ISN School on Miniaturized Fluorescence Microscopy - Buenos Aires 12-15 December, 2022

Buenos Aires, December 29th 2022

Schools committee,

International Society for Neurochemistry

Dear Schools committee,

We are providing you the final report of the ISN School on Miniaturized Fluorescence Microscopy, which was held in Buenos Aires from the 12th to the 15th of December, 2022. We want to once again express our gratitude toward ISN for supporting our initiative, which despite the challenges posted by the recent pandemic was a success.

Miniaturized fluorescence microendoscopy has revolutionized neuroscience along the last decade, allowing the simultaneous recording of neural activity from thousands of individual genetically-targeted neurons while rodents as small as mice behave freely. An open-source version of this tool, the Miniscope, was developed by Daniel Aharoni (UCLA, CA) and collaborators. Crucially, Miniscopes are very cheap, making them an ideal tool for Latin America, where laboratories often lack start-up support or funding for large equipment. Thanks to the hands-on training in Miniscope assembly and data analysis, 21 labs from 12 cities in Latin America have acquired this exciting new tool which can be the central piece of equipment of a neuroscience lab. Students have assembled and tested their Miniscopes and are ready to start using them to answer their own scientific questions.

We have selected students with the aim of maximizing the geographical impact of the School and the extent of the network of new users. Out of 49 applications, we selected 21 students from 12 cities in Mexico, Brazil, Uruguay, Chile and Argentina, with a majority of female students (14 vs 7). Our speakers are Daniel Aharoni (UCLA, CA) and some of his closest collaborators in the Miniscope project: Tristan Shuman (Mt Sinai, NY), Denise Cai (Mt Sinai, NY) and Federico Sangiuliano (UCLA, CA).

In the following pages we are providing: 1) a financial report, including expenses that still need to be covered with the second part of the grant, 2) the School schedule, 3) a map showing the geographical distribution of students, 4) pictures taken during the School and 5) statements written by the students which were the basis for selecting them. We have also prepared a link from where you can download their individual CVs : https://drive.google.com/drive/folders/1zn4cxGG8FoyXCF1ZWOo3XmV9F7spaRxU?usp=sharing.

Please let us know if you require any additional documentation.

Regards,

Emilio Kropff Soledad Espósito Joaquín Píriz

1 – Financial report

ISN grant: $ 25,000.00

Transferred: $ 20,000.00

Pending: $ 5,000.00

Travel expense speakers	$ 9,135.99
Travel expense students	$ 6,337.43
Hotel speakers & organizers	$ 2,665.21
Hotel students	$ 4,399.56
Consumables (posters, badges, etc)	$ 65.26
Catering	$ 2,396.55
Total	$ 25,000.00

2 – School schedule

ISN School on Miniaturized Fluorescence Microscopy

Monday 12 – Introduction and

9.00 – Registration and welcome
10.00 – Miniscope project and imaging principles
11.00 – Coffee break
11.15 – Surgery and baseplating
13.00 – Lunch
14.00 – Miniscope assembly walkthrough
15.00 – Coffee break
15.15 – Hans-on Miniscope assembly and testing

Tuesday 13 – Miniscope

9.00 – Miniscope DAQ software and workflow
10.00 – In-vivo imaging and behavior
11.00 – Coffee break
11.15 – Science done with Miniscopes
12.00 – Processing and analysis overview
13.00 – Lunch
14.00 – Hands-on Miniscope assembly and testing
15.15 – Coffee break

Wednesday 14 – Data processing &

9.00 – Minian overview
10.00 – Minian walkthrough
11.00 – Coffee break
11.15 – Minian walkthrough (cont.)
12.00 – Minian walkthrough (cont.)
13.00 – Lunch
14.00 – Miniscope future directions
15.00 – Closing remarks by Miniscope Team
15.15 – Coffee break

Thursday 15 –

9.00 – Poster session 1
10.00 – Coffee break
10.30 – Poster session 2
11.20 – Closing remarks by local organizers
12.00 – Exam

