Instructors

Elena AVIGNONE, PhD | University of Bordeaux (Bordeaux Neurocampus), France

Elena Avignone is an associated professor in the Development and Adaptation of Neuronal Circuits laboratory at the Interdisciplinary Institute for Neuroscience of Bordeaux (www.iins.u-bordeaux.fr/research-teams-laurent-groc). Her research activity aims to understand how microglial mutually interact with neurons. She investigated microglia properties and the mechanisms regulating microglia-neurons interaction in pathological and physiological conditions using several complementary experimental methods including imaging and electrophysiology. She characterized the activation of microglia after status epilepticus, and how the activation process affects mobility of microglial process. She also investigated how long term potentiation, a classical plasticity protocol, affects microglia morphology, motility and interaction between microglia processes and dendritic spines. More recently she focused on the role of microglia-neuron communication on the maturation of GABAergic transmission.

Selected publications:

- *Avignone E, Ulmann L, Levavasseur F, Rassendren F, Audinat E. Status epilepticus induces a particular microglial activation state characterized by enhanced purinergic signaling. (2008) J Neurosci., 28(37):9133-44*
- *Avignone E, Lepleux M, Angibaud J, Nägerl UV. Altered morphological dynamics of activated microglia after induction of status epilepticus (2015). J Neuroinflammation. 2015 Nov 4;12:202*
- *Pfeiffer T, Avignone E*, Nägerl UV*. Induction of hippocampal long-term potentiation increases the morphological dynamics of microglial processes and prolongs their contacts with dendritic spines. (2016) Sci Rep. Sep 8;6:32422*
- *Bertot C, Groc L, Avignone E. Role of CX3CR1 Signaling on the Maturation of GABAergic Transmission and Neuronal Network Activity in the Neonate Hippocampus. (2019) Neuroscience. 2019 May 15;406:186-201.*

Stéphane BANCELIN, PhD | University of Bordeaux (Bordeaux Neurocampus), France

I study the structure and dynamics of dendritic spines in the hippocampus at the nanoscale, using state-of-the-art super-resolution technique (STED). In particular, my research aims at better understanding the role of spine plasticity upon memory acquisition and recall. To that end, I use and develop in vivo STED microscopy to visualize and quantify spine nanoscale morphology and correlate this imaging approach with behavioral experiments. In the course, I will instruct in vivo STED microscopy to observe and characterize spine nanoscale morphology and dynamics in the hippocampus.

Selected publications:

- *Pfeiffer et al., Chronic 2P-STED imaging reveals high turnover of dendritic spines in the hippocampus in vivo, Elife (in press)*
- *Tonnesen et al., Super-resolution imaging of the extracellular space in living brain tissue, Cell (2018)*
- *Tonnesen et al., Spine neck plasticity regulates compartmentalization of synapses, Nature Neurosciences (2014)*

Francisco DE LOS SANTOS, PhD student | Max Planck Institute Cologne, Germany

I am a neuroscientist working as a PhD student in the laboratory of Prof. Dr. Tatiana korotkova at the Max Planck Institute for Metabolism Research and the Institute for Vegetative Physiology at the University of Cologne. My main broad interest is understanding how innate behaviors emerge from specific neural circuits. As these circuits are highly strongly selected and conserved by natural selection across many animal species, I believe that they provide a unique opportunity to understand the neural computations performed by local and large scales circuits to generate behaviors. On this line, my current project focuses on how different subpopulations of the lateral septum are involved in sociability and feeding, behaviors comorbid with multiple psychiatric disorders. To investigate this, my approach is to use a combination of recordings with calcium imaging in freely-behaving mice, optogenetics and DREADDs for the perturbation of the activity of these neuronal populations as well as computational techniques to study the dynamic of these neurons.

