	Junior Scientist Workshop on Neural Circuits and Behavior, Janelia Farm, Washington
2015	Mechanisms of Memory Consolidation, Reconsolidation and Extinction, Lausanne
	Why trust a theory? – Modern Physics Scientific Methodology, LMU
	3rd Baltic-Nordic Summer School on Neuroinformatics, University of Tartu
	Optogenetics Workshop SPP1665, Ruhr University Bochum
	7th G-Node Winter Course in Neural Data Analysis, LMU
2014	NIN Interneuron Summer School, Amsterdam
	Understanding Sleep: Novel Perspectives in Neurosciences, European Sleep Research Society, Milan
	Optogenetics: controlling the brain with light, University of Oxford
	International Course on Animal Communication, University of Tübingen
	Practical course optical imaging in Neuroscience, University of Tübingen
2013	Models of Synaptic Plasticity Doctoral Course, University of Tübingen
	1st Live Cell Imaging and Electrophysiology Workshop, Pasteur Institute, Athens
	11th Summer Course on Computational Neuroscience, Göttingen
	Neurasmus Workshop, Coimbra
	5th G-Node Winter Course in Neural Data Analysis, LMU
	Brain-Computer Interface workshop and hands-on seminar, INRIA, Bordeaux
2012	Super Resolution Imaging Techniques Workshop, Bordeaux Imaging Center
	Neurasmus Workshop, Barcelona
	Mathematical Cell Biology Graduate Summer Course, University of British Columbia, Vancouver
	Cerebral Ischemia: in vivo and in vitro models (Methods Course), Dept. Of Exp. Neurology, Charité, Berlin
	FELASA category B training (License for experimentation on living animals), Charité, Berlin
2010	5th International Summer School on Emerging Technologies in Biomedicine, Patras
	Summer Program in Computational Neuroscience, University of Pennsylvania, Philadelphia
	Study Group Mathematics with Industry, Amsterdam
2009	8th EEGLAB Workshop, Aspet
2008	Modern Methods in Industrial Mathematics Ph.D. Course, Technical University of Denmark, Copenhagen
	66th European Study Group with Industry, Technical University of Denmark, Copenhagen
	Mathematics Summer School, University of Crete
	Graduate Industrial Mathematics Modeling Camp, University of Regina
	Industrial Problem Solving Workshop, University of Regina
	2nd Workshop for Drug Design, National Hellenic Research Foundation, Athens
2007	MITACS Industrial Math Summer School, Simon Fraser University, Vancouver
2006	Arizona Winter School "Computational Aspects of Algebra and Arithmetic", Tucson, Arizona
	Introduction to Grid Computing, Athens
	Next Generation Computing Systems - AIT Summer School, Athens
	BEST Robotics Summer School, Athens
2001 – 2004	Participation in national mathematical competitions

Travel grants

2018	Onassis Foundation nomination and grant to attend Lindau Nobel Laureate Meeting
	FENS-IBRO/PERC travel grant to attend FENS Forum 2018
2017	BCCN travel grant to attend Bernstein Conference
	Janelia Farm travel grant to attend Junior Scientist Workshop on Neural Circuits and Behavior
	FENS travel grant to attend JNS Annual Meeting
	Travel grant to attend EMBL Symposium on Neural Circuits
	Travel grant to attend 37th Blankenese Conference
2015	University of Tartu – INCF travel grant
2014	British Neuroscience Association travel grant
2013	Hellenic Pasteur Institute travel grant
2011	Thomaideio grant (NTUA) for active participation in conference.
2010	COST Grant (5th International Summer School on Emerging Technologies in Biomedicine)
	Centrum Wiskunde & Informatica (CWI) (Study group Mathematics with Industry)
2009	Centre de Recherche Cerveau et Cognition
2008	Danish Center for Applied Mathematics and Mechanics (DCAMM)
	University of Crete
	Pacific Institute for the Mathematical Sciences (PIMS) grant
2006	FORTH scholarship
	Athens Information Technology (AIT)
	National Science Foundation (NSF)

