



ROME 2022

28•29•30 SEPTEMBER



AUDITORIUM SERAPHICUM

Via del Serafico 1, Rome

5th BRAINSTORMING RESEARCH ASSEMBLY
FOR YOUNG NEUROSCIENTISTS

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STEERING COMMITTEE

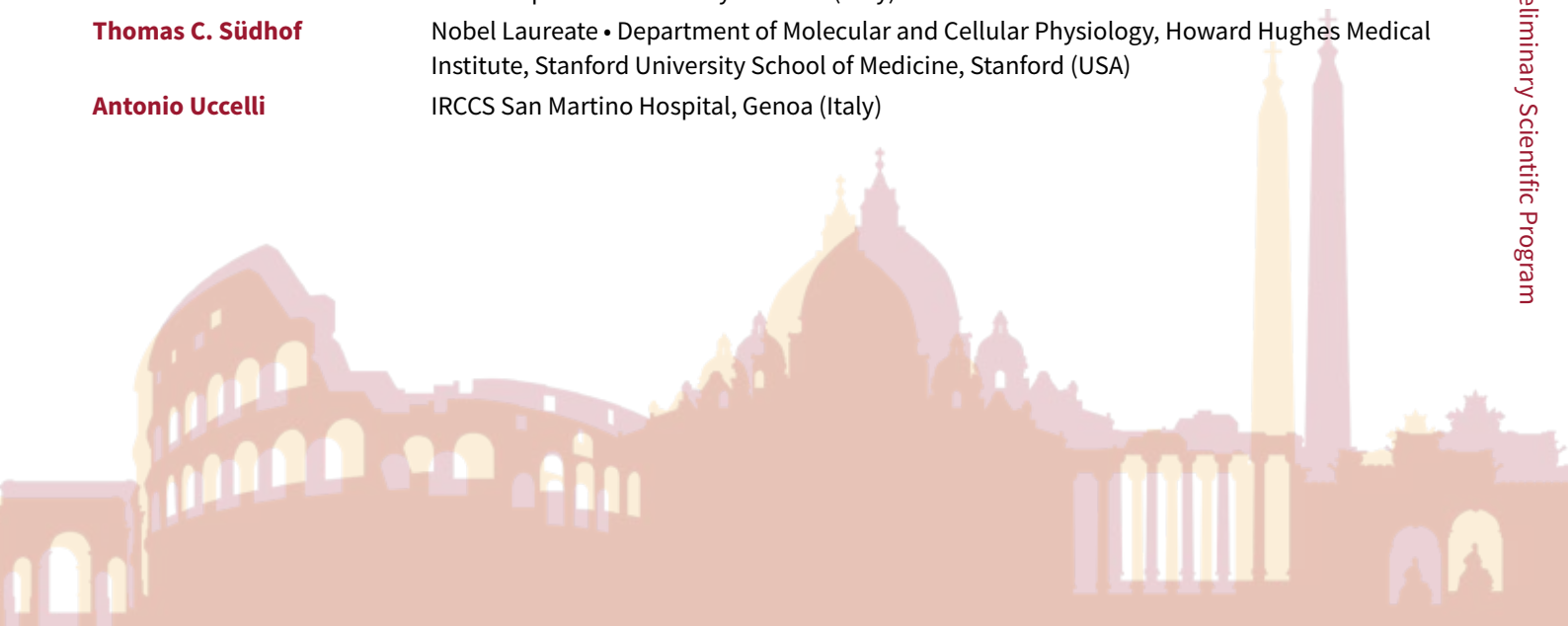
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Manuela Medelin	University of Verona (Italy)
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Giovanni Nardo	Istituto di Ricerche Farmacologiche Mario Negri IRCCS (Italy)
Rosa C. Paolicelli	University of Lausanne (Switzerland)
Simona Schiavi	University of Genoa (Italy)

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Cristina Limatola	«Sapienza» University of Rome (Italy)
Antonella Polimeni	Dean «Sapienza» University of Rome (Italy)
Thomas C. Südhof	Nobel Laureate • Department of Molecular and Cellular Physiology, Howard Hughes Medical Institute, Stanford University School of Medicine, Stanford (USA)
Antonio Uccelli	IRCCS San Martino Hospital, Genoa (Italy)



