## Nikolaos Karalis

LMU Department Biology II Großhaderner Straße 2 82152, Planegg-Martinsried Website Email Tel. www.nikolaskaralis.gr nikolaskaralis@gmail.com +49 157 566 23579

## **Current position**

#### Ph.D. candidate in Neuroscience

2013 - 2017 Faculty of Medicine, Ludwig-Maximilians University Munich

Thesis Mechanisms of memory consolidation across hippocampal and cortical circuits

Advisor Prof. Dr. Anton Sirota

#### **Education**

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 Ranking 1/5 **School of Applied Mathematics and Physical Sciences** B.Sc. & M.Sc. 2004 - 2011National Technical University of Athens (NTUA) Grade 7.42/10 Majors Computational Mathematics, Statistics

Thesis EEG signal analysis for identification of meditative states Grade 10/10

#### Research methods

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

#### **Publications** (Citations: 225; h-index: 5; \*: equal contribution)

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

2. 4 Hz oscillations synchronize prefrontal - amygdala circuits during fear behaviour.

Nature Neuroscience, 2016

Karalis N, Dejean C, Chaudun F, Khoder S, Rozeske R, Wurtz H, Bagur S,

3. 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

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

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

6. Effect of meteorological variables on the incidence of lower urinary tract infections.
Falagas ME, Peppas G, Matthaiou DK, Karageorgopoulos DE,
Karalis N, Theocharis G

European Journal of Clinical
Microbiology and Infectious
Diseases, 2009

7. Novel graph invariants for fast graph isomorphism identification. Mitacs Proceedings, 2007

Karalis N, Aliaga R, Arnold R, Wu W

Benchenane K, Sirota A, Courtin J, Herry C

8. Combinatorial and statistical analysis of keno game. CUMC Annual, 2007

Karalis N

#### **Invited Talks**

2017	Neuronal synchrony and oscillatory coupling	Coupling & Causality in Complex Systems
2017	Respiratory entrainment of memory circuits	Harvard-LMU Young Scientists' Forum
2017	Respiratory entrainment of prefrontal circuits	Japan Neuroscience Society meeting
2017	Prefrontal oscillatory mechanisms of fear behavior	British Neuroscience Association meeting
2016	Oscillatory circuit organization during fear behavior	LMU lecture series
2016	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
2013	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
2007	Combinatorial and statistical analysis of keno game	Canadian Undergraduate Mathematics Conference

## **Research Experience**

2013 – now	PhD candidate Mechanisms of a Advisor	Ludwig-Maximilians-Universität München memory consolidation across hippocampal and cortical circuits Prof. Dr. Anton Sirota	Faculty of Medicine
2012 – 2013	M.Sc. Thesis Neuronal signatu Supervisor	Neurocenter Magendie, Bordeaux ures of fear memory Dr. Cyril Herry	INSERM
2009 – 2011	M.Sc. Thesis EEG Analysis of Supervisors	National Technical University of Athens f the neurophysiological effects of meditation on visual evoked Dr. Irene Karanasiou & Dr. Nikolaos Uzunoglou	Electrical Engineering Dept. I potentials
2005 – 2009		ance National Technical University of Athens nputing infrastructure - Network development and administrati	High Energy Physics Dept. on

## **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**

**Programming** 

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 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

## **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

## **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

#### References

#### Anton Sirota, Ph.D.

Professor, Chair for Cognition and Neural Plasticity Department Biology II Ludwig-Maximilians-Universität München Großhaderner Straße 2 82152 Planegg-Martinsried, Germany Email: sirota@biologie.uni-muenchen.de

Tel: (+49) 89218074805

#### Cyril Herry, Ph.D.

Researcher CR1 INSERM U862 Neurocentre Magendie 146 rue Léo Saignat 33077 Bordeaux Cedex, France Email: cyril.herry@inserm.fr Tel: (+33) 0557573726

#### Irene Karanasiou, Dr.-Ing.

Associate Professor Hellenic Military University National Technical University of Athens School of Electrical & Computer Engineering Microwave & Fiber Optics Laboratory Iroon Polytechneiou 9, 157 73 Zografou Campus, Athens, Greece

Email: ikaran@esd.ece.ntua.gr Tel: (+30) 2107722289

#### Travel grants

2017	FENS travel grant to attend JNS Annual Meeting
2017	Travel grant to attend EMBL Symposium on Neural Circuits
2017	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)
2010	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)
2008	University of Crete
2008	Pacific Institute for the Mathematical Sciences (PIMS) grant
2006	FORTH scholarship
2006	Athens Information Technology (AIT)
2006	National Science Foundation (NSF)
Confer	ence abstracts

#### Conference abstracts

2017	Neuronal synchrony and oscillatory coupling - Functional role and implementation <b>Karalis N</b> , Sirota A [Coupling and Causality in Complex Systems Conference]
	Respiratory entrainment of memory circuits
	Karalis N, Sirota A [SfN Meeting 2017]
	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].

2014 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]

Increased prelimbic neuronal activity is associated with contextual fear discrimination Rozeske R, Karalis N, Khoder S, Herry C [4th GDR Congress]
 Effects of Himalayan tradition meditation during a SSVEP study Karalis N, Karanasiou I, Uzunoglu N [Meeting of the Society of Applied Neurosciences 2011]
 Short term effects of Vipassanā meditation in a single subject SSVEP study Karalis N, Karanasiou I, Uzunoglu N [4<sup>th</sup> Congress for Electr. Engin. Students]
 Grid Computing [TEE Research and Technology Days]

## Workshops and summer schools

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 Models of Synaptic Plasticity Doctoral Course, University of Tübingen 2013 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 5th International Summer School on Emerging Technologies in Biomedicine, Patras 2010 Summer Program in Computational Neuroscience, University of Pennsylvania, Philadelphia Study Group Mathematics with Industry, Amsterdam 2009 8th EEGLAB Workshop, Aspet Modern Methods in Industrial Mathematics Ph.D. Course, Technical University of Denmark, Copenhagen 2008 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

Participation in national mathematical competitions

2001 - 2004

## 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
2004 – 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

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

#### **Conference participation**

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 22<sup>nd</sup> European Students Conference on Regenerative Medicine, Berlin Society of Applied Neuroscience meeting, Thessaloniki Breaking Convention, University of Kent 34<sup>th</sup> European Conference on Visual Perception, Toulouse 25<sup>th</sup> Annual Hellenic Congress of Neurosurgery, Athens 25<sup>th</sup> Annual Hellenic Congress of Neurology, Athens 4<sup>th</sup> Congress for Electrical Engineering Students, Patras 2010 2009 The Brain: Function, Imaging and Repair, Athens Canadian Undergraduate Mathematics Conference, Simon Fraser University, Vancouver 2007 Which mathematics for biology?, FORTH, University of Crete 2006