

**Sunday, July 3, 2016**

**SYMPOSIUM: S01. SYNCHRONY IN SCHIZOPHRENIA: FROM MECHANISMS TO DISEASE SYMPTOMS.**

09:45 - 11:15

Hall F

Schizophrenia is a devastating psychiatric illness affecting roughly 1% of the population. Although the causes of the disease are incompletely understood, several lines of evidence suggest that abnormal neural synchrony plays a role in the pathophysiology of the disease. This symposium will examine how environmental and genetic risk factors for schizophrenia can disrupt neural synchrony at the cellular level and how abnormal synchrony could contribute to the symptoms of the disease.

	Chair: Torfi Sigurdsson (Germany)	61
09:50	<b>Dysfunction of neonatal prefrontal-hippocampal networks in neuropsychiatric disorders.</b> Ileana Hanganu-Opatz (Germany)	62
10:10	<b>The contribution of impaired synchrony to cognitive deficits in animal models of schizophrenia.</b> <u>T. Sigurdsson</u> (Germany)	63
10:30	<b>Gamma oscillation abnormalities in schizophrenia: Role of NMDA receptor hypofunction as modeled by ketamine.</b> <u>D. Mathalon</u> , B. Roach, J. Krystal, H. Gunduz-Bruce, J. Ford (USA)	64
10:50	<b>Neural Synchrony in Schizophrenia and At-Risk Populations: Perspectives from MEG.</b> Peter Uhlhaas (United Kingdom)	65

**SYMPOSIUM: S02. THE MOLECULAR MECHANISMS OF AMPHETAMINE ACTION: OF MEMBRANES, MICE AND MEN.**

09:45 - 11:15

Hall C

Amphetamine and its congeners elicit their well-known psychostimulant effects via targeting plasmalemmal and vesicular monoamine transporters. However, they also interfere with a variety of other intracellular targets like protein kinases and other enzymes. In this symposium, the speakers will explore so far underappreciated targets which may nevertheless underlie the recreational abuse liability of amphetamines.

	Chair: Harald H Sitte (Austria)	66
	Chair: Susan G Amara (USA)	67
09:50	<b>Neuropsychiatric Disorders Move Flies to a PIP2 Groove.</b> <u>A. Galli</u> (USA)	68
10:10	<b>Amphetamine regulation of intracellular signaling in dopamine neurons: dual action on dopamine- and glutamate-mediated behaviors.</b> Susan G Amara (USA)	69
10:30	<b>Behavioural amphetamine effects in mice critically depend on the interaction of monoamine transporters and protein kinases.</b> <u>H.H. Sitte</u> (Austria)	70
10:50	<b>Organic cation transporters: unsuspected players in amphetamine's actions on behavior.</b> <u>L. Daws</u> , A. Owens, F. Mayer, W. Koek, H. Sitte (USA)	71

### **SYMPOSIUM: S03. CEREBELLAR INTERACTIONS WITH THE LIMBIC SYSTEM, BASAL GANGLIA AND THALAMO-CORTICAL NETWORKS.**

09:45 - 11:15

Hall G

The cerebellum is well-known for its fundamental role in the control of movement, which comes about via its interactions with the motor cortex and spinal cord. In this seminar, we go beyond these connections with the motor system to examine how cerebellar circuits interact with the hippocampus, amygdala, basal ganglia and thalamo-cortical networks. The results presented will provide new insights about the role of these interactions in spatial navigation, associative learning, dystonia-Parkinson.

	Chair: Freek E Hoebeek (Netherlands)	72
09:50	<b>Cerebellar-Hippocampus interactions during navigation.</b> Laure Rondi-Reig (France)	73
10:10	<b>Cerebellar-Basal Ganglia interactions In Health and Disease.</b> <u>K. Khodakhah</u> (USA)	74
10:30	<b>Cerebellar output controls oscillations in thalamo-cortical networks in mouse models of generalized absence epilepsy</b> Freek E Hoebeek (Netherlands)	75
10:50	<b>Modulation of cerebellar-dependent associative learning by the amygdala</b> <u>Javier F Medina</u> , Henk-Jan Boele (USA)	76

### **SYMPOSIUM: S04. FUNCTION AND REGULATORY CIRCUIT MECHANISMS OF BRAIN STATE.**

09:45 - 11:15

Hall H

The brain is never at rest: the state of brain activity changes moment-by-moment even during sleep and even without any sensory inputs. The importance of such 'spontaneous' brain activity has been recognized over the past decades, but the following fundamental questions are still unsolved fully: how does spontaneous activity affect brain function? How is spontaneous activity controlled? In this symposium, we will discuss this important topic in contemporary neuroscience.

	Chair: Shuzo Sakata (United Kingdom)	77
	Chair: Akihiro Yamanaka (Japan)	78
09:50	<b>State-dependent and cell-type-specific auditory processing.</b> <u>S. Sakata</u> (United Kingdom)	79
10:10	<b>Cellular mechanisms of cortical state change in the somatosensory cortex of the awake mouse</b> <u>S. Crochet</u> (Switzerland)	80
10:30	<b>The role of hypothalamic peptidergic neurons in the regulation of brain states.</b> Akihiro Yamanaka (Japan)	81
10:50	<b>Neural circuits for sleep-wake control.</b> <u>Y. Dan</u> (USA)	82

### **SYMPOSIUM: S05. SELECTION AND CONSOLIDATION OF NEURONAL CIRCUITS DURING BEHAVIORAL LEARNING.**

09:45 - 11:15

Hall I

From perception to action, mental functions are mediated by the activities of neuronal circuits. A fundamental challenge in neuroscience is to understand the processes by which neuronal circuits are selected and consolidated for specific information processing tasks. Here we present recent studies of such processes during

behavioral learning that afford integrative understanding across multiple levels, from population activity and synaptic connection to neuromodulation and molecular dynamics.

	Chair: Kuan Hong Wang (USA)	83
	Chair: Sonja B Hofer (Switzerland)	84
09:50	<b>Imaging Neural Ensembles in Mice During Learning.</b> Takaki Komiyama (USA)	85
10:10	<b>Experience-regulated spatial-temporal dynamics of dendritic spines in the living brain</b> Yi Zuo (USA)	86
10:30	<b>Illuminating the molecular logic of experience-dependent information processing in frontal cortical circuits.</b> <u>K.H. Wang</u> (USA)	88

#### **SYMPOSIUM: S06. GENETIC REGULATION OF STRESS SENSITIVITY: RELEVANCE TO ANXIETY AND DEPRESSION.**

09:45 - 11:15 Hall D

Stress can increase susceptibility to developing psychiatric disorders, including depression and anxiety. Understanding the neurobiological mechanisms underlying stress resilience and susceptibility is key to identifying novel targets for the development of more effective treatments for stress-related psychiatric disorders. This symposium will focus new evidence implicating gene networks, microRNAs, long non-coding RNAs and microbial genes in the sensitivity to stress and ameliorative therapies.

	Chair: John Cryan (Ireland)	89
09:50	<b>Epigenetic Regulation of Stress and Fear Sensitivity in Mouse Models of Anxiety</b> <u>N. Singewald</u> , S. Sotnikov, M. Kharitonova, A. Wille, C. Schmuckermair, R. Diepold, N. Whittle, R. Landgraf, A. Lusser, S. Sartori, A. Sah (Austria)	90
10:10	<b>Genetic and Epigenetic Factors that Modulate Stress-induced neuro- and glioplasticity: Relevance to Depression.</b> <u>L. Pinto</u> (Portugal)	91
10:30	<b>Adult hippocampal neurogenesis alters vulnerability to acute and chronic stress</b> <u>C. Belzung</u> (France)	92
10:50	<b>Microbial Genes, Brain and Behaviour: Regulation of Stress Susceptibility by the Microbiome.</b> John Cryan (Ireland)	93

#### **SYMPOSIUM: S07. NEUROBIOLOGY OF SOCIAL REWARD AND ATTACHMENT.**

09:45 - 11:15 Hall E

Understanding the neurobiological underpinnings of social reward and attachment will provide important insights into healthy and impaired social functioning. The latter is observed in many neuropsychiatric disorders for which currently there are no effective treatments, most notably autism. This symposium will discuss how different brain systems are involved in social reward and attachment in rats, voles, and humans.

	Chair: Alexa H. Veenema (USA)	94
09:50	<b>The Neurobiology of Social Play Reward.</b> <u>L.J. Vanderschuren</u> (Netherlands)	95
10:10	<b>Do the human opioid and oxytocin systems promote approach of social rewards?</b> Siri Leknes (Norway)	96

10:30	<b>Role of opioid and vasopressin systems in socially rewarding juvenile behaviors.</b> <u>A.H. Veenema</u> , C.J.W. Smith, R. Bredewold (USA)	97
10:50	<b>Oxytocin and the neural mechanisms of social bonding.</b> Larry J Young (USA)	98

#### **SYMPOSIUM: S08. MICROGLIAL ACTIVATION IN DISTINCT BRAIN DISEASES.**

09:45 - 11:15

Hall B

Microglial cells are the immune competent cells of the CNS and respond with activation to any form of brain injury or brain disease. They transform from a ramified morphology into an ameboid phenotype and this transformation was considered as a sign of activation. The activation, however, can be quite distinct depending on the type of pathology. In this symposium, the features of microglia in Alzheimer's disease, multiple sclerosis, glioma and developmental disease are compared.