INVITED SPEAKERS

Marco Cambiaghi	Dep. Neurosciences, Biomedicine and Movement Sciences, University of Verona (Italy)
Laura Cancedda	Italian Institute of Technology - IIT, Genova (Italy)
Rafael Fernández-Chacón	Instituto de Biomedicina de Sevilla (IBiS) (Spain)
Giacomo Koch	Santa Lucia IRCCS/Università di Ferrara, Ferrara (Italy)
Konstantinos Meletis	Karolinska Institutet / Department of Neuroscience (Sweden)
Rodrigo Quiñan Quiroga	Centre for Systems Neuroscience, University of Leicester (UK)
Maria Rescigno	Humanitas University, Humanitas Research Hospital, Milan (Italy)
Dirk Sieger	Centre for Discovery Brain Sciences, University of Edinburgh, Edinburgh (UK)
Amanda Sierra Saavedra	Achucarro Basque Center for Neuroscience Fundazioa, Leioa (Spain)
Henrique Veiga-Fernandes	Champalimaud Research Foundation, Lisbon (Portugal)

BRAYNIACS

Gianmarco Abbadessa	University of Campania “Luigi Vanvitelli” (Italy)
Stefano Amoretti	University of Padua (Italy)
Vito Antonio Baldassarro	Department of Veterinary Medical Sciences, University of Bologna (Italy)
Marta Bottero	IRCCS San Martino Hospital, Genoa (Italy)
Luca Cuffaro	UO Neurologia Ospedale Universitario San Paolo, Milan (Italy)
Giulia D’Arrigo	Neuroscience Institute - National Research Council of Italy, Milan (Italy)
Samuele Negro	University of Padova (Italy)
Paola Pacifico	Scuola Normale Superiore, Pisa (Italy)
Simona Paglia	University of Bologna (Italy)
Gianmarco Pallavicini	Department of neuroscience “Rita Levi Montalcini”, University of Turin (Italy)
Laura Porta	SISSA, Trieste (Italy)
Marco Rasile	Humanitas University, Rozzano (Italy)
Gabriele Sansevero	Neuroscience Institute - National Research Council of Italy, Pisa (Italy); Fondazione Umberto Veronesi, Milan (Italy)
Giacomo Sferruzza	San Raffaele Scientific Institute, Milan (Italy)
Elisabetta Stanzani	Italian National Research Council, Milan (Italy); Humanitas Res. Hospital, Rozzano (Italy)
Maria Velasco	Trinity College, Dublin (Ireland)

YOUNG EPILEPSY SECTION-ITALY, YES-ITALY, ILAE

Simona Balestrini	Department of Clinical and Experimental Epilepsy, UCL Queen Square Institute of Neurology, London (UK)
Giulia Battaglia	Neuroscience Section, University of Catania, Catania (Italy)
Luca De Palma	Rare and Complex Epilepsy Unit, Department of Neuroscience, Bambino Gesù Children’s Hospital IRCCS, Rome (Italy)
Lorenzo Ferri	Department of Biomedical and Neuromotor Sciences, University of Bologna, Bologna (Italy)



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BRAYN SCIENTIFIC SESSIONS

NEUROIMAGING

Neuroimaging exploits various techniques to image the structure, function, or physiology of the nervous system. Two main NI approaches exist: i) structural imaging, which evaluates the structure of the nervous system and allows the diagnosis of large-scale intracranial diseases (such as tumors, multiple sclerosis lesions, and stroke) and injuries (like traumatic brain injury); ii) functional imaging, which is used to diagnose metabolic diseases such as Alzheimer's disease, and for neurological and cognitive psychology research, as well as for building brain-computer interfaces. The most commonly used techniques for neuroimaging are Computed Tomography (CT), Diffuse Optical Imaging (DOI), Event-Related Optical Signal (EROS), Magnetic Resonance Imaging (MRI), Arterial Spin Labeling (ASL), low to ultra-high frequency ultrasound with photoacoustics, Magnetoencephalography (MEG), Electroencephalography (EEG), Positron Emission Tomography (PET), Single-Photon Emission Computed Tomography (SPECT), and cranial or functional ultrasound imaging. In this session, we will discuss the use of these techniques, both alone and in combination, to investigate, detect, and understand various aspects of neurological diseases.

