

OPTOGEN 2022

May 11-13, Paris



7TH INTERNATIONAL WORKSHOP ON TECHNOLOGIES
FOR OPTOGENETICS AND NEUROPHOTONICS

Conference Booklet

1. Program
2. Practical information
3. List of posters
4. Full list of participants

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1. Program

Minor modifications of the program might be possible. The updated version will be available on the website.

Wednesday, May 11		
14:00	Registration	
15:00	Welcome	
15:15	Plenary talk: José-Alain Sahel	Early translational experience of optogenetics for vision restoration
16:05	Shy Shoham	Exciting insights into neural coding with sculpted light
16:45	Contributed talks:	Niall McAlinden: <i>The Utah Optrode Array for multisite optogenetic excitation in the primate cortex</i> Petra Ondrackova: <i>High-resolution structural and functional deep brain imaging using holographic endoscopy</i>
17:10	Ileana Hanganu-Opatz	Dissecting the developing circuits of cognitive processing
17:50	Sponsor talks:	3i / Class5 Photonics
18:05	Welcome cocktail	

Thursday, May 12		
09:00	Massimo De Vittorio	Multifunctional tapered optical fibers for sensing and actuation in the deep brain
09:40	Patrick Ruther	Innovative fiber-based optrodes realized using MEMS technologies
10:20	Robrecht Raedt	Optogenetic and photopharmacological modulation of hippocampal excitability
11:00	Coffee Break – sponsored by 3i	
11:20	Michael Hausser	Optical probing of causal relationships between neural circuit activity and behaviour
12:00	Sponsor talks:	Green Leaf Scientific / OptogeniX / CoolLed
12:20– 14:15	Lunch + poster session S1	
14:15	Claire Wyart	Optogenetic approaches to dissect motor circuits throughout the brainstem and spinal cord
14:55	Olivier Marre	Disentangling retinal circuits with holographic stimulation
15:35	Stefano De Renzi	Optogenetic-Guided Tissue Morphogenesis
16:15	Sponsor talks:	Amplitude / NeuroNexus
16:30	Coffee Break – sponsored by OptogeniX	
16:50	Daniel Huber	EthoLoop: Closed-loop behavioral control in freely roaming primates
17:30	Ehud Isacoff	Optical control of dopamine receptors
18:10	End	
20:00	Gala Dinner	

Friday, May 13		
9:00	Johannes Vierock	<i>Molecular tools for multicolour optogenetics</i>
9:40	François St-Pierre	<i>Deep, rapid, and prolonged two-photon recording of voltage dynamics with JEDI indicators</i>
10:20	Deniz Dalkara	<i>Cell-targeted optogenetics in the retina</i>
11:00	<i>Coffee Break</i>	
11:20	Tommaso Fellin	<i>Aberration correction in GRIN microendoscopes through 3D printed polymer microlenses</i>
12:00	Contributed talks:	<i>Ilenia Meloni : Spatial light patterns using smartphone optogenetics for behavioral control of Drosophila melanogaster larvae</i> <i>Filip Janiak : Tailoring 2-photon Point Spread Function by non-telecentric microscopy</i>
12:25	Sponsor talks:	Spark laser /Femtonics / OptonLaser
12:45– 14:40	<i>Lunch + poster session S2</i>	
14:40	Camilla Bellone	<i>Circuit and synaptic mechanisms of approach and avoidance social behavior</i>
15:20	Nicolò Accanto	<i>A flexible two-photon fiberscope for fast functional imaging and holographic photostimulation of neurons in freely moving mice</i>
16:00	Emmanuel Beaurepaire	<i>Color and large-scale multiphoton imaging of developing tissue</i>
16:40	<i>Coffee Break</i>	
17:00	Plenary talk: Edvard Moser	<i>Accessing neural population coding with 2-photon microscopy in freely moving mice</i>
17:50	Poster awards and closing remarks	

2. Practical information

- **Conference Venue**

OPTOGEN2020 will be held at on the Jussieu campus of Sorbonne University, at the [Auditorium Patio 44-55, 4 Place Jussieu 75005, Paris](#). Access from Metro stop “Jussieu”, line 7.

Wi-fi access will be available in the conference venue. The name of the network will be “**congres**” and you will have an individual username and password printed on the back of the badge that you will get on-site after registration.

