

2nd Workshop on "Mechanisms, Therapies, and Biomarkers in Neurodevelopmental Disorders"

Scuola Normale Superiore
Saturday May 18 2024

Organizers:

Laura Baroncelli (Institute of Neuroscience, CNR, Pisa)

Michele Emdin (Health Science Interdisciplinary Center, Scuola Superiore Sant'Anna, Pisa)

Michela Fagiolini (Boston Childrens' Hospital, Boston USA)

Tommaso Pizzorusso (Laboratory of Biology, Scuola Normale Superiore, Pisa)

Paola Tognini (Health Science Interdisciplinary Center, Scuola Superiore Sant'Anna, Pisa)



Paola



Tom



Laura



Michela



Michele

Speakers List



Laura Cancedda (Italian Institute of Technology, Genoa, Italy).

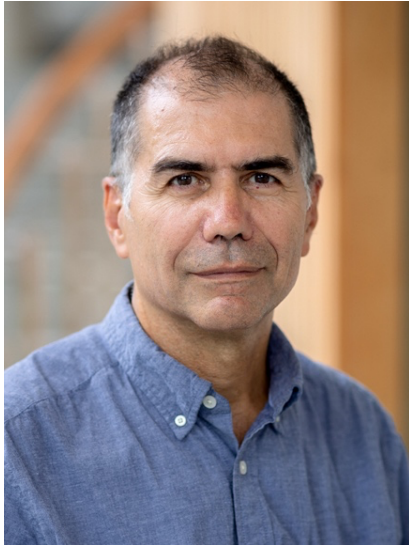
Laura Cancedda graduated in Medicinal Chemistry at the University of Genoa in 1999, with a thesis on the role of neurotrophic factors on neurotransmitter release. She received her Ph.D. in neurophysiology from Scuola Normale Superiore (Pisa, Italy) in 2003, under the supervision of Prof. Lamberto Maffei. In Pisa, she investigated the molecular and environmental basis of experience-dependent plasticity in the rat brain. In 2003, she moved to University of California at Berkeley in Dr. Poo's laboratory where she focused her studies on molecular mechanisms of GABAergic-transmission modulation. Starting in 2006, she has also started a collaboration on a project aimed at studying early determinants of neuronal polarization. Currently, she holds a team-leader position at the Italian Institute of Technology (IIT) in Genoa and a scientist position at the Telethon Dulbecco Institute. Laura is also a scholar of the FENS KAVLI network of excellence. Her research focuses on the role of extracellular factors such as GABA in neurogenesis, migration and morphological maturation of cortical neurons under physiological as well as pathological conditions. In 2021, Laura launched the start-up IAMA Therapeutics, based on her research. Laura comes from a neurophysiological and neuropharmacological background. The techniques applied in her laboratory include, among others, *in vitro* electrophysiology on brain slices and cell cultures, *in vivo* transfection of nucleic acids (*in utero* electroporation), *in vitro* and *in vivo* pharmacology, immunohistochemistry, and confocal imaging. She also has experience in rodent behavioral testing.

Antonino Caridi (Associazione CDKL5 Insieme Verso la Cura, Rome, Italy)

Graduate in Psychology (University of Rome) with a Master Degree in Psychotherapy (SITCC-Rome). 1970- 2024, 54 years of experience in Telecommunications & IT industry in seven different Companies, working abroad in UK, France, Luxembourg, Spain, USA, Argentina, Chile, Brazil, Bolivia, Cuba. 2004-2009 Siena (Italy) University Faculty of Psychology, Teaching Psychology of the Organizations. 2014 among the founder of CDKL5 Insieme verso la Cura Italian Organization 2017 Founder of the CDKL5 Alliance

2019 -2021 Chairman of the CDKL5 Alliance
2020-2024 Link University Rome Expert for "Complex System Theories"
2024 Board Member of the CDKL5 Alliance





Pablo Castillo (Albert Einstein College of Medicine, Bronx, NY, USA)

Pablo E. Castillo completed his PhD in Neuroscience at the University of California, San Francisco, and the Universidad de la República, Montevideo, Uruguay, in 1998. He conducted his postdoctoral studies at Stanford University from 1999 to 2001, after which he joined the Albert Einstein College of Medicine in Bronx, NY, initially as an Assistant Professor. Currently, he holds the position of Full Professor in the Department of Neuroscience at Albert Einstein College of Medicine. His work, funded by the National Institutes of Health (NIH), addresses key topics related to synaptic plasticity and neurological diseases. His research investigates presynaptic forms of long-term plasticity, synaptic mechanisms for contextual memory formation, activity-dependent transcriptional pathways underlying synaptic mechanisms for memory, and ANKS1B haploinsufficiency in a novel brain disorder. Castillo's contributions include discoveries on presynaptic long-term potentiation at hippocampal mossy fiber synapses, the role of kainate receptors in synaptic transmission and plasticity, endocannabinoid-mediated plasticity, synaptic plasticity of NMDA receptors, and synaptic dysregulation in brain diseases. His work has significantly advanced our understanding of synaptic function and neurological disorders.