NEUROINFLAMMATION

Neuroinflammation is the inflammatory response initiated in the central nervous system (CNS) by resident cells or triggered by infiltrating immune cells, which causes the neuronal dysfunctions observed in inflammatory and neurodegenerative disease of the CNS. The NI session mainly focuses on basic and clinical research in multiple sclerosis (MS), Neuromyelitis Optica Spectrum Disorder (NMOSD) and other inflammatory diseases of the CNS that have a significant impact on the lives of young adults. Although the scientific discoveries of recent decades have improved the therapeutic approaches used for the treatment of such pathologies, many questions still remain unanswered. The aim of the NI session is to discuss the basic pathogenic mechanisms governing CNS inflammation, the role of immune system in CNS autoimmunity, and the importance of genetic and environmental factors in the development of neuroinflammatory diseases, with a patient-centered focus.

NEUROPHYSIOLOGY & NEURAL PLASTICITY

We will focus on studies addressing the function of the nervous system and of its components, and the capacity of the nervous system to modify itself, functionally and structurally, in response to experience and injury. All levels of function and plastic changes are included, from the membrane and cell to systems and behavior. Experimental approaches include molecular, cellular and developmental neurobiology, functional neuroanatomy, neurochemistry, neuropharmacology, electrophysiology, and behavioral analysis, in *in vivo*, *ex-vivo* and *in vitro* models in invertebrate or vertebrate species, including humans.



NEURO-ONCOLOGY

Neuro-oncology is an emerging field of investigation that studies nervous system tumors. As many of them can cause severe nervous system damage, neuro-oncology represents a trending research area in neuroscience, which may identify the molecular mechanisms involved in tumor pathogenesis. This would ultimately lead to the development of novel therapeutic approaches for the treatment of life-threatening diseases such as glioma, medulloblastoma. These topics will be discussed in depth during the session.

EPILEPSY, BRAIN DEVELOPMENT & NEUROGENETICS

Epilepsy, neurodevelopment and neurogenetics are deeply interconnected fields. Human neurodevelopment is a dynamic and extensive process, beginning at the pre-natal stages, driven by genetic information, and influenced by many environmental factors. The alteration of this process at different levels can lead to neurodevelopmental and psychiatric disorders such as autism spectrum disorder, intellectual disability, and epilepsy. Epilepsy is one of the most common neurological diseases globally. Its etiologies cover a wide range, from genetics to traumas, auto-immunity, and tumors, and available therapeutics only treat symptoms but not the root cause of the disease. This complexity has pushed epilepsy research to embrace many different fields of neuroscience, in order to discover the pathophysiological processes that cause and sustain seizures, and potential therapeutic targets. In this session we discuss how new insights from the fields of epilepsy research, developmental disorder and neurogenetics can improve our understanding of the human brain and contribute to novel therapeutic perspectives.

NEURODEGENERATION

Neurodegeneration is a key aspect of a large number of diseases characterized by progressive damage of the nervous system that leads to irreversible neuronal death, such as Parkinson's disease (PD) and Alzheimer's disease (AD). PD is a slowly progressive syndrome that begins insidiously, gradually worsens in severity, and usually affects one side of the body before spreading to involve the other side. Rest tremor is often the first symptom recognized by the patient, but the illness sometimes begins with bradykinesia, and in some patients, tremor may never develop. AD is the most common type of dementia and it is an irreversible, neurodegenerative and progressive central nervous system disorder that slowly destroys memory and thinking skills, and, eventually, other mental abilities. Other examples of neurodegenerative diseases are tauopathies, narcolepsy, depression and psychiatric disorders. During the BraYn conference we will be updated on the more recent advances in the field.

CLINICAL NEUROSCIENCE

Clinical neuroscience is a translational field in which neuroscience data and basic research are coupled with clinical neurology to better understand the neural underpinnings of nervous system disorders, and to improve their diagnosis and treatment. In this session we encourage the submission of data with a clear translational significance and real-world clinical applications. We will discuss patient-related observations derived from experimental research, clinical research, and clinical trials, focusing especially on the potential role and use of biomarkers in the clinical setting and on new treatments for neurological diseases. We also welcome works describing clinical cases (or case-series) that directly discuss the application of new therapies or novel biomarkers in a clinical population.