Student supervision

2016 – 2017	Jialiang Lu	M.Sc. Thesis	Currently: Graduate student at Caltech
2017	Auguste Schulz	Research Internship	Currently: M.Sc. student at TUM
2016	Sandra Reinert	Research Internship	Currently: Graduate student at LMU
2015 – 2016	Elena Itzcovich	Research Internship	Currently: Graduate student at LMU
2015 – 2016	Amar Roy	M.Sc. Thesis	Currently: Industry
2015 – 2016	Felix Brechtmann	Research Internship	Currently: Industry

Scientific outreach

2016 – today	Administrator of Systems Neuroscience mailing list
2016 – today	Peer reviewer
2015 – today	Organizer of Neurophysiology Nights seminar series, LMU
2012 – 2015	Writer & editorial board of the "CNS Charité Neuroscience Newsletter"
2012 – 2013	Neurasmus course representative at the Erasmus Mundus Association (EMA)
2012 – today	Scholarpedia Assistant Editor
2011 – 2014	TED talks translator
2008 – 2010	American Mathematical Society's (AMS) poster series "Mathematical Moments" translator
2004 – 2006	Organizer and invigilator - National mathematical competitions - Hellenic Mathematical Society (HMS)
2004	Coordinator, guide and invigilator at the International Mathematical Olympiad (IMO) 2004
2004	Coordinator, guide and invigilator at the International Informatics Olympiad (IOI) 2004

Teaching experience

2017	Assistance at Miniscope Workshop Munich
2015 - 2017	Student supervision
2015	Tutor at the 7th G-Node Winter Course in Neural Data Analysis
2012	"Speaking to the public" (M.Sc. course), Charité University Hospital, Berlin
2004 – 2012	Private and group tutor (university and high school students), Athens

Internships

2011 – 2012 **Lab Rotations - Charité - Universitätsmedizin Berlin**
"Comparison of cell counting techniques for the assessment of cell death in tissue slices"
"Effects of PEDF on primary neuronal cells after oxygen-glucose deprivation"
Departments of Experimental Neurosurgery & Experimental Neurology
Supervisors: Dr. Ana Luisa Piña – Dr. Marietta Zille

2010 **Summer research scholar - University of Pennsylvania**
Department of Psychiatry, Supervisor: Dr. Ruben Gur

2009 **M.Sc. Thesis - Université Paul Sabatier, Toulouse**
Centre de Recherche Cerveau et Cognition (CERCO), Supervisor: Dr. Arnaud Delorme

2008 **Internship on Biostatistics - Alfa Institute of Biomedical Sciences (AIBS)**
Supervisors: Dr. Matthew E. Falagas - Dr. Dimitrios Matthaiou

2007 **Graph theory research for MapleSoft – Simon Fraser University (SFU)**
"Algorithmic graph isomorphism determination"
Centre for Experimental and Constructive Mathematics (CECM)
Supervisors: Dr. Michael Monagan - Mohammad Ghebleh

Other publications

7. Combinatorial and statistical analysis of keno game. **CUMC Annual, 2007**
Karalis N

8. Effect of meteorological variables on the incidence of lower urinary tract infections. **European Journal of Clinical**
Falagas ME, Peppas G, Matthaiou DK, Karageorgopoulos DE, **Microbiology and Infectious**
Karalis N, Theocharis G **Diseases, 2009**

9. Novel graph invariants for fast graph isomorphism identification. **Mitacs Proceedings, 2007**
Karalis N, Aliaga R, Arnold R, Wu W