Janosch HELLER, PhD | FutureNeuro and Royal College of Surgeons, Ireland

Janosch Heller has a Diplom in Biology from the University of Cologne, Germany. He obtained his PhD from the University of Cambridge, UK under the supervision of Prof James Fawcett and Prof Keith Martin. There, Janosch investigated integrin manipulation as a therapeutic strategy in spinal cord injury and age-related macular degeneration. Thereafter, Janosch moved to the Queen Square Institute of Neurology at University College London, UK as a research associate to work with Prof Dmitri Rusakov. Janosch was the first to establish single molecule localisation microscopy at the Institute of Neurology where he investigated the nano-environment of tripartite synapses. Currently, Janosch is a Marie Skłodowska-Curie Fellow in the FutureNeuro SFI Research Centre hosted by the Royal College of Surgeons in Ireland, Ireland. His project AstroMiRimage aims at deciphering microRNA control of local translation in astrocytic processes in epilepsy. Janosch manipulates microRNAs to boost local translation of neurotransmitter and ion channels in astrocytes as a means to increase the clearing of excess glutamate and potassium from the synaptic cleft and hence to prevent synchronous neuronal discharges that generate seizures.

Selected publications:

- *Henneberger C, Bard L, Panatier A, Reynolds JP, Medvedev NI, Minge D, Herde MK, Anders S, Kraev I, Heller JP, Kopach O, Rama S, Zheng K, Jensen TP, Sanchez-Romero I, Janovjak H, Ottersen O-P, Nagelhus E-A, Oliet SHR, Stewart MG, Nagerl UV, Rusakov DA (2019) LTP induction drives astroglial remodelling to boost extrasynaptic glutamate escape.* bioRXiv *DOI:10.1101/349233]*
- *Heller JP*, Odii T, Zheng K and Rusakov DA* (2019) Imaging tripartite synapses using super-resolution microscopy. Methods [Epub ahead of print] DOI:10.1016/j.ymeth.2019.05.024*
- *Heller JP* and Rusakov DA* (2019) A method to visualize the nanoscopic morphology of astrocytes in vitro and in situ. Methods Mol Biol 1938:69-84. DOI:10.1007/978-1-4939-9068-9_5*
- *Heller JP* and Rusakov DA* (2017) The nanoworld of the tripartite synapse: Insights from super-resolution microscopy. Front Cell Neurosci 11(374). DOI:10.3389/fncel.2017.00374*
- *Heller JP*, Michaluk P, Sugao K and Rusakov DA* (2017) Probing nano-organization of astroglia with multi-color super-resolution microscopy. J Neurosci Res 95(11):2159-71. DOI:10.1002/jnr.24026*

Tom JENSEN, PhD | University College London, UK

Tom Jensen is a postdoctoral researcher working in Prof. Dmitri Rusakov's Synaptic Imaging lab at University College London. He studies Ca2+ dependent mechanisms controlling neurotransmitter release by employing patch-clamp electrophysiology combined with state of the art multi-photon imaging in hippocampal brain slices. He has a special interest in activity-dependent control of neurotransmitter release by neuromodulatory signalling and applies synthetic and genetically encoded Ca2+/neurotransmitter sensors to examine these processes at the level of individual synapses. In previous work he has characterised synaptic feedback control mechanisms working through activity-dependent activation of pre-synaptic G-Protein coupled receptors (GPR55, A1R). And more recently he has developed novel experimental methodologies to enable simultaneous monitoring of glutamate release and quantitative measurement of pre-synaptic Ca2+ using Fluorescence Lifetime Imaging.