3 – Geographical distribution of students

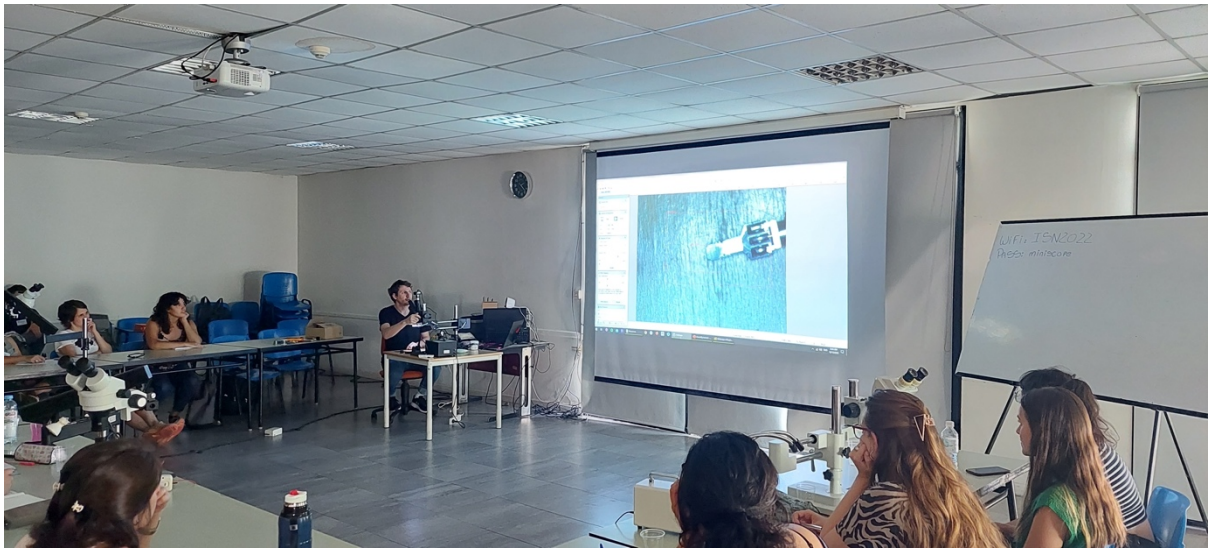
Geographical distribution of students: 1) Querétaro, Mexico, 2) Veracruz, Mexico, 3) Belo Horizonte, Brazil, 4) Natal, Brazil, 5) Porto Alegre, Brazil, 6) Valparaiso, Chile, 7) Santiago, Chile, 8) Montevideo, Uruguay, 9) Cordoba, Argentina, 10) Bariloche, Argentina, 11) Buenos Aires, Argentina, and 12) Sao Paulo, Brazil.