	Chair: Helmut Kettenmann (Germany)	99
09:50	<b>T cell regulation of microglial responses in mouse models of multiple sclerosis.</b> <u>B. Finsen</u> (Denmark)	100
10:10	<b>Microglial cells promote glioma growth</b> <u>H. Kettenmann</u> (Germany)	101
10:30	<b>TREM2, a novel risk factor for Alzheimer's disease affects microglia function.</b> <u>C. Haass</u> (Germany)	102
10:50	<b>Human and mouse transcriptomes related to aging and neurodegeneration</b> Erik Boddeke (Netherlands)	103

#### **SYMPOSIUM: S09. GENETIC CONTROL OF CEREBRAL CORTEX EXPANSION AND EVOLUTION.**

15:45 - 17:15

Hall F

The unmatched complexity of the human cerebral cortex is defined during embryonic development and impacts critically on its function. Cortical neuron number depends on the output of neural progenitors, which show different cell and molecular properties from mouse to human. Here, we shall present the most recent advances on the genetic and cellular mechanisms regulating neurogenesis and cortical size during development, and how these have changed along evolution leading to the human neocortex.

	Chair: Victor Borrell (Spain)	118
15:50	<b>Novel mechanisms of neurogenesis</b> <u>M. Götz</u> , S. Gascón, S. Grade, N. Mattugini (Germany)	119
16:10	<b>Neural stem and progenitor cells in neocortex development and evolution.</b> Wieland B. Huttner (Germany)	120
16:30	<b>Genetic control of cerebral cortex expansion.</b> <u>V. Borrell</u> (Spain)	121
16:50	<b>Primate-specific cellular and molecular logic of OSVZ expansion.</b> <u>C. Dehay</u> (France)	122

#### **SYMPOSIUM: S10. CHLORIDE REGULATION, INHIBITORY FUNCTION AND NEUROLOGICAL DISEASE.**

15:45 - 17:15

Hall C

Fast synaptic inhibition is provided mainly by chloride conducting GABAergic and glycinergic receptors, and

consequently is influenced hugely by the relative levels of chloride inside and outside neurons. Intraneuronal chloride levels can vary widely, both physiologically and in disease. We will discuss how this happens and how it is regulated, how we can image chloride levels and manipulate them optogenetically, and how chloride dysregulation can give rise to different neurological conditions.

	Chair: Andrew Trevelyan (United Kingdom)	123
15:50	<b>Arginine vasopressin suppresses perinatal neuronal network events driven by depolarizing GABA: implications on acute and long-term protection of the brain</b> <u>K. Kaila</u> (Finland)	124
16:10	<b>Imaging of intracellular Chloride in vivo by means of 2-photon in vivo spectroscopy.</b> <u>G. Ratto</u> (Italy)	125
16:30	<b>Using optogenetic manipulation of intraneuronal Cl to influence epileptic activity.</b> <u>A. Trevelyan</u> , H. Alfonsa (United Kingdom)	126
16:50	<b>Modulation of Intracellular Chloride Concentration to Regulate Synaptic Plasticity and Rescue Cognitive Functions in Down Syndrome.</b> <u>L. Cancedda</u> (Italy)	127

#### **SYMPOSIUM: S11. RETHINKING THE ROLE OF PREFRONTAL CORTEX IN WORKING MEMORY.**

15:45 - 17:15 Hall B

Persistent activity in the prefrontal cortex has been long viewed as the neural correlate of working memory (WM). Recently, classification analyses in neuroimaging have probed memory content across the brain, and optogenetics and pharmacological manipulations have explored the causal role of PFC in WM. The emerging view reveals context-dependent involvement of PFC in WM tasks, from learning to categorization, suggesting a possible reformulation of PFC as the primary site of memory maintenance.

	Chair: Albert Compte (Spain)	128
15:50	<b>Bump attractor dynamics in prefrontal cortex explains behavioral precision in spatial working memory.</b> Albert Compte (Spain)	129
16:10	<b>Contrasting roles of visual and prefrontal cortices in visual working memory.</b> <u>K. Sreenivasan</u> (United Arab Emirates)	130
16:30	<b>Dopamine receptors modulate associative learning and neural activity in the prefrontal cortex: insights from studies in non-human primates.</b> <u>M.V. Puig</u> (Spain)	131
16:50	<b>Functional role of medial prefrontal activity during delay period in learning of a working memory task.</b> Chengyu T Li (China)	132

#### **SYMPOSIUM: S12. FUNCTIONAL IMAGING OF NEURONAL AND DENDRITIC COMPUTATION IN BEHAVING ANIMALS**

15:45 - 17:15 Hall I

The speakers in this symposium will present their latest results investigating the properties of neural networks in awake behaving animals. The symposium will also cover recent developments in 3D 2-photon microscopy and related technologies, which have enabled high speed measurements of signalling within 3D networks. The speakers will provide new results into how different layers interact and different areas of the brain work together to process sensory information and govern behaviour.

Chair: Gergely Katona (Hungary)	133
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15:50	<b>Dendritic activity, sparse coding and spatio-temporal integration in in vivo networks.</b> Angus Silver (United Kingdom)	134
16:10	<b>MLspike: Accurate spike estimation from noisy calcium signals of large neuronal populations</b> Thomas Deneux (France)	135
16:30	<b>Functional imaging hippocampal microcircuits during learning</b> <u>A. Losonczy</u> (USA)	136
16:50	<b>3D imaging of fast neuronal assembly activity during learning in behaving animals.</b> <u>G. Szalay</u> , L. Judák, G. Katona, P. Maák, K. Ócsai, M. Veress, Z. Szadai, T. Tompa, B. Chiovini, D. Pálfi, B. Rózsa (Hungary)	137

#### **SYMPOSIUM: S13. VISION THROUGH TIME: HOW THE VISUAL SYSTEM INTEGRATES INFORMATION OVER TIME AND SPACE.**

15:45 - 17:15

Hall D

Visual perception happens across space in over time. How it is that we integrate information across eye movements and in a dynamic visual scene--often both happening at the same time while we are ourselves moving through space--is a critical but understudied aspect of visual science. This symposium will discuss temporal visual perceptual as it relates to fundamental aspects of visibility, eye movements, and visuomotor behavior, and their clinical applications.

	Chair: Stephen Macknik (USA)	138
	Chair: Susana Martinez-Conde (USA)	139
15:50	<b>The perception and physiology of stimulus duration: Vision across time.</b> <u>S. Macknik</u> (USA)	140
16:10	<b>Vision is All About Change: The Role of Eye movements in Driving Visual Perception</b> <u>S. Martinez-Conde</u> (USA)	141
16:30	<b>Distinctive Features of Eye Movements in Neurological Disease.</b> <u>Z. Kapula</u> (France)	142
16:50	<b>Optimal Integration of Sensory Evidence: Building Blocks and Canonical Computations.</b> Dora Angelaki (USA)	143

#### **SYMPOSIA: S14. GUT-BRAIN CROSSTALK IN THE REGULATION OF FEEDING AND EATING DISORDERS.**

15:45 - 17:15

Hall G

Central nervous system and viscera are engaged in a process of continuous reciprocal communication. This gut-brain axis allows for a flow of bidirectional information that participates in the homeostatic control of energy balance. Preclinical and clinical research in this area continues to provide important new insights into the physiological regulation of feeding and body weight, and to identify defects in the gut-brain axis, which might contribute to the pathogenesis of eating disorders.

	Chair: Maria Beatrice Passani (Italy)	144
	Chair: Daniele Piomelli (Italy)	145
15:50	<b>Altered interactions between appetitive, aversive, and interoceptive processes in anorexia and bulimia nervosa.</b> Walter Kayes (USA)	146

16:10	<b>Digesting receptor crosstalk in appetite regulation and food reward.</b> <u>H. Schellekens</u> (Ireland)	147
16:30	<b>Oleoylethanolamide: A "fatty gut feeling" to combat obesity?</b> <u>S. Gaetani</u> (Italy)	148
16:50	<b>Brain histamine participates in the hypophagic and cognitive effects of oleoylethanolamide.</b> <u>M.B. Passani</u> (Italy)	149

#### **SYMPOSIA: S15. REWARD AND PUNISHMENT IN PRIMARY SENSORY CORTICES.**

15:45 - 17:15 Hall E

Maximizing reward and avoiding punishment is an important behavioral drive, and animals routinely learn what stimuli and actions predict favorable and aversive outcomes. The panel will discuss the emerging idea that learning to recognize reward-predicting stimuli involves remodeling at early stages of perception, the primary sensory cortices. Covered topics include demonstrations that cortical cells "learn" to predict attributes of the reward, and the underlying synaptic mechanisms.