- **Welcome cocktail**

The cocktail will take place on Wednesday evening, May 11 at 6:30 pm on the top floor of the Zamansky Tower, in the middle of the University campus (see map), few steps away from the conference venue.

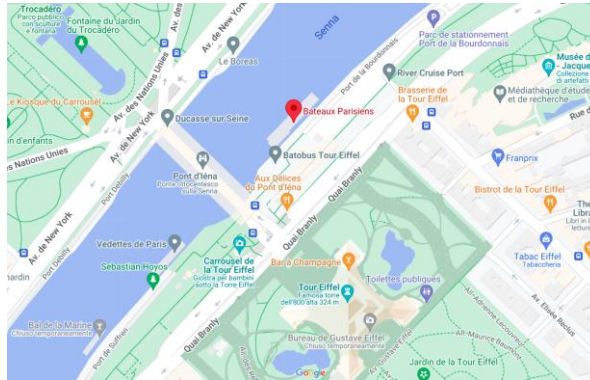


- **Gala dinner**

The gala dinner will take place on Thursday evening, May 12 at 8 pm on a "[Bateaux Parisiens](#)", a boat by to the dock close the Eiffel Tower. After dinner (around 10:30 pm) a boat tour of around 1h along the river is scheduled. Address: [Port de la Bourdonnais, 75007 Paris](#).

Closest metro station: Bir-Hakeim, line 6; Trocadero, line 9; Champs de Mars-Tour Eiffel , RER C.

Fastest way from the Conference Venue: Line 7 - direction La Courneuve-8-Mai-1945- until metro stop "Chaussée D'Antin – La Fayette" + metro 9 – direction Pont de Sèvres – until metro stop "Alma-Marceau"



- **Covid tests**

Few participants might need a Covid test for the travel back. You can easily perform an antigenic test and have a result and a certificate within 15 minutes. Below the addresses of a couple of pharmacies where you can do it without appointment. If you need PCR tests instead, contact us and we will suggest some options.

- *Pharmacie Cuvier* : 1 rue Cuvier Monday-Friday 8:30-19h45. Saturday: 9:00 -18:45.
- *Pharmacie des Arenes*: 30 rue Monge, Monday-Saturday: 9:00 -20:00

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3. Posters' list

Full text abstracts are included in a dedicated PDF sent by email to all participants.

Session S1 – Thursday , May 12, afternoon		
Board #	Presenting author	Title
1	Eric Lowet	Deep brain stimulation creates information lesion through membrane depolarization
2	Hongbo Jia	An auditory engram represented by holistic bursting cells
3	Jakub Kralik	Electrophysiological exploration of functional vision restoration in blind retinas treated with ON-bipolar-cell-specific optogenetic gene therapy
4	Déborah Varoo	Understanding the role of VIP+ inhibitory interneurons in the retina
5	Thomas Buffet	Functional characterization of a subset of amacrine cells in the retina
6	Augusto Anesio	Involvement of nucleus accumbens parvalbumin interneurons in incubation of cocaine craving
7	Elena Gjorgievska	Exploring the Dynamics of Cell Excitability by Optogenetics in ex vivo Neuronal Cultures
8	Carmen B. Schäfer	A Direct Pathway for Cerebro-Cerebellar Communication
9	Billel Khouader	Neuronal dynamics in the baso-lateral amygdala-hippocampus network during sleep
10	Andrea Saponaro	Opto-TASK: A new light-gated potassium channel for sustained inhibition of cell excitability
11	Enrico Peter	Structural Determinants for the Potassium Selectivity in KR2-R109Q and natural KCRs
12	Chung Yuen Chan	In vivo high-throughput probing of synaptic connectivity using two-photon holographic optogenetic stimulation
13	Cinzia Montinaro	Spatial localization of functional fluorescence collection from different brain regions
14	Naveen G. Kumar	Flexible lensless endoscopes for 2-photon fluorescence imaging of hippocampal neurons in mice
15	Giuseppe Ciccone	Dual-color organic LEDs for optogenetic activation and inhibition of cellular activity
16	Andrey Formozov	A flexible and versatile system for multi-color fiber photometry and optogenetic manipulation
17	Antonio Lorca	A flexible two-photon endoscope for fast activity imaging and cell-precise optogenetic photo-stimulation of neurons in freely moving animals
18	Eric Klein	Single-sided μ LED array controlled via stackable wireless controller for optogenetics in behaving animals
19	Barbara Spagnolo	Fibertrodes: achieving brain optical control with single and multi-channel artefact-free implantable neural probes
20	Chang-Ki Moon	Micro-OLED arrays on CMOS chips for spatiotemporal control of neural activity in deep brain
21	Seonil Kwon	Reliable optogenetic stimulation of macaque primary visual cortex evoked by high performance, flexible OLEDs embedded into cranial inserts
22	Svetoslav Stoyanov	Optoelectronic Neural Implants for the study of Deep Brain Regions
23	Ryan Greer	Towards Optogenetic Cortical Implants for Hearing Impaired
24	Kashif M. Fayyaz	Modeling local heat generation with plasmonic taper optical fibers
25	Maria S. Andriani	Integrating multiple functionalities in tapered optical fibers neural implants
26	Niall McAlinden	The Utah Optrode Array for multisite optogenetic excitation in the primate cortex