4 – Pictures

Denise Cai

Daniel Aharoni

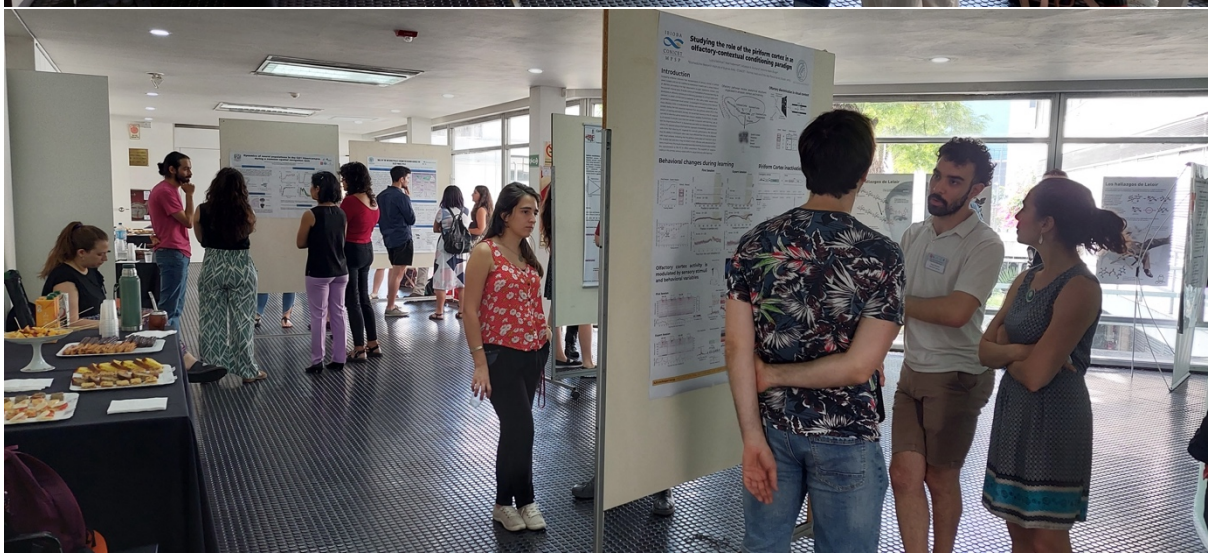
Tristan Shuman



Federico Sangiuliano, hands – on assembly

ISN School on Miniaturized Fluorescence Microscopy - Buenos Aires 12-15 December, 2022

Data analysis



Posters

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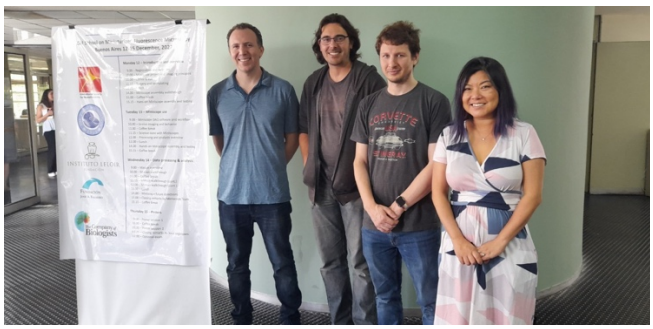
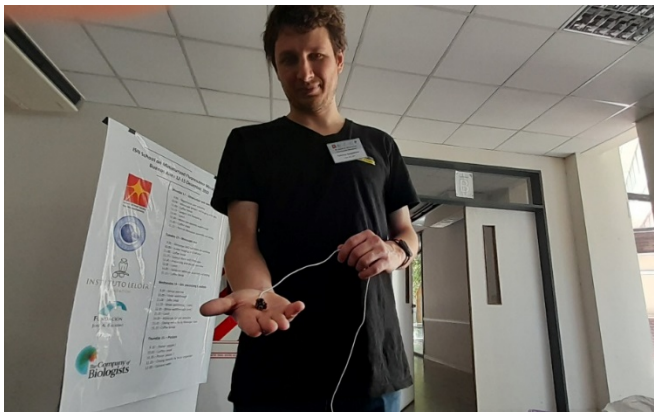


Speakers

Organizers



The Miniscope

ISN School on Miniaturized Fluorescence Microscopy, Buenos Aires 12-15 December, 2022

5 – Student statements

Moises Altamira Camacho

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

I have no experience with Miniscopes, but I am currently learning about calcium imaging in a course offered by my university.

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

In our lab we are interested about how the hippocampus encodes information during learning in a goal-directed spatial navigation task. For this we implement electrophysiological recordings in free-moving animals. However, we have considered that calcium imaging with miniscopes could offer us another alternative to explore this issue. In particular we have been interested in this technique due to its characteristic of capture neuronal activity at population level and following it for several days during free navigation. We are highly interested in this promising technology because its properties provide us the exceptional opportunity to figure out how populations of neurons participate in the integration of information during training.

Osvaldo Torres Quintana

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

My name is Osvaldo, in the laboratory, I built an upright epifluorescence microscope that uses light-emitting diodes (LEDs), a monochrome camera, and ready-to-assemble commercially available parts. This optomechanical setup enables recording optical imaging for in vitro electrophysiology, fluorescence detection, and microfluorometry. Due to its flexible design, it can be adapted to several levels of complexity, from the combination of simple optics, infrared, oblique illumination, and camera to a side port that can be used for transient recordings of Ca+2 with a photodiode as a fluorescence detection device. By incorporating a monochrome camera and modifiable optical elements (lenses, filters, mirrors, and objectives), this system also allows brightfield image analysis and monitoring of blood flow, as well as particle flow. All of this with the capability to be analyzed in in vivo and in vitro models.

The optomechanical setup has also allowed the incorporation of elements for the application of electrical stimulation and the detection of evoked potentials. In the future, we plan to integrate these elements in fluorescence imaging studies and patch-clamp

recordings from our camera software, and the analysis of signals with open-source programs such as python.