Selected publications:

- *Jensen, T. P. et al. Multiplex imaging relates quantal glutamate release to presynaptic Ca2+ homeostasis at multiple synapses in situ. Nature Communications 10, 1414 (2019). https://www.nature.com/articles/s41467-019-09216-8*
- *Zheng K.*, Jensen T.P.*, & Rusakov D.A. (2018). Monitoring intracellular nanomolar calcium using fluorescence lifetime imaging. Nature Protocols, 13(3), 581. https://doi.org/10.1038/nprot.2017.154*
- *Jensen T.P., Zheng K., Tyurikova, O., Reynolds J.P., & Rusakov D.A. (2017). Monitoring single-synapse glutamate release and presynaptic Calcium concentration in organised brain tissue. Cell Calcium, 64, 102–108. https://doi.org/10.1016/j.ceca.2017.03.007*
- *Boddum K.*, Jensen T.P.*, Magloire V, Kristiansen U., Rusakov D.A., Pavlov I., & Walker M.C. (2016). Astrocytic GABA transporter activity modulates excitatory neurotransmission. Nature Communications, 7, 13572. https://doi.org/10.1038/ncomms13572*
- *Sylantyev S.*, Jensen T.P.*, Ross, R.A. & Rusakov D.A. (2013). Cannabinoid- and lysophosphatidylinositol-sensitive receptor GPR55 boosts neurotransmitter release at central synapses. Proceedings of the National Academy of Sciences of the United States of America, 110(13), 5193–8. https://doi.org/10.1073/pnas.1211204110*

Ani JOSE, PhD | University of Bordeaux (Bordeaux Neurocampus), France

Ani Augustine JOSE develops super-resolution imaging techniques to study the nanoscale organization and dynamics of various proteins within adhesion sites (AS). During his PhD at IINS under Brahim Lounis and Gregory Giannone, he built a RESOLFT microscope capable of imaging at nanoscale resolution (~55 nm) and demonstrated its ability to study the dynamic reorganization of AS protein in living cells and dendritic spines. He also used RESOLFT to study mechanotransduction within AS. Ani obtained his master's degree in Photonics from the Cochin University of Science and Technology. He did his master's thesis in the lab of Fred Bijkerk at XUV optics group at University of Twente, where he was involved in the development of an atomic hydrogen sensor.

Olga KOPACH, PhD | University College London, UK

Olga Kopach had been working on deciphering central sensitization in sensory circuits of the spinal cord, a form of synaptic plasticity in central pain signaling pathways, since her PhD in Kyiv, Ukraine. Her works unveiled that changes in the dynamic trafficking of AMPA receptors in dorsal horn spinal neurons play the central role in pain chronification (Kopach et al., 2011; 2013; 2015; 2016; 2017). Olga is currently a researcher in the Laboratory of Synaptic Imaging at the UCL Institute of Neurology. Her work is focused on mechanisms of transmission and plasticity within the brain circuits in health and neurodegenerative diseases, using a combination of cell/molecular biology tools, electrophysiology and imaging approaches. During the course, Olga will instruct on probing the glutamatergic synapse function by employing viral strategy and multiplex imaging in acute hippocampal slices.

Selected publications:

- *LTP induction drives remodeling of astroglia to boost extrasynaptic glutamate escape. Henneberger C1, Bard L1, Panatier A1, Reynolds JP1, Kopach O1, Medvedev NI1, Minge D1, Herde MK, Anders S, Kraev I, Heller JP, Rama S, Zheng K, Jensen TP, Sanchez-Romero I, Jackson C, Janovjak H, Ottersen OP, Nagelhu EA, Oliet SHR, Stewart MG, Nägerl UV, Rusakov DA. BioRxiv, 349233*
- *Polymer microchamber arrays for geometry-controlled drug release: a functional study in human cells of neuronal phenotype. Kopach O, Zheng K, Sindeeva OA, Gai M, Sukhorukov GB, Rusakov DA.* Biomater Sci. *2019 May 28;7(6):2358-2371*
- *Nano-engineered microcapsules boost the treatment of persistent pain. Kopach O, Zheng K, Dong L, Sapelkin A, Voitenko N, Sukhorukov GB, Rusakov DA.* Drug Deliv. *2018 Nov;25(1):435-447.*
- *Maturation of neural stem cells and integration into hippocampal circuits - a functional study in an in situ model of cerebral ischemia. Kopach O, Rybachuk O, Krotov V, Kyryk V, Voitenko N, Pivneva T.* J Cell Sci. *2018 Feb 20;131(4).*