28 SEPTEMBER • Day 1

10:00 Registration

11:00 Opening Ceremony | **G. Ferrara**

BRAYN STARTING GRANT SESSION

Chairpersons: C. Calì, V. Chiurchiù, N. Iraci, M. Catalano, P. Infante

- 11:30 Loredana Leggio** (Starting Grant 2021 Winner)
Identification of bioactive molecules responsible for the neuroprotection of astrocyte-derived EVs
- 11:45 Eveljn Scarian** (Starting Grant 2021 Winner)
Brain organoids RNA-seq analysis for the study of sALS pathogenesis
- 12:00** Lecture | **Marco Cambiaghi** (Chairwoman: M. Medelin)
Non-invasive brain stimulation: an old tool into the hands of modern translational research.

12:30 Lunch box with Poster session 1

PARALLEL SESSION (13:00-13:30)

• For scheduled groups only (max 20 persons) •

Alexion Practical Workshop

Giovanni Novi • *Can we prevent damage for relapsing NMOSD patients?*

SESSION 1 • EPILEPSY, BRAIN DEVELOPMENT & NEUROGENETICS • ORAL COMMUNICATIONS

(curated by Young Epilepsy Section-Italy, YES-Italy, ILAE)

Chairpersons: G. Balagura, S. Balestrini, M. Rasile, A. Rutsch

- 14:15** Lecture | **Rafael Fernández-Chacón** (Chairwoman: G. Balagura)
Homeostatic reprogramming of GABAergic neurons upon presynaptic dysfunction.
- 14:45 Luca Fusar Bassini** • *A genome-wide atlas of poison exons for antisense oligonucleotide therapeutics in the Central Nervous System.*
- 15:00 Antonella Lauri** • *Mutations in the new disease-causing gene ARF3 have disruptive consequences on Golgi integrity and brain development.*
- 15:15 Gianmarco Pallavicini** • *Patients derived organoids show differences in DNA damage accumulations in neural progenitors leading microcephaly syndrome.*
- 15:30 Maryam Khastkhodaei Ardakani** • *Rescuing neural cell survival and maturation in a primary autosomal recessive microcephaly-17 (MCPH17) mouse model: effects of the postnatal N-acetyl cysteine treatment.*

SESSION 2 • NEUROINFLAMMATION • ORAL COMMUNICATIONS

Chairpersons: S. Angiari, I. Prada, A. Musella, M. Tiberi

- 16:00** Lecture | **Henrique Veiga-Fernandes** (Chairman: S. Angiari)
Neuroimmune interactions in health and disease.
- 16:30 Mikolaj Opielka** • *The pH-sensing receptor TDAG8 modulates inflammatory signalling and maturation of oligodendrocytes.*
- 16:45 Francesca Fagiani** • *Modelling chronic neuroinflammation in Multiple Sclerosis using patient-derived 3D BrainSpheres and single-cell transcriptomics.*

- 17:00 BraYn Educational Symposium • Beckman Coulter ► Valerio Chiurchiù**
Another break in the brain wall: from tissue dissociation to identification and immunophenotyping of resident and infiltrated immune cells. (Chairmen: V.A. Baldassarro, M. Rasile)
- 17:15 Francesca Montarolo, Fabio Buttari •** *The role of MICROGLIA in MS: from micro to macro different point of view.*
- 17:40 Coffee Break**
- 18:00 Matteo Bizzotto •** *Interplay between microglial receptor TREM2 and maternal immune challenges in schizophrenia onset.*
- 18:15 Jessica Garau •** *DNA methylation profiling of patients with Aicardi-Goutières Syndrome carrying the identical p.A177T RNASEH2B mutation but showing heterogeneous phenotypes.*
- 18:30 Marta Bottero •** *Anti-NG2 autoantibodies as prognostic biomarker in persons with multiple sclerosis.*
- 18:45 Closing remarks**

