Keynote Speakers

3 October: Troy Margrie

Talk’s title: “Cellular dissection of cortical circuit function”

Biosketch: Troy Margrie is a Professor of Systems Neuroscience and Associate Director at the Sainsbury Wellcome Centre, University College London and was previously Head of the Division of Neurophysiology at the MRC National Institute for Medical Research, Mill Hill. He received his PhD from the University of Newcastle, Australia where he studied the interaction between synaptic maturation and plasticity. He carried out postdoctoral research at The Max Planck Institute for Medical Research in Heidelberg, Germany where he developed methods to target intracellular recording from single neurons in the mouse in vivo to investigate stimulus encoding in the olfactory bulb and neocortex. His lab is now focused on understanding the biophysical diversity of neurons and networks and its relation to function and connectivity.

4 October: Moritz Helmstaedter

Talk’s title: "Cerebral Cortex Connectomics"

Biosketch: Moritz Helmstaedter is a director at the Max Planck Institute for Brain Research, Frankfurt, Germany, where he heads the department of Connectomics.

He aims at pushing the frontiers of connectomics, a research field aiming at mapping communication maps of nerve cells at high throughput. His ambition is to unravel the brain’s computational algorithms, measure the imprints of experience in neuronal circuits, and search for connectome alterations in models of psychiatric disease.

Born 1978 in Berlin, Germany, Moritz obtained his Medical license and physics diploma from Ruprecht-Karls-University Heidelberg, Germany. Doctoral thesis with Bert Sakmann and Post-Doc with Winfried Denk at the Max Planck Institute for Medical Research in Heidelberg. Brief interlude as strategy consultant with McKinsey. 2011-2014 Research Group leader and Principal Investigator at the Max Planck Institute of Neurobiology, Munich. Since August 2014 Scientific Member of the Max-Planck-Society and Director at the Max Planck Institute for Brain Research.

For his research, Moritz was honored with the Otto Hahn Medal (2009) and the Bernard Katz Lecture (2013).

5 October: Larry Swanson

Talk’s title: “Macroconnectomics (and the future of systems neuroscience)”

Biosketch: Dr. Larry Swanson has headed basic research laboratories in systems neuroscience at the Washington University School of Medicine, the Salk Institute for Biological Studies, and the University of Southern California. He is best known for discoveries related to the basic plan of neural systems controlling motivated and emotional behaviour using experimental, neuroinformatics, and historical methods.
6 October: **Gordon Shepherd**

**Talk’s title:** "Synaptic circuit organization of neocortex: a motor system perspective"

**Lab’s biosketch:** Local synaptic circuits in motor-frontal cortex engage in neural operations underlying many aspects of cognition and behaviour – motor control, executive functions, working memory, and more – yet circuit organization at the synaptic, cellular, and molecular levels remains poorly understood in this agranular cortex. What is the functional organization of these synaptic pathways? What cellular and circuit-level operations do neurons in these perform? How do these local circuits communicate with each other and how do they interact with subcortical systems in the basal ganglia and thalamus? The focus of Dr Shepherd’s laboratory is to apply multiple tools of quantitative synaptic circuit analysis to elucidate the functional ‘wiring diagrams’ of neocortical neurons in motor-frontal cortex. They use laser scanning photostimulation (LSPS) microscopy, based on glutamate uncaging and channelrhodopsin-2 excitation, for rapid functional mapping of synaptic pathways onto single neurons in brain slices of motor-frontal cortex. They are also applying a variety of circuit analysis tools in efforts to identify circuit-level mechanisms in mouse models of disease, including autism, Rett syndrome, epilepsy, and motor neuron diseases. Dr Shepherd’s lab is also involved in the development and maintenance of software tools for imaging and electrophysiology applications: www.scanimage.org, www.ephus.org.

9 October: **Thomas Mrsic-Flogel**

**Talk’s title:** "Principles of connectivity in cortical circuits"

**Biosketch:** The research in my lab aims to understand the fundamental principles of neural circuit organization and how this organization relates to the computations that support sensory and behavioural function. The approach we take is to (i) record activity in identified neurons in large ensembles to uncover the computations taking place during sensory processing and sensory-guided behaviours, (ii) understand how these computations arise from the neural hardware: from the synaptic interactions between identified cell types that differ in the patterns of input and output connectivity.

For this purpose, we focus on sensory processing in visual cortex and connected brain areas of the mouse using a combination of methods, including two-photon calcium imaging in anesthetized and behaving mice, in vitro whole-cell recordings, in vivo whole-cell and extracellular recordings, optogenetics, genetic labelling and anatomical tracing, single-cell transcriptional profiling, visual behavioural tasks, and computational modeling.