Session S2 – Friday , May 13, afternoon		
Board #	Presenting author	Title
1	Ana Marta Capaz	Interactions between the Edinger-Westphal and Dorsal Raphe Nuclei promote parental nesting
2	Chitaranjan Mahapatra	Quantifying detrusor smooth muscle electrophysiology from calcium transient images to understand urinary incontinence
3	Baptiste Grimaud	In-vivo fast non-linear microscopy reveals intraneuronal transport impairment induced by slight molecular motor imbalances in the brain of zebrafish larva
4	Henri Lassagne	Continuity within the somatosensory cortical map facilitates learning
5	Agathe Lafont	Elucidating how non-neuronal action potentials generated by midline radial glia initiate motor behaviour
6	Alice Abbondanza	Deletion of beta2* nicotinic acetylcholine receptors in striatal interneurons inhibit striatal activity and control striatal-dependent behaviors
7	Imane Bendifallah	Sculpted two-photon excitation of channelrhodopsins and genetically encoded voltage indicators for all-optical neurophysiology
8	Christiane Grimm	Potassium-conducting ChRs for the optical inhibition of neuronal activity using 2-photon holographic illumination
9	Ilenia Meloni	Spatial light patterns using smartphone optogenetics for behavioral control of <i>Drosophila melanogaster</i> larvae
10	Sophie Brustlein	Introducing CIRCUITPHOTONICS, a Centre for Imaging the Dynamics of Neural Circuits
11	François Marquier	Holography-based 3D Real Time Single-Particle Tracking for intraneuronal transport characterization
12	Filip Janiak	Tailoring 2-photon Point Spread Function by non-telecentric microscopy
13	Théo TRAVERS	Light-sheet in a microfluidic channel with an optical fiber as a cylindrical lens
14	Jules Lubetzki,	Fast 2-photon stimulation using holographic patterns
15	Chandeclerc Marie-charlotte	Dynamic single particule orientation detection
16	Elisa Scarpa	Microelectrodes fabrication on Flat Optical Fiber for a multifunctional imaging endoscope
17	Eszter Báthory	Photomanipulation of different types of neurons in the primary visual cortex with simultaneous acousto-optical 2-photon-3D imaging
18	Hamdani Massilia	Hybrid Scanning and Parallel Illumination Microscopy
19	Marco Bianco	Extending the capabilities of depth-resolved fiber photometry in brain tissue with tapered optical fibers
20	Mohammad Mohammadiaria	Toward photo-patterned Organic electrochemical transistor (OECT) on a Tapered fiber for recording and stimulation of neurons
21	Filippo Pisano	Exploring novel approaches in optical neural interfaces with deep brain regions: from cancer detection with Raman spectroscopy to plasmonic light structuring
22	Cecile Telliez	Ultrafast Light Targeting for High-Throughput Precise Control of Neuronal Networks
23	Surabhi K. Sreenivas	New Approaches for Multiplexing in SMLM
24	Liam Collard	Wavefront shaping applied to plasmonic fiber optics
25	Di Zheng	SERS detection of neurotransmitters through gold nanoislands-decorated tapered optical fibers with sub-10 nm plasmonic gaps
26	Michele Castriotta	A cost efficient full-wave computation approach for tapered optical fibers