29 SEPTEMBER • Day 2

SESSION 3 • NEUROPHYSIOLOGY & NEURAL PLASTICITY • ORAL COMMUNICATIONS

Chairwomen: E. Boda, R.C. Paolicelli, G. Calabrese, M. Di Domenico

- 9:00 Lecture | Laura Cancedda** (Chairwoman: I. Prada)
Treating neurodevelopmental disorders: the road is long and winding, but we need to try.
- 9:30 Ori Roethler •** *Cooperation between two experience-regulated enhancers maintains visual processing by controlling E/I ratio in VIP interneurons.*
- 9:45 Valeria de Rosa •** *D-Aspartate treatment attenuates myelin damage and stimulates myelin repair.*
- 10:00 BraYn Educational Symposium • BGI ► Xin Yi**
Sequencing strategy in neuroscience : From RNAseq to Spatial Transcriptomics.
 (Chairpersons: S. Amoretti, P. Pacifico, L. Porta)
- 10:15 BraYn Educational Symposium • Femtonics ► Balázs Rózsa**
High-Speed 3D Acousto-Optical Network and Dendritic Imaging in Behaving Mice Revealed that Brain Activity is Organized Locally in Spatio-Temporal Clusters of Neuronal Functional Assemblies.
 (Chairpersons: S. Amoretti, P. Pacifico, L. Porta)
- 10:30 Coffee Break**
- 11:00 Claudia Cristiano •** *Effect of maternal butyrate supplement on autistic-like behavior and synaptic plasticity deficits in mice offspring.*
- 11:15 Fanny S. Martineau •** *Microglia contribution to neuronal network remodeling after paralysis onset.*
- 11:30 Lecture | Maria Rescigno: The microbiota in gut-brain vascular axis.** (Chairman: V. Chiurchiù)
- 12:00 Lunch box with Poster session 2**

PARALLEL SESSION (12:30-13:00)

• For scheduled groups only (max 20 persons) •

Alexion Practical Workshop

Fiammetta Vanoli • *Can we regain control of daily life for gMG patients?*

SESSION 4 • NEURO-ONCOLOGY • ORAL COMMUNICATIONS

Chairpersons: G. D'Alessandro, E. Vannini, G. Pallavicini, M. Conenna

- 14:00** Lecture | **Dirk Sieger**: *Understanding the role of microglia during brain tumour initiation.*
(Chairwomen: G. D'Alessandro, E. Vannini)
- 14:30** **Antonino Cucinotta** • *Blocking the Hedgehog-dependent tumor growth by a new selective Endoplasmic Reticulum Aminopeptidase 1 inhibitor.*
- 14:45** **Maria Velasco-Estevez** • *Mechanoreception in glioma: an insight into the role of Piezo1 in GBM progression and cancer stem cells.*
- 15:00** **BraYn Educational Symposium • Euroclone ► Diego Muzzini**
Deciphering the Complex Biology of Brain Tumors with Single Cell and Spatial Technologies.
(Chairpersons: G. D'Arrigo, G. Pallavicini)
- 15:15** **Alessandro Mormino** • *Histone-deacetylase 8 drives the immune response and the growth of glioma.*
- 15:30** **Francesca Viale** • *Design of implantable hydrogel for glioblastoma treatment.*

15:45 Coffee Break

SESSION 5 • NEUROIMAGING • ORAL COMMUNICATIONS

Chairpersons: F. Di Lorenzo, S. Schiavi, S. Ruinet

- 16:30** Lecture | **Rodrigo Quian Quiroga**: *What makes us human?* (Chairman: G. Ferrara)
- 17:00** **Pietro Bontempi** • *Investigating the feasibility of assessing magnetization transfer properties of distinct white-matter connections.*
- 17:15** **BraYn Educational Symposium • Perkinelmer ► Francesca Malerba**
Looking for a needle in a haystack: how to detect a biological drug against its natural background. The case of painless NGF. (Chairmen: P. Lippiello, G. Sansevero)
- 17:30** **BraYn Educational Symposium • Fujifilm Visualsonics ► Philippe Trochet**
Multimodal and Multiscale In-Vivo Imaging of Cerebral Hemodynamic. (Chairmen: P. Lippiello, G. Sansevero)
- 17:45** **BraYn Educational Symposium • Siemens Healthineers ► Gian Franco Piredda**
Probing myelin content of the human brain with MR relaxometry. (Chairmen: P. Lippiello, G. Sansevero)
- 18:00** **Francesco Tazza** • *Differentiating MS lesions with or without paramagnetic rim with advanced MRI.*
- 18:15** **Andrea Termine** • *Development of a Frontotemporal dementia computer-aided diagnostic tool using a Dense Convolutional Neural Network on 3D brain scans and explainable artificial intelligence methods.*