10 October: **Fritjof Helmchen**

**Talk’s title:** "Novel optical approaches to study mesoscale functional connectivity in the mouse brain during tactile discrimination behaviour”

**Biosketch:** Fritjof Helmchen is Professor of Neuroscience and Co-Director at the Brain Research Institute of the University of Zurich. His research focuses on the development and application of optical methods (in particular two-photon microscopy) to study neural activity on the single-cell and neural circuit level. His group has pioneered several microscopy techniques and contributed to...
recent advancements in the study of behaviour-related microcircuit dynamics in the mouse brain. Most recently, they applied novel optical approaches to study mesoscale functional connectivity during a whisker-based texture discrimination behaviour. Fritjof Helmchen is a recipient of several awards, including an ERC Advanced Grant and the Cloëtta Prize 2015. He serves as a member of scientific advisory and foundation boards and he is the current Director of the Neuroscience Center Zurich.

12 October: Julie Harris

_Talk’s title:_ “Cell type-specific mesoscale connectivity maps”

**Biosketch:** Julie Harris joined the Allen Institute in 2011 to help establish the Allen Mouse Brain Connectivity Atlas. She currently leads scientific efforts to generate a comprehensive map of neural projections between brain areas and from specific cell types within those regions throughout the adult mouse brain. Her research interests include understanding the relationship between anatomical and functional large-scale neural circuits in normal and disease states. As a postdoctoral fellow at the Gladstone Institute for Neurological Disease, she worked with mouse models to understand how Alzheimer's disease can propagate through vulnerable neuronal networks. Harris received a B.S. in zoology from Michigan State University and a Ph.D. in neurobiology and behaviour from the University of Washington.

13 October: Kenneth Harris

_Talk’s title:_ "Understanding neuronal population activity"

**Biosketch:** Kenneth Harris studied mathematics at Cambridge University, did a PhD in robotics at UCL, then moved to Rutgers University in the United States for postdoctoral work in neuroscience. Before returning to UCL in 2012, he was Associate Professor of Neuroscience at Rutgers, and Professor of Neurotechnology at Imperial College London. He is currently Professor of Quantitative Neuroscience, jointly appointed in the Institute of Neurology and the Department of Physiology, Pharmacology, and Neuroscience at the Faculty of Brain Sciences in London.

16 October: Karl Zilles

_Talk’s title:_ "New approaches to study connectivity: Detection of functional systems using multi-receptor fingerprints and visualization of fiber tracts using polarized light imaging"

**Biosketch:** Prof. Karl Zilles, MD, PhD, graduated from the University of Frankfurt and received the MD in 1971. He received the PhD (1977) in Anatomy from the Medical School, Hannover, Germany. He became a Full Professor of Anatomy and Neuroanatomy in 1981 at the University of Cologne, and 1991 at the University of Düsseldorf. He was Director of the C. & O. Vogt- Brain Research Institute from 1991 to 2012, and from 1998 to 2012 Director of the Institute of Neuroscience and Medicine, Research Center Jülich, Germany. He is now JARA-Senior Professor at the Research Center Jülich and at the RWTH University Aachen, Germany. He is Editor-in-Chief of the journal Brain Structure and Function, and was member of editorial boards of various scientific journals (e.g., Neuroimage). Karl
Zilles is Fellow of the German National Academy of Sciences Leopoldina, and Fellow of the North-Rhine Westphalia Academy of Science and Arts. His research focus is on the structural (cyto- and myeloarchitecture), molecular (receptorarchitecture) and functional (neuroimaging using MRI, fMRI and PET) organization of the mouse, rat, non-human primate and human cerebral cortex. He pioneered brain mapping based on the regional and laminar distribution of transmitter receptors in healthy and pathologically impaired human brains and brains of genetic mouse and models. Recently, he introduced together with Katrin Amunts, Marcus Axer and colleagues an ultra-high-resolution method for nerve fiber and fiber tract visualization based on polarized light imaging in the human brain and those of mouse, rat and monkey.