	Chair: Alfredo Kirkwood (USA)	150
15:50	<b>How rewards drive attentional selection signals in the visual cortex.</b> <u>P. Roelfsema</u> (Netherlands)	151
16:10	<b>Cortical mechanisms for dynamic modulation of auditory processing and fear learning.</b> <u>M. Geffen</u> (USA)	152
16:30	<b>Eligibility Traces for LTP and LTD in Cortical Synapses.</b> <u>A. Kirkwood</u> (USA)	153
16:50	<b>Stable reinforcement learning via competition between eligibility traces.</b> Harel Shouval (USA)	154

#### **SYMPOSIA: S16. CELLULAR MECHANISMS OF NEUROVASCULAR COUPLING.**

15:45 - 17:15 Hall H

The brain is uniquely dependent on a continuous energy supply, and brief disruptions lead to a permanent loss of function, a common cause of cell death in stroke and neurodegenerative diseases. It is essential to obtain an understanding of how the brain controls the local blood flow, which is also the basis for powerful neuroimaging techniques. This symposium will describe recent progress in the field with a focus on controversies over cellular mechanisms that are central to blood flow control.

	Chair: Martin Lauritzen (Denmark)	155
	Chair: David Attwell (United Kingdom)	156
15:50	<b>Rapid stimulus-evoked astrocyte Ca<sup>2+</sup> elevations and hemodynamic responses in mouse somatosensory cortex in vivo.</b> <u>B.L. Lind</u> , A. Brazhe, S. Jessen, M. Lønstrup, M. Lauritzen (Denmark)	157
16:10	<b>Steady-state regulation of arteriole diameter by astrocytic endfeet</b> <u>G. Gordon</u> (Canada)	158
16:30	<b>The role of astrocytes in neurovascular coupling at the capillary level.</b> <u>A. Mishra</u> , Y. Chen, D. Attwell (United Kingdom)	159
16:50	<b>Neurons in neurovascular coupling.</b> <u>A. Devor</u> (USA)	160

**Monday, July 4, 2016**

**SYMPOSIA: S17. EPIGENETIC MECHANISMS UNDERLYING NEURAL DEVELOPMENT.**

09:45 - 11:15

Hall F

This symposium aims at providing the latest developments in epigenetic mechanisms regulating cell fate specification and differentiation in the CNS. The speakers will cover diverse epigenetic marks (such as histone post-translational modifications and DNA methylation) and epigenetic regulators (including chromatin-modifying enzymes and non-coding RNAs) and will discuss their roles in establishing transcriptional programs associated with specific neural cell fates/states.

	Chair: Gonalo Castelo-Branco (Sweden)	1149
09:50	<b>Endogenous retroviruses underlie a primate-specific gene regulatory network in human brain development</b> Johan Jakobsson (Sweden)	
10:10	<b>Distinguishing the roles of long noncoding RNAs in the human brain from transcriptional noise using epigenetic marks and expression QTLs.</b> Chris P Ponting (United Kingdom)	1151
10:30	<b>Epigenetic states in the oligodendrocyte lineage: insights from single-cell RNA sequencing.</b> G. Castelo-Branco (Sweden)	1152
10:50	<b>Nuclear events modulating Oligodendrocyte Differentiation.</b> Patrizia Casaccia (USA)	1153

**SYMPOSIA: S18. VESICULAR NEUROTRANSMITTER TRANSPORTERS IN SICKNESS AND IN HEALTH.**

09:45 - 11:15

Hall G

Vesicular neurotransmitter transporters (VNTs) play a central role in brain communication and are altered in a number of pathologies including neurological and neuropsychiatric conditions. Not only neurons, but also astrocytes express VNTs, including VGLUT1-3 and VMAT2. In this symposium we will discuss recent results addressing the mechanisms that control vesicular transport of neurotransmitters and the pathological consequences of their dysfunctions.

	Chair: Paola Bezzi (Switzerland)	1154
09:50	<b>The Mechanism and Regulation of Vesicular Neurotransmitter Transport</b> R. Edwards, J. Eriksen, J. Ullman, R. Chang, M. MacGregor, F. Li (USA)	1155
10:10	<b>Astrocyte VGLUTs in epilepsy</b> G. Carriero (Switzerland)	1156
10:30	<b>Vesicular glutamate transporters use flexible anion and cation binding sites for efficient accumulation of neurotransmitter.</b> Reinhard Jahn (Germany)	1157
10:50	<b>Autistic-like behaviours and prefrontal cortex dysfunctions in mice lacking astrocytic VMAT2.</b> Jean-Pierre Mothet (France)	1158



## SYMPOSIA: S19. NEOCORTEX: WHY SO MANY LAYERS AND CELL TYPES?

09:45 - 11:15

Hall B

"Neocortex is not a collection of homogenous and interchangeable ""units"". Its laminar structure was described over a century ago. Since then numerous cell types have been defined, differing in connectivity, morphology, and biophysics, but their distinct functional roles remain unknown. Recently, new optical and physiological techniques have afforded unique insights into the architecture of cortical circuitry and begun directly linking specific layers and cell types to sensation and behavior."

	Chair: Randy Bruno (USA)	1159
09:50	<b>The neocortical circuit is two circuits.</b> Randy Bruno (USA)	1160
10:10	<b>Adaptive Control of an Innate Reflex by Visual Cortex</b> <u>M. Scanziani</u> (USA)	1161
10:30	<b>Cortical sensory processing varies with cell type and behavioral state.</b> <u>J. Cardin</u> (USA)	1162
10:50	<b>Cortical layers, cell size and polyploidy.</b> Michael Brecht (Germany)	1163

## SYMPOSIA: S20. TIMING NEUROGENESIS: INTRINSIC AND EXTRINSIC FACTORS.

09:45 - 11:15

Hall H

The generation of the correct neuronal subtype at the appropriate position and time in the developing embryo is the first step in the assembly of functional neural circuits. Distinct neuronal subtypes are generated in a precise spatial and temporal order from progenitor cells according to their location. Underpinning this organization is a complex network of extrinsic and intrinsic factors. Mechanisms underlying this process in various vertebrate and invertebrate systems will be discussed.

	Chair: Victor Tarabykin (Germany)	1164
09:50	<b>Nutritional control of neural stem cells.</b> <u>A. Brand</u> (United Kingdom)	1165
10:10	<b>Temporal and spatial patterning of neural stem cells.</b> <u>C. Desplan</u> (USA)	1166
10:30	<b>The Gene Regulatory Logic for Reading the Sonic Hedgehog Gradient In The Vertebrate Neural Tube.</b> James Briscoe (United Kingdom)	1167
10:50	<b>Cell fate in the neocortex: cell intrinsic and extrinsic factors.</b> Victor Tarabykin (Germany)	1168

## SYMPOSIA: S21. CONVERGENT DESIGN: HOW INHIBITORY CIRCUITS GOVERN OLFACTORY PROCESSING.

09:45 - 11:15

Hall C

Processing within the vertebrate olfactory bulb - or its analogue in insects, the antennal lobe - involves a host of various subtypes of local inhibitory neurons. This symposium will integrate recent findings by comparing principles of inhibitory action in various species. The presentations will range from subcellular aspects of interneuron activity via odor coding by subsets of inhibitory neurons to the behavioral impact of inhibitory circuitry, and from flies to rodents.

Chair: Veronica Egger (Germany)	1169
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09:50	<b>The wiring variability of <i>Drosophila</i> olfactory local interneurons.</b> <u>Y. Chou</u> (Taiwan)	1170
10:10	<b>Structure and function of inhibitory olfactory circuits in <i>Drosophila</i>.</b> <u>S. Sachse</u> , A. Strutz, A. Baschwitz, V. Grabe, B. Hansson (Germany)	1171
10:30	<b>The rodent olfactory bulb granule cell: A confederation of inhibitory mini-neurons.</b> <u>V. Egger</u> (Germany)	1172
10:50	<b>Inhibitory circuits in the mouse olfactory bulb during learning.</b> <u>A.T. Schaefer</u> (United Kingdom)	1173

## **SYMPOSIA: S22. NON-CODING RNA SIGNALS LINKING PAIN AND MOOD DISORDERS.**

09:45 - 11:15

Hall D

Non-coding RNAs (ncRNA), including several microRNAs(miRNA) have been associated with psychiatric mood disorders like anxiety and depression and rapidly emerge as important biomarkers of mental impairments. NcRNAs may operate as master switches at the neuroimmune interface, associated with specific signalling pathways and with comorbid disorders. This symposium will address this innovative issue and discuss it from different view points with a strong mechanistic focus.