18:30 Closing remarks

30 SEPTEMBER • Day 3

SESSION 6 • NEURODEGENERATION • ORAL COMMUNICATIONS

Chairpersons: G. Nardo, B. Bettegazzi, M. Medelin, C. Natale

- 9:00** Lecture | **Amanda Sierra**: *Not just corpse removal: how microglial phagocytosis maintains brain tissue homeostasis.* (Chairwoman: R. Paolicelli)
- 9:30** **Elisa Pagliari** • *Optimization of AAV9 gene therapy for Spinal Muscular Atrophy with Respiratory Distress type 1 using in vivo disease model.*
- 9:45** **Elena Abati** • *Combined RNA interference and gene replacement therapy targeting MFN2 for the treatment of Charcot-Marie-Tooth type 2A.*
- 10:00** **Delia Gagliardi** • *Exploiting three-dimensional in vitro models to identify early neuronal vulnerability and test therapeutic strategies in amyotrophic lateral sclerosis.*
- 10:15** **BraYn Educational Symposium • Miltenyi Biotec ► Beatrice Formicola**
Beyond the boundaries of Neuroscience with 3D microscopy: Application and methods with the Light-Sheet Ultramicroscope Blaze. (Chairmen: L. Cuffaro, S. Negro)
- 10:30** Coffee Break
- 11:00** **Giulia Lunghi** • *New insights into the effects of SARS-COV-2 infection on nervous system: alteration of dopamine metabolism in iPSCs-derived dopaminergic neurons.*
- 11:15** **Francesca Natale** • *Aberrant Protein Palmitoylation: a novel therapeutic target in Alzheimer's disease.*
- 11:30** **Alessandro Matera** • *Role of SHIP1 as a modulator of microglial function.*

12:00 Lunch box with Poster Session 3

SESSION 7 • CLINICAL NEUROSCIENCE ORAL COMMUNICATIONS

(Chairmen: M. Tartaglia, L. Cuffaro, G. Abbadessa)

- 14:00** Lecture | **Giacomo Koch**: *Non-Invasive brain stimulation in neurodegenerative diseases: clinical implications.* (Chairman: F. Di Lorenzo)
- NEUROIMMUNOLOGY (MULTIPLE SCLEROSIS)**
- 14:30** **Margherita Maria Ravanelli** • *A humanized model of blood brain barrier to investigate immune cells infiltration in Multiple Sclerosis: toward a personalized medicine approach.*
- 14:40** **Francesca De Vito** • *The emerging role of microRNAs in experimental and clinical multiple sclerosis: implications for inflammation-driven synaptic dysfunctions and disease course.*
- 14:50** **Gianmarco Bellucci** • *Deciphering Multiple Sclerosis endophenotypes through Mendelian disorders: a network-based approach.*
- NEURODEGENERATIVE (MOVEMENT DISORDERS, MND)**
- 15:00** **Cecilia Mei** • *New insight for Riboflavin Transporter Deficiency (RTD) Syndrome: gene therapy as a new therapeutic strategy for RTD patients.*
- 15:10** **Petra Šošćarić** • *Central Effects of Botulinum Toxin Type A in Motor Nervous System of the Rat.*

NEURO-ONCOLOGY

15:20 Marta Ibáñez Navarro • *Driving CARs on a highway to cure pediatric CNS malignant tumors.*

15:30 Eugenia Guida • *Cytotoxic activity of small molecule inhibitors on patient-derived glioblastoma cells.*

OTHER

15:40 Ingrid Battistella • *Human iPSC-based cellular systems to model Autosomal dominant leukodystrophy.*

SESSION 8 • Curated by Karolinska Institutet ORAL COMMUNICATIONS

(Chairmen: K. Ampatzis, G. Ferrara)

16:00 Lecture | **Konstantinos Meletis**: *Organization and function of circuits that control motivated behaviors.* (Chairman: G. Ferrara)

16:30 Emanuela Santini • *Dysregulated brain protein synthesis in autism spectrum disorders.*

16:45 Daniel De Castro Medeiros • *Studying sleep-related disturbances in a mouse model of Parkinson's disease.*

17:00 Irene Pallucchi • *Transformation of an early-established motor circuit during maturation in zebrafish.*

17:15 Questions & Answers

17:30 Closing remarks • BraYn Awards (Best Oral and Poster Presentation and BraYn Starting Grant)



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