François MAINGRET, PhD | University of Bordeaux (Bordeaux Neurocampus), France

Based on a combination of cell biology, electrophysiology and high imaging approaches, his research aims at investigating the contribution of neurotransmitter receptor surface dynamics and interactions to developing synapses. He is particularly interested on deciphering the functional interplay between dopamine receptors and ionotropic synaptic receptors in physiological conditions and in neuro-psychiatric disorders.

Selected publications:

- *Jézéquel J, Dupuis JP, Maingret F, Groc L. Tracking single membrane targets of human autoantibodies using single nanoparticle imaging. J Neurosci Methods. 2018 1; 304:76-82.*

Philipe R. F. MENDONÇA, PhD | University College London, UK

I am an experimental neurobiologist, interested in how the intrinsic electrical properties of neurons, (e.g. ion channel kinetics and distribution) can generate distinct firing patterns and different synaptic activities. Ultimately, I seek to understand how diversity in the action potential timing and waveform can affect the local network and neurotransmitter release, and how an imbalance in these features can cascade into neurological disorders. To this end, I use a combination of electrophysiological and imaging techniques, including in-vitro patch-clamp and local field potential recordings (in slices and neuronal cultures), optogenetics and liveimaging fluorescence microscopy.

Selected publications:

- *Tagliatti E, Bello OD*, Mendonca PRF*, Kotzadimitriou D, Nicholson E, Coleman J, Timofeeva Y, Rothman JE, Krishnakumar SS, and Volynski KE (2019). Synaptotagmin 1 oligomers clamp and regulate different modes of neurotransmitter release. Under revision at Nature Communications, available at BioRxiv.*
- *Cano-Jaimez M, Tagliatti E, Mendonca PRF, Nicholson E, Vivekananda U, Kullmann D, Volynski KE (2019) Preparation of dissociated mouse primary neuronal cultures from long-term cryopreserved brain tissue. J. Neurosci. Methods (in press).*
- *Mendonca PRF, Kyle V, Yeo SH, Colledge WH and Robinson HPC. (2017). Kv4.2 channel activity controls intrinsic firing dynamics of arcuate kisspeptin neurons. J Physiol. 5, 885–899.*
- *Mendonca PRF, Vargas-caballero M, Erdélyi F, Szabó G and Robinson HPC. (2016). Stochastic and deterministic dynamics of intrinsically irregular firing in cortical inhibitory interneurons. eLife 5, e16475.*
- *Butler JL, Mendonca PRF, Robinson HPC, and Paulsen O. (2016). Intrinsic Cornu Ammonis Area 1 Theta-Nested Gamma Oscillations Induced by Optogenetic Theta Frequency Stimulation. J Neurosci. 36, 4155–4169.*

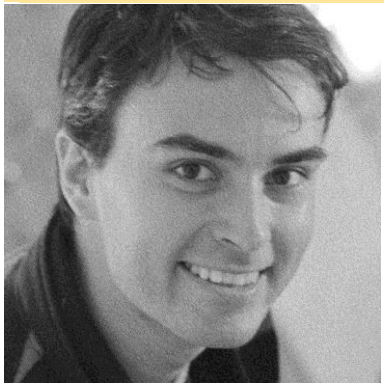
Luc MERCIER, PhD | University of Bordeaux (Bordeaux Neurocampus), France

I am a biologist with a strong interest in microscopy that guided me from my early studies to my current research projects. During my PhD in the lab of J. Goetz (INSERM U1109, Strasbourg), I worked on the development of an intravital correlative light and electron microscopy (Intravital CLEM) methodology applicated to the study of metastasis formation in mouse. Intravital CLEM allows for the first time to dissect the dynamic of cell machinery implicated in metastasis formation at the ultrastructural level. I recently joined Valentin Nägerl lab at the Interdisciplinary Institute of Neurosciences in Bordeaux, to study in vivo the involvement of the aquaporin 4 in the dynamic of the extracellular space and the synaptic plasticity after traumatic brain injury using STED microscopy.