	Chair: Michaela Kress (Austria)	1174
	Chair: Marc Landry (France)	1175
09:50	<b>Neuronal-expressed MicroRNA-targeted Pseudogenes Compete with Coding Genes in the Human Brain</b> <u>H. Soreq</u> , S. Barbash, A. Simchovitz, A. Buchman, D. Bennett, S. Shifman (Israel)	1176
10:10	<b>microRNA containing microvesicles for intercellular communication in the brain.</b> <u>C. Verderio</u> , I. Prada, E. Turola, M. De Luca, M. Pacifici, M. Gabrielli, L. Amin, G. Legname, D. Cojoc, F. Peruzzi (Italy)	1177
10:30	<b>microRNAs involved in the pathogenesis of neuropathic pain following neuronal injury.</b> <u>T. Kalpachidou</u> , S. Quarta, P. Malsch, M. Kress (Austria)	1178
10:50	<b>Pathogenesis of cancer pain: involvement and therapeutic potential of microRNAs</b> Alexandre Favereaux (France)	1179

## **SYMPOSIA: S23. UNDERSTANDING LOCAL AND GLOBAL CIRCUIT MECHANISMS FOR COGNITION IN PRIMATES.**

09:45 - 11:15

Hall E

Understanding the circuit mechanisms of cognitive functions remain important issues in neuroscience. In particular, primate studies play an important role, providing both functional and anatomical models for the cognitive circuits in the human brain. This symposium provides recent findings on the functions of both thalamo-cortical global interactions and local interactions in the cortical microcircuits of primates, to further understand their computational principles important for cognition.

	Chair: Toshiyuki Hirabayashi (Japan)	1180
	Chair: Anna Mitchell (United Kingdom)	1181
09:50	<b>Microcircuit operation in the macaque temporal cortex for representation and retrieval of associative object memory</b> <u>T. Hirabayashi</u> (Japan)	1182
10:10	<b>Development of prefrontal circuits mediating working memory and response inhibition in adolescence</b> Christos Constantinidis (USA)	1183

10:30	<b>A pathway from the brainstem that targets frontal lobe microcircuits for vision.</b> <u>M. Sommer</u> (USA)	1184
10:50	<b>Interactions between the mediodorsal thalamus and prefrontal cortex important for learning and decision-making in macaque monkeys.</b> <u>A. Mitchell</u> (United Kingdom)	1185

#### **SYMPOSIA: S24. INTERACTIONS BETWEEN EXCITATORY AND INHIBITORY SYNAPSES WITHIN LOCAL NETWORKS.**

09:45 - 11:15

Hall I

Healthy brain function depends on a complex set of interactions between synaptic inputs that are established during development, and regulated by experience. Speakers will report recent findings about formation, maintenance and plasticity of excitatory and inhibitory synapses in local microcircuits in health and disease. Special emphasis will be on highlighting sites and mechanisms of interactions for excitatory and inhibitory synapses within single neurons and local microcircuits.

	Chair: Arianna Maffei (USA)	1186
09:50	<b>Local interactions between excitation and inhibition within dendrites</b> Corette Wierenga (Netherlands)	1187
10:10	<b>Distinct learning rules for subpopulations of GABAergic synapses in the neocortex.</b> Michael Higley (USA)	1188
10:30	<b>Crosstalk between excitatory and inhibitory hippocampal neurons controls engram formation and memory stability</b> <u>P. Mendez</u> (Switzerland)	1189
10:50	<b>Cortical circuit dissection in neurodevelopmental disorders.</b> Michela Fagiolini (USA)	1190

#### **SYMPOSIA: S25. BRAIN REPROGRAMMING AND REPAIR.**

15:45 - 17:15

Hall I

Novel approaches to cellular programming and re-programming, and recent developments in the use of pluripotent stem cells, have opened up new possibilities for studies of brain plasticity and repair, providing now tools for restoration of damaged brain circuitry. In this symposium recent breakthroughs in this field will be reviewed by four leading European scientist, each representing a different approach to regeneration, reprogramming and cell-based repair.

	Chair: Anders Björklund (Sweden)	1207
15:50	<b>New stem cell based therapies for Parkinson's disease.</b> <u>M. Parmar</u> (Sweden)	1208
16:10	<b>Reawakening the sleeping beauty in the adult brain: lineage conversion of brain-resident cells into neurons</b> M. Karow, S. Péron, A. Pataskar, V. Tiwari, <u>B. Berninger</u> (Germany)	1209
16:30	<b>Reprogramming Neuronal Circuits in the Neocortex.</b> Paola Arlotta (USA)	1210
16:50	<b>Repair of damaged or diseased neural circuits by recruitment of resident cells.</b> Steven A Goldman (Denmark)	1211

## SYMPOSIA: S26. MODELING OF SYNAPTIC TRANSMISSION - THE PRESYNAPTIC SIDE.

15:45 - 17:15

Hall F

Synaptic release during single or repetitive stimulation depends on the precise arrangement of Ca<sup>2+</sup>-channels, vesicles and release machinery, making it hard to predict the outcome of perturbations based on intuition alone. Therefore, mathematical modeling of the presynapse is becoming an increasingly important tool for understanding the basis for experimentally observed synaptic phenotypes. The symposium brings together some of the people driving this relatively new field along.

	Chair: Jakob B. Sørensen (Denmark)	1212
	Chair: Alexander M. Walter (Germany)	1213
15:50	<b>Supralinear modulation of synaptic strength.</b> <u>L.N. Cornelisse</u> (Netherlands)	1214
16:10	<b>Ca<sup>2+</sup> channel-release sensor coupling and molecular identity of the Ca<sup>2+</sup> sensor at inhibitory synapses.</b> I. Arai, C. Chen, <u>P. Jonas</u> (Austria)	1215
16:30	<b>Impact of presynaptic calcium dynamics in vesicle release at inhibitory and excitatory nerve terminals of the cerebellum</b> Nelson Rebola (France)	1216
16:50	<b>Modeling short-term Plasticity at the Calyx of Held.</b> <u>E. Neher</u> (Germany)	1217

## SYMPOSIA: S27. 'DIRECT' AND 'INDIRECT' PATHWAYS IN BASAL GANGLIA DISORDERS: SEGREGATION OR COOPERATION?

15:45 - 17:15

Hall G

Movement disorders and addictive behaviours have been attributed to imbalances in the activity of 'direct' and 'indirect' pathways linking the striatum with the basal ganglia output nuclei. These two important pathways provide a backbone through which dopamine shapes the operations and plasticity of cortico-basal ganglia networks. The symposium will present new findings on the involvement of 'direct' and 'indirect' pathways in Parkinson's and Huntington's disease, and psychostimulant abuse.

	Chair: M. Angela Cenci Nilsson (Sweden)	1218
	Chair: Paolo Calabresi (Italy)	1219
15:50	<b>A critical reappraisal on the two pathways: from physiology to movement disorders</b> <u>P. Calabresi</u> (Italy)	1220
16:10	<b>Cell type-specific plasticity of striatal projection neurons in Parkinson's and Huntington's models.</b> <u>D.J. Surmeier</u> (USA)	1221
16:30	<b>The two pathways in parkinsonian akinesia and dyskinesia.</b> <u>M.A. Cenci Nilsson</u> (Sweden)	1222
16:50	<b>Distinct roles of ventral striatal pathways in psychostimulant abuse.</b> <u>M.K. Lobo</u> (USA)	1223

## SYMPOSIA: S28. NEURONAL, SYNAPTIC AND CIRCUIT ALTERATIONS IN ALZHEIMER'S DISEASE.

15:45 - 17:15

Hall B

We are experiencing an increased interest in understanding the neurophysiology of Alzheimer's Disease (AD). Unraveling the alterations seen at different levels of neuronal organization may reveal key time points in the disease onset. Even though ample clinical studies exist there is a distinct lack of physiological studies about

changes in the neuronal circuits. This symposium aims to collate new and exciting data on neuronal, synaptic and circuit alterations in the hippocampal formation in AD.

	Chair: Prateep Beed (Germany)	1224
15:50	<b>Presynaptic mechanisms of action of presenilin.</b> Christophe Mulle (France)	1225
16:10	<b>Early stage changes in a specific cell type in layer II of the entorhinal cortex.</b> Menno P Witter (Norway)	1226
16:30	<b>Altered cortical oscillations in AD.</b> P. Beed, A. Klein, D. Schmitz (Germany)	1227
16:50	<b>Restoring Brain Functions in Alzheimer Models by Enhancing Inhibitory Interneuron Function.</b> Jorge J. Palop (USA)	1228

#### **SYMPOSIA: S29. VISUAL NEURONS IN ACTION: LINKING VISION TO ORIENTED BEHAVIORS IN FLIES.**

15:45 - 17:15 Hall C

Sensory signals guide motor programs critical to survival through a transformation of sensation into action, which is modulated by experience. A key question that remains open is how neural circuits in the brain implement the computations underlying such flexible sensorimotor processing. Focusing on visuomotor behaviors, we will discuss by what means neural circuits in the fly brain extract specific sensory and motor features that the brain then uses to inform oriented behavioral decisions.