4. Full list of participants –alphabetical order

Last Name	First Name	e-mail
Aarts	Arno	aarts@atlasneuro.com
Abbondanza	Alice	alice.abbondanza@fgu.cas.cz
Accanto	Nicolò	nicolo.accanto@inserm.fr
Albon	Amélie	amelie.albon@emse.fr
Andriani	Maria Samuela	mariasamuela.andriani@iit.it
Anesio	Augusto	augusto.anesio@unifesp.br
Assayag	Osnath	osnath@intelligent-imaging.com
Barral	Jérémie	jeremie.barral@pasteur.fr
Bathellier	Brice	brice.bathellier@cnrs.fr
Báthory	Eszter	eszter.bathory@femtonics.eu
Báthory	Eszter	eszter.bathory@femtonics.eu
bayou	Nassim	bayoumaher@yahoo.fr
Beaurepaire	Emmanuel	emmanuel.beaurepaire@polytechnique.edu
Beck	François	fbeck@optoprim.com
Bellone	Camilla	Camilla.Bellone@unige.ch
Bendifallah	Imane	imane.bendifallah@inserm.fr
Bianco	Marco	marco.bianco@iit.it
Blot	Francois	blotfrancois@hotmail.fr
Bonneau	Nicolas	nbonneau@inscopix.com
Bouvier	Julien	julien.bouvier@cnrs.fr
Braaker	Philipp	p.braaker@ed.ac.uk
Brito	Raphaël	raphael.brito@college-de-france.fr
Brunstein	Maia	maia.brunstein@pasteur.fr
Brustlein	Sophie	sophie.brustlein@inserm.fr
Bucherer	Andreas	andreas.bucherer@imtek.uni-freiburg.de
Buffet	Thomas	thomas.buffet.bcpst@gmail.com
Capaz	Ana Marta	anamarta.capaz@icm-institute.org
Carbo Tano	Martin	martin.carbotano@icm-institute.org
Castriotta	Michele	michele.castriotta@iit.it
Chaffiol	Antoine	antoine.chaffiol@inserm.fr
Chaigneau	Emmanuelle	emmanuelle.chaigneau@inserm.fr
Chan	Chung Yuen	chung-yuen.chan@inserm.fr
Chandeclerc	Marie-Charlotte	marie-charlotte.chandeclerc@ens-paris-
Chen	I-Wen	i-wen.chen@inserm.fr
Ciccone	Giuseppe	giuseppe.ciccone@tu-dresden.de
Cizmar	Tomas	cizmart@isibrno.cz
Collard	Liam	liam.collard@iit.it
Contreras	Marie-Louise	marilouctso@gmail.com
Dalkara	Deniz	deniz.dalkara@inserm.fr
de Bernede	xavier	xavier.debernede@hadrian-advisors.com
de Renzis	Stefano	derenzis@embl.de
De Sars	Vincent	vincent.de-sars@inserm.fr
de Vittorio	Massimo	Massimo.DeVittorio@iit.it
Del Bene	Filippo	filippo.del-bene@inserm.fr
Dhanasekar	Mahalakshmi	m.dhanasekar@icm-institute.org
Domingues	Daniela	daniela.domingues@icm-institute.org
Dupriez	Pascal	pascal.dupriez@spark-lasers.com
Eggeler	Fanny	fanny.eggeler@inserm.fr
Ego-Stengel	Valerie	valerie.ego-stengel@cnrs.fr
Eisele	Max	Max.Eisele@toptica.com
Emiliani	Valentina	valentina.emiliani@inserm.fr
Emma	Butt	emma.butt@strath.ac.uk
Eric	Lowet	elowet@mailfence.com
Estebanez	Luc	luc.estebanez@cnrs.fr
Faini	Giulia	giulia.faini@inserm.fr
Fellin	Tommaso	Tommaso.Fellin@iit.it