Conference abstracts

2018   Dynamic organization of limbic circuit dynamics by breathing
Karalis N, Sirota A [FENS forum 2018]

2017   Respiratory entrainment of memory circuits
Karalis N, Sirota A [Junior Scientist Workshop on Neural Circuits and Behavior]
Respiratory entrainment of memory circuits
Karalis N, Sirota A [SfN Meeting 2017]
Neuronal synchrony and oscillatory coupling - Functional role and implementation
Karalis N, Sirota A [Coupling and Causality in Complex Systems Conference]
Respiratory entrainment of prefrontal circuits
Karalis N, Sirota A [Bernstein Conference 2017]
Respiratory entrainment of prefrontal circuits
Karalis N, Sirota A [40th Meeting of Japan Neuroscience Society]
Respiratory entrainment of prefrontal circuits
Karalis N, Sirota A [Causation, Explanation, Conditionals workshop]
Respiratory entrainment of prefrontal circuits
Karalis N, Sirota A [EMBL Symposium Neural Circuits in the Past, Present and Future]
Respiratory entrainment of prefrontal circuits
Karalis N, Sirota A [37th Blankenese Conference on Synaptic plasticity & stability]

2016   Manipulating and interpreting fast oscillatory dynamics using optogenetics
Karalis N, Lu J, Sirota A [3rd Bordeaux Neurocampus Conference]
Manipulating and interpreting network dynamics using optogenetics
Karalis N, Lu J, Sirota A [Bernstein Retreat - 10th Sparks Workshop]
Oscillatory circuit organization during fear behavior
Karalis N, Courtin, J, Dejean C, Chaudun F, Rozeske R, Wurtz H, Herry C [Neurizons]

2015   High-density electrophysiological characterization of the hippocampal and cortical network activity
Karalis N, Blanco-Hernandez E, Sirota A [11th Meeting of the German Neuroscience Society 2015]
Multichannel extracellular recordings in freely behaving rodents
Resnik E, **Karalis N**, Schwesig G, Sirota A [Center of Competence in Neuroengineering Meeting 2015]

2014   Synchronized prefrontal-amygdala 4Hz oscillations mediate fear behavior
Karalis N, Courtin, J, Dejean C, Chaudun F, Rozeske R, Wurtz H, Herry C [SfN Meeting 2014]
Prefrontal circuits of contextual fear discrimination and generalization
Rozeske R, Khoder S, Chaudun F, Karalis N, Wurtz H, Herry C [SfN Meeting 2014]
Towards the dissection of the olfactory sampling strategies during exploratory activity
Blanco-Hernandez E, Graboski J, **Karalis N**, Sirota A [Olfaction SPP 5th Annual Meeting].
Long-range synchronization of prefrontal-amygdala neuronal circuits during fear behavior
Karalis N, Courtin, J, Dejean C, Chaudun F, Rozeske R, Wurtz H, Herry C [FENS Meeting 2014]
Prefrontal Circuits of Contextual Fear Discrimination
Rozeske R, Chaudun F, Khoder S, **Karalis N**, Wurtz H, Herry C   [FENS Meeting 2014]
Medial prefrontal cortex neuronal ensembles encode conditioned fear behavior
Dejean C, Courtin, J, **Karalis N**, Wurtz H, Herry C   [FENS Meeting 2014]
Synchronized prefrontal-amygdala 4Hz oscillations mediate fear behavior
Karalis N, Courtin, J, Dejean C, Chaudun F, Rozeske R, Wurtz H, Herry C   [NIN Interneurons Summer School]

2013   Increased prelimbic neuronal activity is associated with contextual fear discrimination
Rozeske R, **Karalis N**, Khoder S, Herry C   [4th GDR Congress]

2011   Effects of Himalayan tradition meditation during a SSVEP study
Karalis N, Karanasiou I, Uzunoglu N [Meeting of the Society of Applied Neurosciences 2011]

2010   Short term effects of Vipassanā meditation in a single subject SSVEP study
Karalis N, Karanasiou I, Uzunoglu N [4th Congress for Electr. Engin. Students]

2006   Grid Computing [TEE Research and Technology Days]

Conference participation

2018   68th Lindau Nobel Laureate Meeting in Physiology & Medicine
11th FENS forum, Berlin