	Chair: M Eugenia Chiappe (Portugal)	1229
15:50	<b>Visuomotor interactions representing self-movement estimation.</b> E. Chiappe, M. Silies, K. Sporar, Y. Fisher, J. Leong, L. Ramos Traslosheiros (Portugal)	1231
16:10	<b>A spike-timing mechanism for selection of visually-driven escape behaviors in <i>Drosophila</i></b> Gwyneth M. Card (USA)	1232
16:30	<b>Neural circuits underlying visuomotor integration in <i>Drosophila</i>.</b> J.D. Seelig (USA)	1233
16:50	<b>Using virtual reality and genetics to reverse engineer <i>Drosophila</i> visual behavior.</b> Andrew Straw (Austria)	1234

#### **SYMPOSIA: S30. ANIMAL MODELS OF AUTISM SPECTRUM DISORDER - FROM DISEASE MECHANISMS TO NOVEL THERAPIES.**

15:45 - 17:15 Hall H

Autism is a neuropsychiatric disorder characterized by stereotyped behaviors and impairments in social interactions. Despite its high incidence the etiology and pathology of autism are largely unknown. Recently identified risk genes have enabled creation of animal models that mimic specific facets of autism. This symposium will take a multi-disciplinary approach to the question of how we can use these models to better understand disease mechanisms and translate this knowledge into new therapies.

	Chair: Daniel H. Geschwind (USA)	1235
	Chair: Marija-Magdalena Petrinovic (Switzerland)	1236
15:50	<b>Autism: From genetic findings to therapeutics.</b> Daniel H. Geschwind (USA)	1237
16:10	<b>Autism and the synapse: emerging mechanisms and mechanism-based therapies</b> Peter Tsai (USA)	1238

16:30	<b>Modeling ASD core symptoms in animal models.</b> M.L. Scattoni (Italy)	1239
16:50	<b>Brain imaging in ASD: mouse models and human population studies</b> Jason Lerch (Canada)	1240

## **SYMPOSIA: S31. THE NEUROSCIENCE OF BODY CONSCIOUSNESS.**

15:45 - 17:15

Hall D

How do we distinguish our body from the environment? How does the brain link our physical body with our psychological sense of self? We will present recent neuroscientific studies that use virtual reality, neuroimaging and clinical methodologies in addressing such age-old, philosophical problems in novel ways. Taken together, our studies reveal some of the neural mechanisms involved in the multiple and competing ways in which the body is represented in the brain.

	Chair: Mel Slater (Spain)	1241
15:50	<b>Body ownership and embodied cognition.</b> Henrik Ehrsson (Sweden)	1242
16:10	<b>Using auditory and multisensory stimulation to alter body representation.</b> Ana Tajadura-Jimenez (United Kingdom)	1243
16:30	<b>Virtual Body Ownership Influences Attitudes, Behaviours and Illusory Agency</b> Mel Slater (Spain)	1244
16:50	<b>From Action Sensations to Body Predictions: Psychophysical and Neuroimaging Studies on Body Unawareness.</b> Aikaterini Fotopoulou (United Kingdom)	1245

## **SYMPOSIA: S32. CELL-TO-CELL PROPAGATION OF MISFOLDED PROTEINS AS A COMMON FEATURE IN NEURODEGENERATION.**

15:45 - 17:15

Hall E

Progressive accumulation of protein aggregates in the brain is a common pathological feature of multiple neurodegenerative disorders. Recent studies suggest that this process likely occurs along neuronal circuits, due to cell-to-cell transfer of misfolded proteins. This symposium will bring together research in four different disease areas in order to highlight mechanisms underlying the spread of pathogenic proteins and to provide insight into therapies to disrupt disease progression.

	Chair: Amy M. Pooler (Switzerland)	1246
	Chair: Claus Rieker (Switzerland)	1247
15:50	<b>From nucleation to widespread propagation: A prion-like concept for ALS.</b> Magdalini Polymenidou (Switzerland)	1248
16:10	<b>Secretion and spreading of tau isoforms: similarities and differences.</b> Luc Buée (France)	1249
16:30	<b>Is alpha-synuclein a prion-like protein in Parkinson's disease?</b> Patrik Brundin (USA)	1250
16:50	<b>Transneuronal propagation of mutant huntingtin contributes to non-cell autonomous pathology in neurons</b> E. Pecho-Vrieseling, C. Rieker, S. Fuchs, D. Bleckmann, M. Soledad Esposito, P. Botta, C. Goldstein, M. Bernhard, I. Galimberti, M. Müller, A. Lüthi, S. Arber, T. Bouwmeester, H. van der Putten, F. Paolo Di Giorgio (Switzerland)	1251

**Tuesday, July 5, 2016**

**SYMPOSIA: S33. AREAL SPECIFICATION AND ASSEMBLY OF NEOCORTICAL CIRCUITS**

09:45 - 11:15

Hall C

What are the fundamental differences in circuit properties across neocortical areas, and how do these properties emerge during development? This symposium aims to address these questions by presenting our state-of-the art understanding of structure-function relationships in developing and mature cortical circuits, using motor and sensory circuits as proof-of-principle systems to illustrate salient homologies of circuit structure and function across cortical regions.

	Chair: Denis Jabaudon (Switzerland)	2205
09:50	<b>Molecular mechanisms underlying area-specific circuit formation in the mouse neocortex.</b> Michele Studer (France)	2206
10:10	<b>Activity-dependence of inter-areal circuit assembly in the neocortex.</b> Marta Nieto (Spain)	2207
10:30	<b>Synaptic circuit organization of neocortex: a motor cortex perspective.</b> Gordon Shepherd (USA)	2208
10:50	<b>Disinhibitory circuits regulating cortical plasticity.</b> Christiaan Levelt (Netherlands)	2209

**SYMPOSIA: S34. NANOSCALE ORGANIZATION OF THE POSTSYNAPTIC DENSITY: IMPACT ON SYNAPTIC PLASTICITY?**

09:45 - 11:15

Hall F

Several studies have used super-resolution techniques to reveal the nanoscale organisation of AMPA-type glutamate receptors and scaffolding protein organisation in the postsynaptic membranes. Those observations has important consequences on our understanding of excitatory neurotransmission and in turn information processing in the brain. The functional impact on synaptic plasticity of this nanoscale organisation remains unknown.

	Chair: Anne-Sophie Hafner (Germany)	2210
	Chair: Daniel Choquet (France)	2211
09:50	<b>Organization of the Postsynaptic Density.</b> Xiaobing Chen (USA)	2212
10:10	<b>AMPA receptor organization and function.</b> <u>D. Choquet</u> (France)	2213
10:30	<b>In vivo STED microscopy of postsynaptic proteins.</b> <u>K.I. Willig</u> , W. Wegner, C. Gregor, H. Steffens (Germany)	2214
10:50	<b>Postsynaptic nanodomains regulated by local palmitoylation machinery.</b> <u>M. Fukata</u> , N. Yokoi, A. Sekiya, T. Murakami, K. Kobayashi, Y. Fukata (Japan)	2215

**SYMPOSIA: S35. CELLULAR AND SYNAPTIC ORIGINS OF WALKING, RUNNING, CHEWING, AND BREATHING.**

09:45 - 11:15

Hall G

Specialized 'central pattern generator' circuits in the brain give rise to rhythmic behaviors such as locomotion, respiration, and food ingestion. In mammals, the neural origins of these behaviors are being elucidated using tools from mouse genetics, biophysical recordings, and optogenetic behavioral manipulations in living animals. This symposium presents emerging mechanistic principles at the cellular and synaptic level that generate and express these common rhythmic motor behaviors.

	Chair: Christopher Del Negro (USA)	2216
	Chair: Jack Feldman (USA)	2217
09:50	<b>Start and stop: a matter of excitation.</b> Ole Kiehn (Sweden)	2218
10:10	<b>Contribution of nonlinear firing behaviors in locomotor functions.</b> F. Brocard (France)	2219
10:30	<b>Role of astrocytic networks in generation of rhythmic bursting by assemblies of trigeminal neurons involved in mastication.</b> A. Kolta (Canada)	2220
10:50	<b>Brainstem Dbx1 (V0) interneurons generate inspiratory breathing rhythm and pattern.</b> C. Del Negro, A. Revill, A. Kottick, N. Vann, G. Funk (USA)	2221

**SYMPOSIA: S36. NEURONAL OSCILLATIONS AND THEIR ROLE IN VISUAL PERCEPTION - ELECTROPHYSIOLOGY IN NON-HUMAN PRIMATES.**

09:45 - 11:15

Hall D

How does a visual percept arise from brain activity? This symposium will center on the role of neuronal oscillations in the primate visual system. On the basis of electrophysiological recording findings in the thalamus and cortex of non-human primates, the symposium will seek to find answers regarding the generative mechanisms of oscillations and their role in communicating and selecting behaviorally relevant information of the visual environment.