Ferhat	Thomas	thf@nktphotonics.com
Ferrari	Ulisse	ulisse.ferrari@gmail.com
Forget	Benoit	benoit-claude.forget@sorbonne-universite.fr
Formozov	Andrey	bci.neuro@gmail.com
Fortin	Gilles	gilles.fortin@bio.ens.psl.eu
Fournel	Remi	fournel@bio.ens.psl.eu
Frohly	Maxime	maxime.frohly@inserm.fr
Furness	Ben	ben.furness@cooled.com
Gajendra Kumar	Naveen	naveen.gajendra@fresnel.fr
Gauvain	Gregory	gregory.gauvain@inserm.fr
Gergely	Szalay	szalay.gergely@koki.mta.hu
Gjorgievska	Elena	egjorgie@sissa.it
Goldin	Matias	matias.goldin@inserm.fr
Golinelli	Anna	anna.golinelli@amplitude-laser.com
Greer	Ryan	ryan.greer@strath.ac.uk
Grimaud	Baptiste	baptiste.grimaud@ens-paris-saclay.fr
Grimm	Christiane	grimmchristiane@outlook.com
Hamdani	Massilia	massilia.hamdani@inserm.fr
Hanganu-Opatz	Ileana	hangop@zmnh.uni-hamburg.de
Hausser	Michael	m.hausser@ucl.ac.uk
Higgins	Niamh	n.higgins@greenleafscientific.com
Hofmann	Luisa	luisa.hofmann@class5photonics.com
Hubert	Daniel	Daniel.Huber@unige.ch
Isacoff	Ehud	ehud@berkeley.edu
Janiak	Filip	f.k.janiak@sussex.ac.uk
Janssens	Aline	aline.janssens@spark-lasers.com
Jia	Hongbo	hongbo.jia@lin-magdeburg.de
Jia	Shaobo	shaobo.jia@dzne.de
Joffrois	Corentin	corentin.joffrois@inserm.fr
Johannes	Vierock	vierock@hu-berlin.de
K Sreenivas	Surabhi	surabhi.k-sreenivas@espci.fr
Kashif	Muhammad Fayyaz	muhammad.kashif@iit.it
Khouader	Billel	billel.khouader@inserm.fr
Kilborn	Karl	karl@intelligent-imaging.com
Kilsch	Patrick	patrick.kolsch@nktphotonics.com
Kim	Chae Young	chaeyoung.kim@icm-institute.org
Klein	Eric	eric.klein88@gmail.com
Kontenis	Lukas	lukas.kontenis@lightcon.com
Kralik	Jakub	jakub.kralik@unibe.ch
Krbková	Bára	bara@isibrno.cz
Kwon	Seonil	seonil.kwon@uni-koeln.de
Lafont	Agathe	agathe.lafont@sorbonne-universite.fr
Lassagne	Henri	henri.lassagne@cnrs.fr
Lebel	Ashley	ashley.lebel@sorbonne-universite.fr
LEGER	Elise	elise.leger@inserm.fr
Li	Wei	wei.li@pasteur.fr
Lorca Cámara	Antonio	antonio.lorca@inserm.fr
Lubetzki	Jules	jules.lubetzki@pasteur.fr
Mahapatra	Chitaranjan	cmahapatra97@gmail.com
Marco	Pisanello	marco.pisanello@optogenix.com
Marquier	François	francois.marquier@ens-paris-saclay.fr
Marre	Olivier	olivier.marre@gmail.com
Martin	Sylvain	sylvain.martin@optonlaser.com
Maslianitsyna	Anastasiia	anastasiia.maslianitsyna@etu.univ-amu.fr
Mathieson	Keith	keith.mathieson@strath.ac.uk
McAlinden	Niall	niall.mcalinden@strath.ac.uk
Méhész	Zita	zita.mehesz@femtonics.eu
Meloni	Ilenia	ilenia.meloni@ksi-meinsberg.de
Merkel	Philipp	philipp.merkel@class5photonics.com
Michael	Krumin	m.krumin@ucl.ac.uk
Missinne	Jeroen	Jeroen.Missinne@UGent.be
Mohamed Lafirdeen	Aysha	aysha.mohamed-lafirdeen@inserm.fr