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

My name is Osvaldo; I am currently a graduate student of the PhD program in Brain Research at the Universidad Veracruzana in Mexico. The aim of my doctoral project is to determine the mechanisms of cisplatin, a drug widely used in chemotherapy, for producing a redistribution of pericytes and changes in blood flow in the central nervous system. To achieve my scientific goals, and thanks to my BS degree in Physics, I have designed and built an epifluorescence microscope coupled to a stereotaxic microscope to monitor blood flow and pericyte distribution in the microvasculature in live anesthetized rats. To implement my experimental setup, I have reviewed the scientific literature extensively and I came across the miniscope as a tool to determine neuronal activity in transgenic animals. The design of the miniscope sounds fantastic to me and I immediately wondered if this tool could be modified and used to studying hemodynamics in live animals without using fluorescent probes. In my current laboratory I have had the opportunity to monitor calcium levels associated with electrical activity in cultured neurons and glial cells, so I am familiar with the use of calcium probes. My main interest in attending the workshop is to understand the use of the miniscope to record calcium activity associated with neuronal activity and understand the advantages and limitations of the hardware and software in depth. As a long-term objective, I would like to use the knowledge acquired in the workshop to modify the optical arrangement of the miniscope to record the hemodynamics of the cerebral cortex in freely moving rats. Attending the workshop and experiencing the assembly, implementation, use and analysis of data would be essential for my career as a neuroscientist to implement and expand the use of this tool to other areas of neuroscience.

Matheus Costa Passos

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

Although I have no practical experience with the miniscope, recently the laboratory I am part of – Núcleo de Neurociências (NNC) – received a grant from Lemann/Harvard Foundation to implement this technique. Since then, I have been reading the seminal papers about this technique, as well as the ones applying it to study the space-temporal coding of different behaviors. The discussions about the theoretical and practical aspects of the miniscope have been done together with the Harvard Neuroengineering team, through weekly meetings. I have training in stereotaxic surgery, and I am honing my programming skills in the python language to gaze a better perspective into the data analysis using the

CNMF algorithm as well as training with already captured calcium imaging datasets that were acquired using the miniscope (mainly the UCLA v3 and v4).

I am preparing to deepen my experience with the lens implantation surgery in the coming weeks and intend to keep practicing as to be prepared to tackle the baseplatting and behavioral experiments using the miniscope.

And, at last, as a derivation of my programming training, I developed a port in the python language of a behavior analysis tool in collaboration with a colleague. This work can be found in the official repository: https://github.com/mrdrzit/Behavython

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

I started my undergraduate training in science at NNC 4 years ago, and I have been working on projects related to social memory under the supervision of Prof. Grace Schenatto Pereira since then. My intention is to apply for a PhD in 2023 to develop a project involving the miniscope.

Therefore, this technique will be at the core of my main project.

We have been using several behavioral paradigms to access social memory and also combining them with methods such as immunofluorescence and pharmacology to unravel the neurobiological basis of learning and memory. However, those techniques are insufficient to answer questions about the dynamic changes in neural circuits underlying the observed behavior.

I am interested in answering whether social isolation changes the spatial-temporal dynamic of hippocampal neurons during social memory processing. Thus, calcium imaging in behaving animals is the perfect method to address the hypothesis I want to test in my future PhD project.

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Alicia Moraes Tamais

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

I have no experience with miniscospes or calcium imaging. However, our laboratory have recently acquired a fiber photometry setup. Currently, we are working on establishing this technique in our laboratory.

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

I am currently starting my PhD on how the medial nucleus of the amygdala (MeA) processes olfactory information from a conspecific during social defeat. Being able to assess the activity of different MeA neurons during an encounter with a conspecific (agonistic or not) will allow us to elucidate how MeA processes social cues and how this processing impacts social defense. In this sense, the miniscope could add a lot to my research project, by making it possible to record the activity of MeA neurons while the animal performs the social defensive behavior. Therefore, participating in this course would be very enriching for my training and my PhD project, as well as being a great opportunity to help bring this technique to our laboratory.