	Chair: Michael Schmid (Germany)	2222
09:50	<b>Oscillations and their role in laminar interactions in V1 and V4 in a top down attention task.</b> Alex Thiele (United Kingdom)	2223
10:10	<b>Thalamo-cortical interactions underlying perceptual suppression: evidence from oscillations in local field potentials and noise correlations.</b> Melanie Wilke (Germany)	2224
10:30	<b>Corticothalamic network activity in vision and attention.</b> F. Briggs (USA)	2225
10:50	<b>Communication through coherence.</b> Pascal Fries (Germany)	2226

**SYMPOSIA: S37. CROSSMODAL AND ASSOCIATIVE SIGNALING IN PRIMARY SENSORY CORTEX.**

09:45 - 11:15

Hall E

Although the areas termed "primary sensory cortex" are considered to be mainly dedicated to low-level processing of unisensory information, increasing evidence indicates that more diverse signals converge to these areas and dynamically shape the sensory representation. In this symposium, we will present recent



evidence for these interactions and discuss the current hypotheses on their biological and computational role, including associative learning and predictive coding.

	Chair: Brice Bathellier (France)	2227
09:50	<b>Cellular and synaptic architecture of multisensory integration in the mouse neocortex</b> P. Medini (Sweden)	2228
10:10	<b>Sensorimotor integration in mouse primary visual cortex.</b> Georg Keller (Switzerland)	2229
10:30	<b>Effects of locomotion in the mouse early visual system.</b> Laura Busse (Germany)	2230
10:50	<b>Circuit mechanisms of associative fear learning in auditory cortex.</b> J. Letzkus (Germany)	2231

### SYMPOSIA: S38. CHRONIC PAIN DISORDERS: IMPLICATIONS OF MOOD AND REWARD CIRCUITRIES.

09:45 - 11:15 Hall H

Pain is a multidimensional experience which can be considered as a debilitating disease when it becomes chronic. It associates both sensory, referred to as nociceptive and emotional components and could lead to anxiodepressive consequences. This session highlights new advances on understanding the underlying mechanisms of different components and consequences of chronic pain with a special look on an emerging role of brain mood and reward systems.

	Chair: Ipek Yalcin Christmann (France)	2232
	Chair: Venetia Zachariou (USA)	2233
09:50	<b>Cortical segregation of chronic pain components : A special focus on the anterior cingulate cortex.</b> I. Yalcin Christmann, F. Barthas, J. Sellmeijer, M. Humo, E. Waltisperger, M. Barrot (France)	2234
10:10	<b>A key role of the Nucleus Accumbens in neuropathic pain and its treatment</b> Vasiliki Mitsi, Giannina Descalzi, Dimitra Terzi, Immanuel Purushothaman, Li Shen, Venetia Zachariou (USA)	2235
10:30	<b>Presynaptic and Postsynaptic mechanisms for chronic pain and anxiety</b> Min Zhuo (Canada)	2236
10:50	<b>Chronic pain induces CI dysregulation in reward pathways: Implication for therapeutics.</b> Yves De Koninck (Canada)	2237

### SYMPOSIA: S39. WHAT DOES THE DENTATE GYRUS DO? NEW INSIGHTS FROM ELECTROPHYSIOLOGY, BEHAVIOR AND IN VIVO IMAGING.

09:45 - 11:15 Hall B

The dentate gyrus has long been hypothesized to perform pattern separation, the decorrelation of cortical inputs to the hippocampus. In recent years new tools have enabled rigorous tests of this hypothesis in behaving animals. Our symposium will feature 4 scientists at the forefront of these efforts, who will describe new empirical findings regarding information processing in DG and its relevance to memory and behavior.

	Chair: Michael R Drew (USA)	2238
09:50	<b>Dentate network computations in support of spatial working memory</b> J.K. Leutgeb, T. Sasaki, V.C. Piatti, E. Hwaun, S. Ahmadi, S. Leutgeb (USA)	2239
10:10	<b>Real-time visualization and control of encoding circuits in the dentate gyrus.</b> Mazen A Kheirbek (USA)	2240

10:30	<b>Cellular mechanisms for generating short-term mnemonic representations in the dentate gyrus</b> Ben W. Strowbridge (USA)	2241
10:50	<b>Modulation of fear memory traces in the dentate gyrus.</b> Christine A Denny (USA)	2242

#### **SYMPOSIA: S40. DENDRITIC ENCODING OF NEURONAL NETWORK FUNCTION AND PLASTICITY.**

09:45 - 11:15 Hall I

Single dendrites receive a myriad of synaptic inputs from various origins. Recent studies have provided insight into how local synaptic interaction and nonlinear dendritic integration help processing these inputs to shape the selectivity of neuronal output. Local interactions between synapses have also been shown to trigger specific plasticity events. In this symposium we will explore the relationship between synaptic integration, dendritic plasticity and their role in network function.

	Chair: Anthony Holtmaat (Switzerland)	2243
	Chair: Panayiota Poirazi (Greece)	2244
09:50	<b>Comprehensive 3D calcium imaging in vivo reveals experience-driven rules directing dendritic growth and circuit integration.</b> Kurt Haas (Canada)	2245
10:10	<b>How spontaneous activity drives synaptic plasticity in developing dendrites.</b> <u>C. Lohmann</u> (Netherlands)	2246
10:30	<b>Local dendritic activity drives plasticity in adult cortical neurons in vivo.</b> Anthony Holtmaat (Switzerland)	2247
10:50	<b>Dendritic spikes in cortical networks.</b> Lucy Palmer (Australia)	2248

#### **SYMPOSIA: S41. MAMMALIAN NERVOUS SYSTEM CELL TYPES THROUGH THE LENS OF SINGLE CELL RNA-SEQUENCING (RNA-SEQ).**

15:45 - 17:15 Hall G

The brain contains a myriad of highly specialized cells, but our understanding cell-type diversity is incomplete, at best. Here, we highlight pioneering work using single-cell RNA-seq to better characterize cells in the developing and adult mouse and human nervous system. This work will help reveal taxonomy of neuronal and glial cells guided by their molecular signatures, in efforts towards elucidating nervous system function and development.

	Chair: Bosiljka Tasic (USA)	2264
15:50	<b>Functional heterogeneity of mouse brain cell types by large-scale single-cell RNA-seq.</b> <u>S. Linnarsson</u> (Sweden)	2265
16:10	<b>Human cerebral organoids recapitulate gene expression programs of fetal neocortex development</b> <u>B. Treutlein</u> , J.G. Camp, F. Badsha, S. Paabo, W. Huttner (Germany)	2266
16:30	<b>Cellular diversity of human neocortical germinal zones.</b> <u>A.A. Pollen</u> , T. Nowakowski, J. Chen, H. Retallack, C. Sandoval-Espinosa, C. Nicholas, J. Shuga, S.J. Liu, M. Oldham, A. Diaz, D. Lim, A. Leyrat, J. West, A. Kriegstein (USA)	2267
16:50	<b>Adult Cortical Cell Taxonomy by Single Cell Transcriptomics</b> <u>B. Tasic</u> , V. Menon, T. Nguyen, T.K. Kim, Z. Yao, T. Bakken, K. Smith, B. Levi, D. Bertagnolli, J. Goldy, N. Shapovalova, T. Dolbeare, S. Bort, S. Sunkin, A. Bernard, L. Ng, E. Lein, C. Koch, M. Hawrylycz, H. Zeng (USA)	2268

## SYMPOSIA: S42. REGULATION OF SYNAPTIC PROTEINS IN HEALTH AND DISEASE.

15:45 - 17:15

Hall I

There is a growing appreciation that many neurodevelopment disorders are a result of synaptic dysfunction. In particular, there has been a huge increase in the identification of mutations in pre- and post-synaptic proteins that are present in affected individuals. Thus, studies probing the role of these proteins in both normal neurotransmission and during disease are an important current topic of investigation in order to identify new therapeutic targets.

	Chair: Katherine Roche (USA)	2269
15:50	<b>Regulation of Neuroligins by Phosphorylation.</b> M.A. Bemben, J. Jeong, Q.A. Nguyen, S.L. Shipman, B.E. Herring, R.A. Nicoll, K.W. Roche (USA)	2270
16:10	<b>NMDA receptor dysfunction in autism spectrum disorders (ASDs).</b> E. Kim (Republic of Korea)	2271
16:30	<b>Rescuing the excitation-inhibition imbalance associated with autism and epilepsy by regulating protein translation pathway.</b> C. Sala (Italy)	2272
16:50	<b>Alternative splicing programs for synaptic specificity.</b> Peter Scheiffele (Switzerland)	2273

## SYMPOSIA: S43. DISENTANGLING ASTROGLIAL FUNCTION THROUGH ADVANCED CALCIUM IMAGING.

15:45 - 17:15

Hall C

In electrically passive astroglia, intracellular Ca<sup>2+</sup> waves provide a basic communication medium for transduction, propagation and generation of informative molecular signals sensed by local neuronal networks. Deciphering the complex underpinning of Ca<sup>2+</sup> signals in astrocytes is therefore at the centre stage of our quest to understand physiology of astroglia. Speakers of the present symposium will discuss most recent advances in the field.