Mohammadiaria	Mohammad	mohammad.mohammadiaria@iit.it
Moon	Chang-Ki	changki.moon@uni-koeln.de
Moser	Edvard	edvard.moser@ntnu.no
Neimontas	Karolis	karolis.neimontas@lightcon.com
Nicolson	Alexandra	alexandra.nicolson@icm-institute.org
Ondráčková	Petra	ondrackova@isibrno.cz
Papagiakoumou	Eirini	eirini.papagiakoumou@inserm.fr
Peter	Enrico	enrico.peter.89@gmail.com
Pisanello	Ferruccio	ferruccio.pisanello@iit.it
Pisano	Filippo	filippo.pisano@iit.it
Pisoni	Matteo	matteo.pisoni@iit.it
Putti	Elena	elena.putti@inserm.fr
Riehm	Ornella	riehmornella@gmail.com
Roberts	Brooke	brm21@bu.edu
Ronzitti	Emiliano	emiliano.ronzitti@inserm.fr
Ruther	Patrick	ruther@imtek.uni-freiburg.de
Saggau	Peter	saggaup2@gmail.com
Sahel	José	j.sahel@gmail.com
Sakata	Shuzo	shuzo.sakata@strath.ac.uk
Saponaro	Andrea	andrea.saponaro@unimi.it
Scarpa	Elisa	elisa.scarpa@iit.it
Schäfer	Carmen	c.schafer@erasmusmc.nl
Shalaby	Yasmine	yasminesamir895@gmail.com
Shoham	Shy	shoham@nyu.edu
Spagnolo	Barbara	barbara.spagnolo@iit.it
St.Pierre	Francois	stpierre@bcm.edu
Stoyanov	Svetoslav	svetoslav.stoyanov@strath.ac.uk
Suárez Baquero	Esteban	esteban.suarez-baquero@inserm.fr
Tanese	Dimitrii	dimitrii.tanese@cnsr.fr
Telliez	Cécile	cecile.telliez@inserm.fr
Thonon	Lisa	lisa.thonon@inserm.fr
Tompa	Tamás	ttompa@femtonics.eu
Tournissac	Marine	marine.tournissac@inserm.fr
Travers	Théo	theo.travers@univ-angers.fr
Tricot	Laurence	laurence.tricot@inserm.fr
Uhlirova	Hana	uhlirova@isibrno.cz
Ung	Thi Phuong Lien	lien.ung@polytechnique.edu
Varro	Déborah	deborah.varro@inserm.fr
Vetter	Rio	rvetter@neuronexus.com
Vilette	Adèle	adelevilette@hotmail.fr
Wetstone	Jo	jo.whetstone@cooled.com
Wyart	Claire	claire.wyart@icm-institute.org
Yu	Liu	yu.liu@unige.ch
Zanchi	Ilaria	ilaria.zanchi@iit.it
Zheng	Di	di.zheng@iit.it
Zin	Emilia Araujo	emilia.araujo-zin@inserm.fr

The Photonics Department of the Vision Institute in Paris, host of OPTOGEN22, also organizes the following training course in October 2022. Contact us if you are interested.

AXE 10 - Microscopie et imagerie

Microscopie photonique

Scientific and technical
environment of the training
course



Institut de la vision

<http://www.institut-vision.org/fr>

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Optical control of brain functioning with optogenetics and wave front shaping

OBJECTIVES

- Learn how to choose the most suitable combination of actuator, illumination methods and targeting strategy for each specific application
- Acquire the skills and technologies required to design and build up an optical system for optical control of neuronal circuits

AUDIENCE

Neurophysiologists, physicists (researchers, PhD students or engineers)

PRE-REQUIREMENT

Attendees should have a strong background in neurosciences, in cell biology or in optical microscopy. To adapt the programme to trainees' expectations, we invite the attendees to download and fill out the survey from our web site.

TRAINING PROGRAMME

Lectures

- Introduction to optogenetics
- Opsin photo-cycle modeling
- Wave front shaping and liquid crystal matrix
- Computer generated holography
- Generalized phase contrast
- Temporal focusing
- Three dimensional light patterning and temporal focusing
- Two-photon optogenetics: scanning, spiral scanning, parallel illumination: examples and comparison among the different approaches
- How to build up an holographic optical set-up
- All-optical interrogation of brain circuits
- Patterned voltage and calcium imaging
- Viral vector design
- In depth patterned optogenetics

Practical courses (in small rotating groups of 7 attendees max with 2 trainers per group)

- How to build up an holographic optical set-up (optical design and software)
- *In vitro* and *in vivo* all-optical manipulation of neuronal circuits
- Projects from applicants (practical): proposition of projects by the attendees and discussion on their feasibility

SPEAKERS

V. Emiliani, E. Papagiakoumou, N. Accanto, E. Ronzitti, D. Dalkara, D. Tanese (researchers, IDV, Paris), C. Wyart (researcher, ICM, Paris), D. Oron, O. Yizhar (researchers, Weizmann Institute), P. Hagemman (PR, Institute for experimental biophysics, Berlin) and M. McLean Bolton (Max Planck Florida Institute for Neuroscience, Florida US)

LOCATION

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