2017   Society for Neuroscience Meeting, Washington, DC
Bernstein Conference 2017, Göttingen
Coupling & Causality in Complex Systems, Cologne
Harvard-LMU Young Scientists' Forum, Munich
Japan Neuroscience Society annual meeting, Tokyo
Bernstein Retreat and Causation, Explanation, Conditionals Workshop, Tutzing
EMBL Symposium Neural Circuits in the Past, Present and Future, Heidelberg
37th Blankenese Conference on Synaptic plasticity & stability, Hamburg
British Neuroscience Association festival, Birmingham
Swiss Society for Neuroscience annual Meeting, Basel

2016   Probing neuronal circuits during behavior, Bordeaux
Neurizons, Göttingen
Bernstein Retreat and Multichannel Electrophysiology Workshop, Tutzing

2015   Bernstein Conference, Heidelberg
Cutting Edge Technologies, Munich
Bernstein Retreat and Virtual Reality Workshop, Tutzing
11th Meeting of the German Neuroscience Society, Göttingen
Center of Competence on Neuroengineering Meeting, Technical University of Munich

2014   Society for Neuroscience Meeting, Washington, DC
9th FENS Forum of Neuroscience, Milan

2013   Bernstein Conference, Tübingen
1st European Neuroscience Conference by Doctoral Students, Bordeaux
European Neuroscience Campus Annual Meeting, Bordeaux

2012   8th FENS Forum of Neuroscience, Barcelona
ENC Network Annual Joint Meeting, Barcelona
Erasmus Mundus Association General Assembly, Prague
7th International Symposium on Neuroprotection and Neurorepair, Potsdam

2011   Berlin Brain Days
22nd European Students Conference on Regenerative Medicine, Berlin
Society of Applied Neuroscience meeting, Thessaloniki
Breaking Convention, University of Kent
34th European Conference on Visual Perception, Toulouse
25th Annual Hellenic Congress of Neurosurgery, Athens
25th Annual Hellenic Congress of Neurology, Athens

2010   4th Congress for Electrical Engineering Students, Patras

2009   The Brain: Function, Imaging and Repair, Athens

2007   Canadian Undergraduate Mathematics Conference, Simon Fraser University, Vancouver

2006   Which mathematics for biology?, FORTH, University of Crete

Languages

Language	Level		Certification
Greek	First language		
English	Fluent	C2	Cambridge First Certificate in English (2001)
German	Intermediate	C1	Zentrale Mittelstufenprufung (2002) Zertifikat Deutsch als Fremdsprache (2000)
Spanish	Intermediate	B2	
French	Intermediate	B2	

Soft skills courses

2017   Patent and IP workshop, Center for Nanoscience, Munich
2015   Project management workshop, LMU Graduate School, Munich
2015   Grant writing workshop, LMU Graduate School, Munich
2015   Academic presentation workshop, LMU Graduate School, Munich
2014   Educational course on manuscript and grant writing, Milan

Professional memberships

2017 – today   Japan Neuroscience Association
2014 – today   Society for Neuroscience
2013 – today   Bernstein Center for Computational Neuroscience
2013 – today   Neurasmus Alumni Association
2012 – today   Neuroscience in Bordeaux Association
2012 – today   Federation of European Neuroscience Societies
2012 – today   Hellenic Society for Neurosciences
2011 – today   "School of Applied Mathematics and Physics" Alumni Association
2**004 – today**   Hellenic Mathematical Society

Volunteering work

2011   Volunteering for EDASA (Forest Wildfire Protection), Athens
2010   JeffHOPE student-run free clinics, Philadelphia, PA
2010   Books Through Bars, Philadelphia, PA
2009 – 2012   Photographer in various artistic events
2007   Teaching computer skills to immigrants at the Underground Free University, Athens
2005   European Youth Week 2005, Athens

Non-academic work experience

2011 – 2012   Civic Consulting (Research assistance), Berlin, Germany
2011   Greek Population Census
2010 – 2012   Founder of tutoring and career counseling organization
2009 – 2011   Photographer (freelance, Demotix agency)
2007 – 2011   Animateur
2004 – 2012   Web development **(**PHP, HTML, CSS, Javascript, LaTeX, SQL**)**
2010   Hellenic Post
2004   Hellenic Telecommunications Organization (OTE)
2004   Athens Urban Transportation Organization (OASA)