	Chair: Dmitri Rusakov (United Kingdom)	2274
	Chair: Antje Grosche (Germany)	2275
15:50	<b>Super-resolution imaging of brain extracellular space in live tissue</b> Jan Tønnesen, V.V.G. Krishna Inavalli, U. Valentin Nägerl (France)	2276
16:10	<b>The role of astrocytes in functional hyperaemia in awake mice.</b> Serge Charpak (France)	2277
16:30	<b>3D Ca<sup>2+</sup> imaging reveals new features of astrocyte biology</b> I. Savtchouk, E. Bindocci, N. Liaudet, D. Becker, G. Carriero, A. Volterra (Switzerland)	2278
16:50	<b>Ca<sup>2+</sup> signal integration inside astroglia.</b> D. Rusakov, L. Bard, J. Reynolds, K. Zheng (United Kingdom)	2279

## SYMPOSIA: S44. NEURAL MECHANISMS OF BRAIN-MACHINE INTERFACES.

15:45 - 17:15

Hall F

Volitional modulation of neural activity has been demonstrated across species and cortical areas. By

circumventing in this manner the complexities associated with natural behavior, elucidating the underlying brain mechanisms might uncover intrinsic properties of cortical circuits and general neural bases of skill learning. The proposed symposium intends to discuss potential neural mechanisms, observed constraints, neuronal specificity and innovative approaches in rodents and non-human primates.

	Chair: Daniel Huber (Switzerland)	2280
15:50	<b>Neural mechanisms elucidated by bidirectional brain-computer interfaces.</b> E.E. Fetz (USA)	2281
16:10	<b>Operant conditioning of single units in rat motor cortex allows graded control of a prosthetic device.</b> V. Ego-Stengel (France)	2282
16:30	<b>Rapid and Gradual Learning of Novel BCI Mappings.</b> A.P. Batista (USA)	2283
16:50	<b>Dissecting cortical circuits dynamics with an all-optical Brain-Machine Interface.</b> Daniel Huber (Switzerland)	2284

#### **SYMPOSIA: S45. OPENING UP HIGH-THROUGHPUT APPROACHES TO LINK GENES, CIRCUITS AND BEHAVIOUR.**

15:45 - 17:15 Hall D

This symposium showcases work in both vertebrates and invertebrates using high-throughput approaches to quantify behaviour, image whole brain activity, characterise brain wiring and analyse single cell gene expression. All presenters are active neuroscientists developing, combining and applying new techniques to important problems in sensorimotor behaviour. Crucially, they are also committed to open tools and data and to the idea that high-throughput neuroscience should be accessible to all.

	Chair: Michael B. Orger (Portugal)	2285
15:50	<b>Combining neuron-behavior, neuron-connectivity and neuron-activity maps to study action selection circuits in Drosophila</b> M. Zlatić (USA)	2286
16:10	<b>Brain Maps and Sex Circuits.</b> Gregory S X E Jefferis (United Kingdom)	2287
16:30	<b>Whole-brain imaging in zebrafish: linking behavior to neural data</b> Ruben Portugues (Germany)	2288
16:50	<b>Decoding olfactory neuronal repertoires through transcriptomics: from whole organs to single cells.</b> Darren W Logan (United Kingdom)	2289

#### **SYMPOSIA: S46. NEURAL CIRCUITS CONTROLLING FEEDING BEHAVIOR AND NUTRITIONAL HOMEOSTASIS IN DROSOPHILA.**

15:45 - 17:15 Hall E

Nutrient uptake is an essential activity of all life forms. In both flies and humans, centralized nervous systems coordinate the movements of the pharyngeal muscles and the gut that modulate feeding. These are regulated by external sensory inputs and internal metabolic status. Defects in food intake and metabolism underlie severe health disorders such as diabetes and obesity. This fundamental issue is being addressed at the neural circuit level using the powerful genetics of Drosophila.

	Chair: Michael Pankratz (Germany)	2290
15:50	<b>Central neural circuits involved in the selection of motor programs underlying feeding</b> Michael Pankratz (Germany)	2291

16:10	<b>Enteric neurons and metabolic homeostasis.</b> Irene Miguel-Aliaga (United Kingdom)	2292
16:30	<b>Glia to neuron metabolic shuttling in the Drosophila nervous system</b> A. Volkenhoff, A. Weiler, J. Hirrlinger, C. Klämbt, <u>S. Schirmeier</u> (Germany)	2293
16:50	<b>Behavioral, nutritional and neuronal basis of nutrient homeostasis</b> Carlos Ribeiro (Portugal)	2294

#### **SYMPOSIA: S47. NEUROMODULATORY CONTROL OF BEHAVIOR: PHYSIOLOGY, MECHANISMS AND COMPUTATIONAL PRINCIPLES.**

15:45 - 17:15 Hall B

Traditionally neuromodulatory system are thought to be involved in slow and non-specific modulation of processing. Recent technical advances, such as optogenetics to target specific cell-types, have led to a renaissance in this field and are beginning to yield rich new data on their highly-specific, distinct and often rapid impact. The symposium will feature the latest results about the major neuromodulatory systems from a conceptually integrated, systems neuroscience perspective.

	Chair: Adam Kepecs (USA)	2295
15:50	<b>Attentional and learning signals in the nucleus basalis system.</b> Adam Kepecs (USA)	2296
16:10	<b>Serotonin function in the control of behavior.</b> <u>Z.F. Mainen</u> , E. Lottem, M. Sara, M. Lorincz (Portugal)	2297
16:30	<b>Catecholamines and motivation: why do we need both dopamine and noradrenaline?</b> <u>C. Jahn</u> , B. Sebastien (France)	2298
16:50	<b>Learning from dopamine: synaptic causalities and blueprints of novel treatments for addiction.</b> Christian Luscher (Switzerland)	2299

#### **SYMPOSIA: S48. CIRCUITS UNDERLYING FIXED AND FLEXIBLE BEHAVIORS.**

15:45 - 17:15 Hall H

Innate behaviors enable rapid performance of actions critical for survival. Yet a dynamic environment requires a flexible behavioral repertoire that can rapidly adapt to novel stimuli. This symposium will highlight recent findings on the neural circuits underlying a spectrum of fixed and flexible behaviors, ranging from the hypothalamic circuit for aggression and fear to basal ganglia circuits regulating behavioral flexibility to the medial prefrontal cortex circuits modulating social hierarchy.

	Chair: Hailan Hu (China)	2300
	Chair: Anatol Kreitzer (USA)	2301
15:50	<b>Neural mechanism underlying state dependent modulation of sexual behavior</b> Susana Q. Lima (Portugal)	2302
16:10	<b>Function of Basal Ganglia Circuitry in Value-Based Decision Making.</b> <u>A. Kreitzer</u> (USA)	2303
16:30	<b>Neural mechanism of social hierarchy.</b> <u>H. Hu</u> (China)	2304
16:50	<b>Mechanisms underlying flexibility of innate social behaviors.</b> Nirao Shah (USA)	2305

**Wednesday, July 6, 2016**

**SYMPOSIA: S49. FROM STRUCTURE TO FUNCTION: MULTISCALE APPROACHES TO MOUSE BRAIN CONNECTIVITY MAPPING.**

09:45 - 11:15

Hall F

A major goal of modern neuroscience is to provide a multi-scale brain-wide description of brain connectivity in health and disease states. This symposium illustrates four prominent approaches to this goal, ranging from whole-brain single-axon and mesoscale connectivity mapping, to the in vivo identification of large-scale intrinsic and evoked functional connectivity networks. The use of these complementary approaches to uncover the topological organization of the mouse brain is illustrated.

	Chair: Alessandro Gozzi (Italy)	3293
09:50	<b>Whole-Brain Electron Microscopic Circuit Reconstruction</b> <u>S. Mikula</u> (Germany)	3294
10:10	<b>Mesoscale connectome mapping of the mouse brain.</b> <u>H. Zeng</u> (USA)	3295
10:30	<b>Intrinsic functional connectivity networks of the mouse brain.</b> <u>A. Gozzi</u> (Italy)	3296
10:50	<b>Optogenetic approaches for functional mouse brain mapping in health and disease.</b> <u>T.H. Murphy</u> , M. Vanni, F. Bolanos, J. LeDue, J. Boyd, G. Silasi (Canada)	3297

**SYMPOSIA: S50. NEW METHODS FOR THE STUDIES OF MEMBRANE TRAFFICKING IN NEURONS.**

09:45 - 11:15

Hall B

Many aspects of neuronal function, including synaptic transmission and plasticity, depend on proper membrane trafficking, which can be locally modulated. This seminar will provide an overview of the latest developments to visualize and control receptor trafficking in neurons with light, ranging from super-resolution microscopy, to the selective detection of exo- and endocytosis, optogenetic control of intracellular transport and direct observation membrane trafficking in a living animal.