Anis Contractor (Northwestern University, Chicago, IL USA)

Anis Contractor received his Ph.D. in neuropharmacology from University College London in the laboratory of Professor Alasdair Gibb, where he studied the functional properties of NMDA receptors. He performed postdoctoral studies at the Salk Institute for Biological Studies with Professor Stephen Heinemann, where he studied the role of glutamate receptors in synaptic plasticity and development. He joined the faculty at Northwestern University Feinberg School of Medicine in 2004, where his laboratory focuses on studies of synaptic and circuit mechanisms underlying neurodevelopmental and neuropsychiatric disorders in mouse models. Contractor is currently the Wendell Krieg Professor in the Department of Neuroscience.





Maurizio Giustetto (University of Turin, Turin, Italy)

Maurizio Giustetto obtained his Master's degree in Neuroanatomy from the University of Torino, Italy, in July 1993, followed by a Ph.D. in Cellular and Molecular Neuroscience from the same institution in June 1998. He pursued his postdoctoral training at Columbia University, NY, USA, focusing on Neuroscience of learning and memory under the supervision of Professor E.R. Kandel, until June 2002. Currently, he serves as an Associate Professor of Human Anatomy at the School of Medicine, Department of Neuroscience, University of Torino. Since 2006, he has dedicated his research to studying the neurobiological bases of rare genetic neurodevelopmental disorders, particularly focusing on CDKL5-deficiency disorder

for the last 15 years. Throughout his career, Giustetto has received several awards and honors, including fellowships from prestigious organizations such as the German Society for Neuroscience and the Human Frontier Science Program. He has organized various international scientific meetings and secured substantial grant support for his research, including funding from organizations like Fondazione CRT, Association Française du Syndrome de Rett, and the Telethon Foundation.

Ellen Hoffman (Yale University, New Haven, CT USA)

Ellen studied Biochemistry at SUNY Stony Brook and received her MD from SUNY Stony Brook School of Medicine. As a medical student, she worked in the laboratory of Gail Mandel of the Howard Hughes Medical Institute. Ellen did her residency in Psychiatry and fellowship in Child and Adolescent Psychiatry at Mount Sinai School of Medicine, where she worked in the laboratories of Deanna Benson and Joseph Buxbaum. She then completed a research fellowship in Childhood-Onset Neuropsychiatric Disorders at the Yale Child Study Center and received her PhD in Investigative Medicine from Yale University in the laboratories of Matthew State and Antonio Giraldez. She is currently an Associate Professor in the Yale Child Study Center and the Yale Department of Neuroscience where she directs a lab studying the function of genes in neuropsychiatric disorders using a zebrafish system.





Emily Osterweil (Harvard University, Cambridge, MA USA)

Dr Osterweil's research seeks to understand the biochemical mechanisms used by neurons to support long-term changes in brain function. She performed seminal studies identifying altered protein synthesis as a point of convergence for several monogenic causes of autism and intellectual disability (ID), including the FMR1 mutation responsible for Fragile X Syndrome (FXS). This work identified multiple novel therapeutic strategies that have inspired clinical trials, and suggested new frameworks for understanding the role of translation in specific brain circuits. Her current work is using several molecular strategies including cell type-specific TRAP-seq to study specific neural circuits in autism models. This continues to identify novel disease mechanisms and suggest new avenues for therapeutic intervention.

Dr Osterweil is an Associate Professor of Neurology at Harvard Medical School, a faculty member of the Rosamund Stone Zander Translational Neuroscience Center, a Visiting Professor at the University of Edinburgh, and a Wellcome Trust Senior Research Fellow. She received her PhD in Neuroscience from Yale University, and performed postdoctoral research in the lab of Mark Bear at the Picower Institute at MIT.

Marco Pagani (Scuola IMT Alti Studi Lucca, Italy)

After completing a degree in cognitive neuroscience, I joined the Functional Neuroimaging Lab at the Istituto Italiano di Tecnologia. In my early studies, I described gray matter networks in the rodent brain by combining structural MRI and brain connectivity mapping. I have then moved my research interests to resting-state fMRI connectivity mapping in mice. This research led me to identify functional brain alterations linked to several genetic etiologies of autism. More recently, I worked at the Child Mind Institute in New York where I started my neuroimaging investigations on the heterogeneity of autism in clinical populations. My ongoing research focuses on unraveling the functional architecture of the brain in autism by using fMRI in mouse models and clinical populations with autism.





Carlos Portera-Cailliau (University of California Los Angeles, LA, CA USA)

Dr. Portera-Cailliau was born and raised in Madrid, Spain. He obtained a B.A. in Biochemistry & Cell Biology from U.C. San Diego in 1990. He then obtained his MD-PhD degrees from the Johns Hopkins School of Medicine in 1997. After finishing a residency in Neurology at The Massachusetts General Hospital and Brigham & Women's Hospital in Boston in 2001, Dr. Portera-Cailliau moved to Columbia University for a post-doctoral fellowship, followed by a second post-doc in Cold Spring Harbor Laboratory. He joined the UCLA faculty in November 2004 and has joint appointments in the Departments of Neurology and Neurobiology. He is a member of UCLA's Brain Research Institute, the Intellectual and

Developmental Disabilities Research Center, the Integrated Center for Learning & Memory, and the Center for Autism Research and Treatment. From 2013 to 2021 he served as co-director of the UCLA-Caltech Medical Scientist Training Program. The Portera-Cailliau laboratory investigates how developmental differences in functional connectivity of brain circuits directly lead to symptoms of autism and intellectual disability, using in vivo two-photon calcium imaging, Neuropixels recordings, and head-fixed behavior.