Selected publications:

- *M.A. Karreman, L. Mercier, N.L. Schieber, T. Shibue, Y. Schwab, J.G. Goetz Correlating Intravital Multi-Photon Microscopy to 3D Electron Microscopy of Invading Tumor Cells Using Anatomical Reference Points Plos One doi: 10.1371/journal.pone.0114448*
- *M.A. Karreman, L. Mercier, N.L. Schieber, G.M. Solecki, G. Allio, F. Winkler, B. Ruthensteiner, J.G. Goetz and Y. Schwab Fast and precise targeting of tumor cells in vivo by multimodal correlative microscopy Journal of Cell Science doi: 10.1242/jcs.181842*
- *L. Mercier, J. Böhm, N. Fekonja, G. Allio, Y. Lutz, M. Koch, J.G. Goetz, J. Laporte In vivo imaging of skeletal muscle in mice highlights muscle defects in a model of myotubular myopathy IntraVital doi: 10.1080/21659087.2016.1168553*

Dragomir MILOVANOVIC, PhD | Yale School of Medicine, USA



Dragomir is a fellow of the Human Frontiers in Science Program finishing his postdoc at the Department of Neuroscience at the Yale School of Medicine. From January 2020, Drago will start his independent group within the German Center for Neurodegenerative Diseases (DZNE) at the Charité University Clinic in Berlin. His work focuses on understanding how are numerous synaptic vesicles organized in neuronal cells. Initially, a new concept was proposed (Milovanovic and De Camilli, Neuron, 2017) and recently experimentally confirmed (Milovanovic et al. Science, 2018) in which synaptic vesicles in nerve terminals can be organized as a distinct liquid phase, similarly to oil droplets in water. His general research interests are in synaptic transmission, membrane trafficking, protein-lipid and protein-protein interactions, and what the mechanism is behind the misfunctioning of these processes in neurodegeneration.

Selected publications:

- *Milovanovic D, Wu Y, Bian, X, De Camilli P. A liquid phase of synapsin and lipid vesicles. (2018) Science, 361: 604*

- *Milovanovic D and De Camilli P. Synaptic vesicle clusters at synapses: a distinct liquid phase? (2017) Neuron, 93: 995*
- *Milovanovic D, Platen M, Junius M, Diederichsen U, Schaap I, Honigmann A, Hell SW, van den Bogaart G, Jahn R. Calcium induces syntaxin 1 mesoscale domain formation through phosphatidylinositol 4,5-bisphosphate. (2016) Journal of Biological Chemistry, 291: 7868*
- *Milovanovic D, Honigmann A, Risselada JH, Pähler G, Müllar S, Grübmuller H, Janshoff A, Diedrichsen U, Eggeling C, Hell SW, van den Bogaart G, Jahn R. Hydrophobic mismatch sorts SNAREs in distinct plasma membrane domains. (2015) Nature Communications, 6: 5984*
- *Milovanovic D, Jahn R. Organization and dynamics of SNARE proteins in the presynaptic membrane. (2015) Frontiers in Physiology, 6: 89*

Filipe NUNES VICENTE, PhD student | University of Bordeaux (Bordeaux Neurocampus), France

Filipe Nunes Vicente is a 4th year PhD student in the lab of Gregory Giannone, at the IINS. He is studying the impact of mechanical strain in the nano-organization and dynamics of mechanosenstivie protein assemblies. He is particularly interested in the mechanosensitive properties of the neuronal membrane periodic skeleton (MPS) and focal adhesions (FAs) in migrating cells such as fibroblasts. For this, he is employing a combination of microfabrication, cell stretching and super-resolution microscopy (sptPALM, DNA-PAINT, STED) techniques for different biological systems (mouse fibroblasts, hippocampal neurons, chicken spinal cord explants). Filipe obtained his Master's Degree in Cell and Molecular Biology between the University of Coimbra and the University of Bordeaux. He did his Master's thesis in the lab of Giovanni Marsicano at Neurocentre Magendie (Bordeaux) where he characterized mitochondrial-targeted DREADD receptors as a tool to study G-protein signaling in mitochondrial trafficking.