	Chair: Kenneth L Madsen (Denmark)	3298
	Chair: David Perrais (France)	3299
09:50	<b>Imaging protein organization at high resolution in healthy and diseased synapse.</b> Melike Lakadamyali (Spain)	3300
10:10	<b>Imaging single exo-endocytosis events in neuronal dendrites.</b> <u>D. Perrais</u> (France)	3301
10:30	<b>Guided by light: Optogenetic control of intracellular transport.</b> <u>L.C. Kapitein</u> (Netherlands)	3302
10:50	<b>Visualization of NMDA receptor-dependent AMPA receptor synaptic plasticity in vivo</b> Richard L Huganir (USA)	3303

**SYMPOSIA: S51 AEROBIC GLYCOLYSIS IN THE BRAIN: ROLE OF LACTATE IN SYNAPTIC PLASTICITY AND AXONAL FUNCTION.**

09:45 - 11:15

Hall C

The coupling between neuronal activity and energy metabolism is critical for brain function and is tightly regulated, as best illustrated by functional brain imaging (PET and fMRI). Recent evidence indicates that CNS glial cells play a key role in this neurometabolic coupling. Specifically, lactate formed by astrocytes and oligodendrocytes under normoxic conditions through aerobic glycolysis is required for long term memory and for maintenance of axon function and survival.

	Chair: Pierre Magistretti (Switzerland)	3304
09:50	<b>Exercise induces brain VEGFA and angiogenesis through the lactate receptor</b> <u>Linda H. Bergersen</u> , Cecilie Morland, Krister A. Andersson, Alena Hadzic, Øyvind P. Haugen, Liv Kleppa, Andreas Gille, Johanne Egge Rinholm <sup>1</sup> , Elisabeth Holm-Diget, Lauritz H. Kennedy, Tomas Stølen, Eivind Hennestad, Yiqing Cai, Maja Puchades, Stefan Offermanns, Koen Vervaeke, Ulrik Wisløff, Jon Storm-Mathisen (Norway)	3305
10:10	<b>The role of lactate-mediated metabolic coupling between astrocytes and neurons in long-term memory formation.</b> <u>C. Alberini</u> (USA)	3306
10:30	<b>Investigating single cell glucose and lactate dynamics in vivo using two-photon microscopy and FRET nano sensors</b> Bruno Weber (Switzerland)	3307
10:50	<b>Oligodendroglial NMDA receptors regulating aerobic glycolysis and axonal metabolic support.</b> Klaus Armin Nave (Germany)	3308

## SYMPOSIA: S52. MOTOR NEURONS, NEUROMUSCULAR JUNCTIONS AND DISEASES.

09:45 - 11:15

Hall D

Movement is critical for survival. The complexity of motor output is sustained by several types of muscle fibers, each innervated by distinct classes of Motor Neurons (MNs), and several pools of MNs receiving specific premotor network connections. Defects at any step in this organization lead to severe diseases. The aim of the symposium is to provide insights into mechanisms that dictate MN position, Neuromuscular Junction maintenance and alterations in MN electrical properties in MN diseases.

	Chair: Daniel Zytnicki (France)	3309
	Chair: Claire Legay (France)	3310
09:50	<b>Wnts control the formation and maintenance of Neuromuscular Junctions</b> J. Messéant, A. Dobbertin, P. Delers, G. Emmanuelle, M. Manuel, A. Schmitt, J. Molgo, D. Zytnicki, L. Schaeffer, C. Legay, <u>L. Strohlic</u> (France)	3311
10:10	<b>Motor neuron position and the assembly of spinal motor circuits.</b> Niccolo Zampieri (Germany)	3312
10:30	<b>Mechanical, and electrical properties of mouse motor unit subtypes in a model of familial ALS.</b> M.d.L. Martinez-Silva, M. Baczyk, C. Martinot, R. Imhoff-Manuel, D. Zytnicki, <u>M. Manuel</u> (France)	3313
10:50	<b>Revealing the pathophysiology of Amyotrophic Lateral Sclerosis using human iPSC technology.</b> <u>G. Miles</u> , A. Devlin, C. Zhao, S. Chandran (United Kingdom)	3314

## SYMPOSIA: S53. USING LIGHT TO PROBE NEURAL CIRCUIT DYNAMICS IN BEHAVING ANIMALS.

09:45 - 11:15

Hall I

This symposium will describe new breakthroughs in the use of optical approaches to probe the function of neural circuits in the intact brain. By using light to both read out and manipulate activity from genetically and

functionally defined populations of neurons, in head-fixed and freely-moving animals, these approaches are opening new vistas in neuroscience research, establishing causal links between neural circuit activity and behaviour and providing new insights into the neural code.

	Chair: Michael Hausser (United Kingdom)	3315
	Chair: Mark Schnitzer (USA)	3316
09:50	<b>In vivo spatially selective holographic photoactivation and functional fluorescence imaging.</b> <u>V. Emiliani</u> (France)	3317
10:10	<b>Visualizing mammalian brain area interactions in behaving mice by multi-axis optical microscopy</b> Mark Schnitzer (USA)	3318
10:30	<b>All-optical interrogation of neural circuits during behaviour.</b> Michael Hausser (United Kingdom)	3319
10:50	<b>Using 2-photon microscopy with simultaneous head eye tracking in freely moving animals to quantify the brain in action.</b> Jason Kerr (Germany)	3320

#### **SYMPOSIA: S54. THE ROLE OF SLEEP SPINDLES IN NEUROPLASTICITY, AROUSAL AND COGNITION.**

09:45 - 11:15

Hall G

"Sleep spindles are thalamocortical oscillations that reflect coordinated brain activity during sleep and support ""off-line"" processing and cognitive functions. This symposium will summarize the state-of-the-art in sleep spindle research, linking mechanisms revealed by rodent studies to human cognition. Speakers will show that spindles: shape the strength of connections between brain cells; file memories into long-term storage; control arousal and, ultimately, may reflect general intelligence."

	Chair: Martin Dresler (Germany)	3321
	Chair: Francesco P. Battaglia (Netherlands)	3322
09:50	<b>Sleep spindles from physiology to function.</b> <u>L. Genzel</u> (United Kingdom)	3323
10:10	<b>Spindles support offline processing of spatial information in limbic-cortical circuits.</b> <u>M.W. Jones</u> , N. Becker, R.J. Gardner (United Kingdom)	3324
10:30	<b>Sleep spindles in the control of behavioral arousability.</b> <u>A. Lüthi</u> (Switzerland)	3325
10:50	<b>Sleep spindles and general intelligence in humans.</b> <u>M. Dresler</u> (Germany)	3326

#### **SYMPOSIA: S55. FEAR EXTINCTION: FROM ENGRAMS TO CIRCUITS.**

09:45 - 11:15

Hall H

Learning which sensory stimuli in the world should be feared and extinguishing that fear once it is no longer appropriate is critical for survival. Recent technical advances have prompted a reconceptualization of the neural circuits underlying fear extinction learning. This symposium will share recent findings on local and distributed circuits controlling extinction learning as well as how development and stress regulate these circuits and possibly contribute to anxiety disorders.

	Chair: Joshua P Johansen (Japan)	3327
	Chair: Greg J Quirk (Puerto Rico)	3328



09:50	<b>Prefrontal circuits in extinction of fear and avoidance</b> <u>G.J. Quirk</u> (Puerto Rico)	3329
10:10	<b>Extinguishing the fear engram.</b> Sheena A Josselyn (Canada)	3330
10:30	<b>Regulation of fear extinction learning through distinct neuromodulatory circuits.</b> <u>J.P. Johansen</u> (Japan)	3331
10:50	<b>Developmental differences in the mechanisms of extinction in the adult and post-weanling animals.</b> <u>M. Maroun</u> , R. Schayek, M. Kritman, W. Awad (Israel)	3332

#### **SYMPOSIA: S56. ATAXIAS: FROM PATHOPHYSIOLOGY TO TREATMENT.**

09:45 - 11:15

Hall E

Ataxias are a group of motor coordination disorders that arise from a diverse set of causes. In spite of the different pathways implicated in ataxias, the similarity of their symptoms suggests that common pathophysiological changes might underlie them. By bringing together researchers -- both new and established -- studying a range of different ataxias, we hope to shed light on the common pathophysiological changes that contribute to these ataxias.

	Chair: Alanna J Watt (Canada)	3333
09:50	<b>Mitochondrial association of dynamic-related protein 1 is impaired in cellular models of ARSACS.</b> <u>J.P. Chapple</u> , T. Bradshaw, E. Duncan, L. Romano, S. Nethisinghe, P. Giunti, S. Vermeer (United Kingdom)	3334
10:10	<b>Ineffective mitochondrial calcium buffering in Purkinje neurons in spinocerebellar ataxia type-28 (SCA28).</b> <u>F. Maltecca</u> (Italy)	3335
10:30	<b>Intracellular transport of ataxin-3 in spinocerebellar ataxia type 3.</b> Thorsten Schmidt (Germany)	3336
10:50	<b>New insights into TRPC3 function, cerebellar development, and ataxia.</b> Esther Becker (United Kingdom)	3337