17 October: Bernard Mazoyer

**Talk’s Title:** "Population neuroimaging: a primer"

**Biosketch:** Bernard Mazoyer, Professor of radiology and medical imaging at Bordeaux University Hospital and Medical School, senior researcher at the Institute for Neurodegenerative Disorders, & chair-elect of the Organization for Human Brain Mapping. A graduate of the Ecole Normale Supérieure in Cachan (mathematics, 1972-1976), PhD in Biomathematics (1983) and MD (1985), he did a post-doctoral fellowship in Berkeley in the field of new medical imaging techniques (1984-1985). Afterwards, he was successively an engineer at the Atomic Energy Commission in charge of the positron emission tomography program (1986-1990), Professor of biostatistics and medical informatics at Paris 7 hospital and school of Medicine (1990-1997), Professor of radiology and medical imaging, at Caen University hospital and school of medicine (1997-2011) and since 2012 at Bordeaux university hospital and school of medicine. While in Caen, he also was the director the Cyceron biomedical imaging platform in Caen (2002 to 2011). Bernard Mazoyer is a pioneer of brain imaging techniques and their applications to the study of cerebral bases of cognitive functions in normal and pathological conditions. In 1989 he co-founded the GIn, the first cognitive neuroimaging team in France, which he was the director of until 2016. He is also one of the pioneers of population-based neuroimaging, which allows the study of cerebral aging through the analysis of very large multimodal databases. He was at the origin of the creation in 1997 of the Organization for Human Brain Mapping, of which he was twice the Elected Chairman. Co-author of more than 300 scientific publications, his work received more than 18,000 citations. He was elected a member of the Institut Universitaire de France in 2001 and received the Seymour Cray Prize in Intensive numerical computation (1993) and the Dagnan-Bouveret Prize of the National Academy of Moral and Political Sciences (2003).

18 October: Nathalie Tzourio-Mazoyer

**Talk’s title:**

**Biosketch:** Nathalie Tzourio-Mazoyer is research director at the CEA and manager of the GIN-IMN team. Neuroimager, she is particularly interested in the understanding of the neural bases of hemispheric specialization of cognitive functions, such as language.
MD (1984 Cochin), she completed a master of neurosciences (Pitié-Salpêtrière 1987), then specialized in nuclear medicine (INSTN 1987-1989). As such, she participated in the Frédéric Joliot hospital department in Orsay in the development of neurofunctional imaging techniques and their application to the study of cerebral bases of cognitive functions.

Founding member of the GIN (1989), alongside Bernard Mazoyer and Marc Joliot, she continued her activities in Caen (Cyceron), where she coordinated cognitive neuroimaging and then in Bordeaux since 2010. Her work deals with the study of the anatomical and functional bases of hemispheric specialization in relation to the inter-individual variability of cognitive skills and is based on the most recent neuroimaging methods. In particular, she has coordinated the acquisition of a multimodal database dedicated to this issue (BIL&GIN), including 453 participants (half left-handers) including both anatomical and functional imaging data together with an exhaustive evaluation of participants’ cognitive skills.

19 October: Ed Bullmore

**Talk’s title:** "Economical brain networks in health and disease"

**Biosketch:** Ed Bullmore MB PhD FRCP FRCPSych FMedSci trained in medicine at the University of Oxford and St Bartholomew’s Hospital, London; then in psychiatry at the Bethlem Royal & Maudsley Hospital, London. He moved to Cambridge as Professor of Psychiatry in 1999 and is currently Co-Chair of Cambridge Neuroscience, Scientific Director of the Wolfson Brain Imaging Centre, and Head of the Department of Psychiatry, in the University. He is also an honorary Consultant Psychiatrist and Director of R&D in Cambridgeshire & Peterborough Foundation NHS Trust; and, since 2005, he has worked half-time for GlaxoSmithKline, currently focusing on immuno-psychiatry. He has published more than 500 scientific papers and in 2016 he was listed by Thomson Reuters as one of the most highly cited scientists worldwide in Neuroscience & Behaviour and in Psychology & Psychiatry.

20 October: Olaf Sporns

**Talk’s title:** "Computational Connectomics"

**Biosketch:** After receiving an undergraduate degree in biochemistry, Olaf Sporns earned a PhD in Neuroscience at Rockefeller University and then conducted postdoctoral work at The Neurosciences Institute in New York and San Diego. Currently he is the Robert H. Shaffer Chair and a Distinguished Professor in the Department of Psychological and Brain Sciences at Indiana University, and serves as co-director of the IU Network Science Institute. His main research area is theoretical and computational neuroscience, with a focus on complex brain networks. In addition to over 200 peer-reviewed publications he is the author of two books, “Networks of the Brain” and “Discovering the Human Connectome”. In 2016 he became the Founding Editor of “Network Neuroscience”, a journal published by MIT Press devoted to the intersection of brain and network sciences. Sporns was awarded a John Simon Guggenheim Memorial Fellowship in 2011 and was elected Fellow of the American Association for the Advancement of Science in 2013.