James REYNOLDS, PhD | University College London, UK

I graduated first-class honours from Trinity College Dublin in 2010. During my degree, I was awarded a Wellcome Trust Vacation Scholarship. During both this scholarship and my undergraduate research program, I investigated the trafficking and distribution properties of the sphingosine-1-phosphate receptor-1 in cultured astrocytes using confocal imaging, under the supervision of Prof Kumlesh Dev. In 2010, I was awarded a HRB-funded PhD Scholarship in the Royal College of Surgeons in Ireland and began my PhD research in the laboratory of Prof David Henshall. My research involved assessment of various signalling pathways that are aberrant immediately after strong seizures, which were subsequently modulated in an in vivo model of temporal lobe epilepsy to assess their clinical relevance. I assessed histone modulators and various microRNAs and successfully augmented seizure-induced cell death signalling by targeting microRNA-34a. As part of a collaboration project with Prof An Zhou of the Morehouse School of Medicine, GA, USA, I also characterized the hippocampal proteome immediately after seizures, identifying

a neuroprotective enzyme that may have novel efficacy in treating epilepsy. I joined Prof Dmitri Rusakov's laboratory late in 2014 and have been a postdoctoral researcher there since, working in collaboration with Prof Alex Gourine. During my time there, I have set up an experimental protocol for in vivo multiplexed multiphoton microscopy to study the nature of the tripartite synapse. I helped established a novel imaging protocol for discriminating subcellular basal calcium levels in vivo. In 2016, I continued working under Prof Rusakov through his Wellcome Trust PRF, expanding the imaging techniques available to the group using genetically-encoded indicators for calcium and glutamate imaging. I also contributed optical data to work by Dr Anusha Mishra and Prof David Attwell, helping describe a novel astrocyte-dependent mechanism for activity-dependent capillary dilation.

Selected publications:

- *Multiplexed calcium imaging of single-synapse activity and astroglial responses in the intact brain. Reynolds JP, Zheng K, Rusakov DA. Neurosci Lett. 2019;689: 26-32.*
- *Astroglia withdraw from potentiated synapses boosting inter-synaptic cross-talk. Henneberger C, Bard L, Panatier A, Reynolds JP, Medvidov NI, Minge D, Rusakov DA et al. BioRxiv. 2019: 349233. doi:10.1101/349233*
- *Time-Resolved imaging reveals heterogeneous landscapes of nanomolar Ca(2+) in neurons and astroglia. Zheng K, Bard L, Reynolds JP, King C, Jensen TP, Gourine AV, Rusakov DA. Neuron. 2015;88: 277–288*
- *Monitoring single-synapse glutamate release and presynaptic calcium concentration in organised brain tissue. Jensen TP, Zheng K, Tyurikova O, Reynolds JP, Rusakov DA. Cell Calcium. 2017;64: 102–108*
- *Astrocytes mediate neurovascular signaling to capillary pericytes but not to arterioles. Mishra A, Reynolds JP, Chen Y, Gourine AV, Rusakov DA, Attwell D. Nat Neurosci. 2016;19: 1619–1627*

Olga TIURIKOVA, PhD student | University College London, UK

Olga is a final year PhD student in Synaptic imaging laboratory led by Prof. Dmitri Rusakov. Through her research work in the laboratory, Olga primary investigate principal mechanisms underlying neuron-glial interaction in the tripartite synapse, through studying single-synapse presynaptic glutamate release, astroglial calcium and potassium signalling and electrogenic glutamate uptake by transporters. To obtain novel insights into the mechanisms underpinning astroglial regulation of excitatory synaptic transmission Olga combined live-cell life-time fluorescence imaging along with patch-clamp electrophysiology in acute brain slices.