Debby Silver (Duke University, Durham, NC USA)

Debby Silver received her B.S. in Biology from Tufts University in 1993 and her PhD with Dr. Denise Montell of The Johns Hopkins University School of Medicine studying cell migration in *Drosophila* and cancer cells. For her postdoctoral studies, Dr. Silver trained with Dr. William Pavan of the National Human Genome Research Institute, where she used mouse genetics to study neural development. She has had an independent lab at Duke University Medical Center since 2010. Her lab aims to understand the genetic and cellular mechanisms controlling cortical development and contributing to neurodevelopmental disorders and brain evolution. She is currently Director for the Duke PhD program in Development and Stem Cell Biology. She is also a co-Director for the Duke Regeneration Center.





Alex Shcheglovitov (University of Utah, Salt Lake City, UT USA)

Dr. Shcheglovitov is an Associate Professor of Neurobiology at the University of Utah and Faculty Director for the Utah Clinical and Translational Research Institute. He earned a Bachelor's and Master's degree from the National Technical University of Ukraine, followed by a PhD at the Bogomoletz Institute of Physiology, Kyiv Ukraine. He completed Postdoctoral Fellowships at the University of Virginia and Stanford University. His lab studies human brain development and neurodevelopmental disorders using neurons and brain organoids derived from induced pluripotent stem cells (iPSCs). Dr. Shcheglovitov is a recipient of several prestigious awards, including the Innovation Research Award from the International Society for Autism Research, NARSAD Young Investigator Award, and Alex's Lemonade Stand Innovation Award. He has co-authored more than 25 peer-reviewed publications, including papers in high-impact journals such as Nature, Science, Cell Stem Cell, Nature Medicine, and Nature Communications, and co-founded a Gordon Research Conference "Functional Genomics of Human Brain Development and Disease".



Program of the event

Venue: Azzurra room, Palazzo della Carovana, Scuola Normale Superiore, Piazza dei Cavalieri, Pisa

Venue Coffee Break, Lunch and Poster-session: Cloister of Palazzo della Caravona

9:15-9:25 Welcome

Tommaso Pizzorusso and Michele Emdin

9:25-9:40 Antonino Caridi "Parents' perspective, needs and challenges"

Session 1: Early neurodevelopmental alterations, Chair: Laura Baroncelli

9:40-10:05 Debby Sylver " Building our brains: from RNA to evolution"

10:05-10:30 Simona Lodato TBD

10:30- 10:55 Alex Shcheglovitov "Modeling human neurodevelopmental disorders using single neural rosette-derived brain organoids"

10:55-11:15 coffee break and poster set-up

Session 2: Functional impairments and treatments, Chair: Michela Fagiolini

11:15-11:40 Emily Osterweil "The long and short of it: troubled translation in Fragile X"

11:40- 12:05 Pablo Castillo "FMRP and Local Protein Synthesis at the Synapse"

12:05-12:30 Laura Cancedda "Early IGF1 Receptor Inhibition in Mice Mimics Preterm Human Brain Disorders and Reveals a New Therapeutic Target"

12:30-14:30 Lunch, poster session and networking

Evaluation of Posters by experts: Maurizio Giustetto, Raffaele Mazziotti, Pablo Castillo, Anis Contractor

Session 3: Excitatory/Inhibitory balance in neurodevelopmental disorder, Chair: Yuri Bozzi

14:30-14:55 Carlos Portera-Cailliau "Developmental differences in cortical circuits of Fragile X mice"



Children's Hospital Boston



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14:55-15:20 Ellen Hoffmann “Functional analysis of autism genes in zebrafish identifies convergent pathways and pharmacological candidates”

15:20-15:55 Anis Contractor: “Pathogenic “Lurcher Site” variants in glutamate receptors”

Session 4: Short-talks, Chair: Paola Tognini

15:55- 16:25 Two short talks selected between the submitted abstracts, TBD

16:25-16:45 Coffee break and poster removal

Session 5: Functional impairments and biomarkers, Chair: Tommaso Pizzorusso

16:45- 17:10 Maurizio Giustetto "CDKL5 Role in Extracellular Vesicle-Mediated Cell-to-Cell Communication"

17:10-17:35 Marco Pagani “Decoding autism with cross-species fMRI”

Closing stages

17:35-17:50 Laura Gianfranceschi “presentation of Matteo Caleo Foundation”, and Paola Tognini, Laura Baroncelli will announce the “Best Poster Award”

17:50 Concluding remarks Michela Fagiolini and Tommaso Pizzorusso

20:00 Speakers’ Dinner