Selected publications:

- *Jennings A, Tyurikova O, Bard L, Zheng K, Semyanov A, Henneberger C, Rusakov DA; Dopamine elevates and lowers astroglial Ca2+ through distinct pathways depending on local synaptic circuitry; Glia. 2017 Mar;65(3):447-459*
- *Tyurikova O, Zheng, K, Rings A, Drews A, Klenerman D, Rusakov D; Monitoring Ca2+ elevations in individual astrocytes upon local release of amyloid beta in acute brain slices; Brain Res Bull. 2018 Jan;136:85-90*

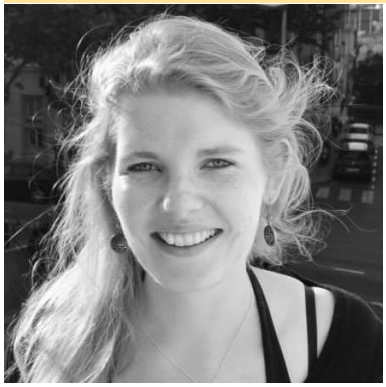
Petr UNICHENKO, PhD | University of Bonn, Germany

Petr Unichenko studied Solid-state Physics and Quantum Radiophysics as an undergraduate student in Moscow. He earned his doctoral degree in Biology at the University of Mainz in 2014, showing that astrocytic intracellular sodium regulates GABA and glutamate transporters interaction. During his postdoctoral training in institute of Physiology in Mainz, Petr demonstrated importance of synaptic phospholipid signalling and synaptic adhesion molecules for cortical information processing. In 2018, he joined Synaptic and Glial Plasticity Lab of Christian Henneberger as a postdoctoral researcher. To assess questions, raise in his work, he uses combination of electrophysiological and imaging techniques, including whole cell patch clamp, sodium, calcium imaging, two-photon excitation microscopy, fluorescence life time imaging (FLIM), FRET sensors for NMDA receptors co-agonists developed in the Lab of Christian Henneberger in collaboration with Colin Jackson's Lab (Zhang et al., Nat Chem Biol, 2018). His current scientific interests: elaboration of FRET sensors for neuro- and gliotransmitters, reciprocal interaction between neurons and astrocytes, astrocytic morphology dynamics and its contribution to brain disorders.

Selected publications:

- *Unichenko P, Yang JW, Kirischuk S, et al. Autism related neuroligin-4 knockout impairs intracortical processing but not sensory inputs in mouse barrel cortex. Cereb Cortex. 2018;28(8):2873-2886. doi:10.1093/cercor/bhx165*
- *Unichenko P, Kirischuk S, Yang JW, et al. Plasticity-related gene 1 affects mouse barrel cortex function via strengthening of glutamatergic thalamocortical transmission. Cereb Cortex. 2016;26(7):3260-3272. doi:10.1093/cercor/bhw066*
- *Unichenko P, Yang JW, Luhmann HJ, Kirischuk S. Glutamatergic system controls synchronization of spontaneous neuronal activity in the murine neonatal entorhinal cortex. Pflugers Arch. 2015;467:1565-1575. doi:10.1007/s00424-014-1600-5*
- *Unichenko P, Dvorzhak A, Kirischuk S. Transporter-mediated replacement of extracellular glutamate for GABA in the developing murine neocortex. Eur J Neurosci. 2013;38(11):3580-3588.*
- *Unichenko P, Myakhar O, Kirischuk S. Intracellular Na plus concentration influences short-term plasticity of glutamate transporter-mediated currents in neocortical astrocytes. Glia. 2012;60:605-614.*

Hanna VAN DEN MUNKHOF, PhD student | Max Planck Institute Cologne, Germany



Hanna finished her master in Biomedical Sciences at the Utrecht University, The Netherlands. Then she worked for a few years at the Institute for Biomedical Research Barcelona studying the mechanisms underlying schizophrenia and depression using in vivo electrophysiology, under supervision of prof. Francesc Artigas. During another stay at prof. Garret Stuber´s lab at the University of North Carolina, she was involved in research into the neural circuitry of obesity and anxiety. Currently she is doing her PhD at the Max Planck Institute for Metabolism Research in Cologne, under supervision of Tatiana Korotkova. She is interested in how different neural subpopulations in the reward circuitry are involved in innate behaviours and reward, and in automatic behavioural analyses using machine learning.

Selected publications:

- *Obesity remodels activity and transcriptional state of a lateral hypothalamic brake on feeding (2019). Rossi, M.A., Basiri, M.L., McHenry, J.A., Kosyk, O., Otis, J.M., van den Munkhof, H.E., Bryois, J., Hübel, C., Breen, G., Guo, W., Bulik, C.M., Sullivan, P.F., Stuber, G.D. Science 364 (6447), 1271-1274.*
- *The antipsychotic drug brexpiprazole reverses phencyclidine-induced disruptions of thalamocortical networks (2017). van den Munkhof, H.E., Arnt, J., Celada, P., Artigas, F. European Neuropsychopharmacology 27 (12), 1248-1257.*
- *Phencyclidine-induced disruption of oscillatory activity in prefrontal cortex: Effects of antipsychotic drugs and receptor ligands (2016). Lladó-Pelfort, L., Troyano-Rodriguez, E., van den Munkhof, H.E., Cervera-Ferri, A., Jurado, N., Núñez-Calvet, M., Artigas, F., Celada, P. European Neuropsychopharmacology 26 (3), 614-625.*
- *Dysfunctional amygdala activation and connectivity with the prefrontal cortex in current cocaine users (2015). Crunelle, C.L., Kaag, A.M., van den Munkhof, H.E., Reneman, L., Homberg, J.R., Sabbe, B., Van den Brink, W., Van Wingen, G. Human Brain Mapping 36 (10), 4222-4230.*

Kaiyu ZHENG, PhD | University College London, UK

Kaiyu Zheng studied physics at Imperial College, London. He obtained PhD at University College London on the subject of measurement of neurotransmitter diffusivity from microscopic to nanoscopic scales in CNS and its physiological implications. He currently works as a postdoctoral researcher at the synaptic imaging lab at the Institute of Neurology, UCL. He has developed and implemented many TCSPC based systems and methods at the lab. He is currently focusing on combining fluorescent lifetime imaging techniques and other advanced imaging techniques to quantitatively measure cellular calcium steady states and dynamics.

Selected publications:

- *Monitoring intracellular nanomolar calcium using fluorescence lifetime imaging. Zheng, K., T. Jensen, and D. Rusakov. 2018. Nature Protocol. 13: 581.*
- *Nanoscale diffusion in the synaptic cleft and beyond measured with timeresolved fluorescence anisotropy imaging. Zheng, K., T. Jensen, L. Savtchenko, J. Levitt, K. Suhling, et al. 2017. Scientific Reports. 7: 42022.*
- *Time-Resolved Imaging Reveals Heterogeneous Landscapes of Nanomolar Ca2+ in Neurons and Astroglia. Zheng, K., Bard, L., Reynolds, J.P., King, C., Jensen, T.P., Gourine, A.V., and Rusakov, D.A. 2015. Neuron 88, 277–288.*
- *Monitoring Ca2+ elevations in individual astrocytes upon local release of amyloid beta in acute brain slices. Tyurikova, Zheng, Rings, and Drews. 2016. Brain Research Bulletin.*