Johseph Paballo Gomes de Souza

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

In 2020, I attended a summer course on optogenetics and calcium imaging. I am particularly interested in calcium imaging because it is a new research tool that allows to elucidate the dynamics of the functioning of neural circuits and animal behavior, and can be applied to understand the neural mechanisms of memory formation and consolidation.

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

I currently work in the Memory Research Laboratory at the Brain Institute, UFRN. Here, we investigate the physiological and neural bases of learning and memory using Wistar rats. Although we are working with pharmacological, optogenetic, and electrophysiological techniques, we perceive calcium imaging as a promising technique that would allow us to expand our ability to answer research questions about the basic mechanisms of memories. Combining the calcium imaging with behavioral tasks in a laboratory that has more than 40 years of experience in research about memory and animal behavior.

Fernanda Nogueira Lotz Alves

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

None.

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

For my research internship at the University of Texas Health Science Center

(UT Health) in Houston in March of 2023, I will be perfoming experiments using miniscopes attached to freely-behaving rats to record calcium transients from neuronal ensembles in the anterior cingulate cortex during recent and remote memory tests in different contexts. These experiments will complement my PhD thesis studies, and possibly lead to publications in international journals.

This relatively inexpensive tool offers a new and exciting possibility, and the techniques learned will be implemented in the very near future, undoubtably opening up new avenues of research into the mechanisms of memory in our lab.

Maria Carolina Gonzales

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

I don't have experience with Miniscopes or calcium imaging.

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

In our lab, we want to better understand how past experiences influence subsequent memory encoding and storage, and how our brain links new incoming information with prior knowledge. To that end, we combine animal behavior with multi-scale electrophysiology and pharmacological, chemogenetic and optogenetic interventions. We are also interested in incorporating calcium imaging approaches into our research. In particular, we would like to use Miniscopes to investigate changes in cell firing in the hippocampus during the association of object memories and determine how prior experience modulates this process.

Andressa Radiske

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

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Tell us how Miniscopes would impact your current or future research (max. 300 words).*

I would like to express my interest in participating of the ISN School on portable fluorescence microscopy. My line of research encompasses the study of the behavioral, biochemical, and electrophysiological characterization of fear-motivated avoidance memory reconsolidation. Recently, we described a new boundary condition for avoidance memory reconsolidation in rats (Radiske et al., 2017). In this regard, we found that previous learning of relevant nonaversive information is essential to elicit the participation of the hippocampus in avoidance memory reconsolidation, which is associated with an increase in theta-gamma coupling in dorsal CA1 during reactivation of the avoidance response. Our results indicate that nesting of hippocampal theta-gamma rhythms at the time of retrieval is a specific marker of the reconsolidation process (Radiske et al., 2017). Also, we investigated the causal relationship between hippocampal cross-frequency coupling and memory reconsolidation. We found that muscimol-induced medial septum (MS) inactivation reduces theta-gamma coupling during memory reactivation and impedes the amnesia caused by post-reactivation intra-CA1 infusion of reconsolidation blockers. We also showed that electrical theta-burst stimulation of the fimbria-fornix during memory reactivation bypasses the effects of MS inactivation, inducing theta-gamma coupling in dorsal CA1 and restoring the amnesia caused by pharmacological reconsolidation impairment (Radiske tel al., 2020). These results suggest that patterned stimulation able to generate theta-gamma coupling in the hippocampus at the moment of retrieval may beget avoidance memory reconsolidation. In this respect, we would like to better characterize this phenomenon using calcium imaging techniques to visualize the real-time process of trace memory retrieval in freely-moving rats. For this reason attending the ISN School would be a great opportunity for me to incorporate into my technical and conceptual background the latest scientific approaches and innovations that involve the use of optical tools to better understand rodents' behavior.

Jocelyn Macarena Urrutia Piñones

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

Unfortunately, I have not any close experience with Miniscope. I have been seen two-photon calcium imaging experiments on dendritic spines, but not performed, thus my knowledge is pretty basic. However, in my lab are planning to acquire a miniscope and I

would like to record activity-depend changes (calcium imaging) in the neurons that study in my PhD thesis while the animal is performing a specific task. Therefore, I am very interested in this ISN school. I would like to understand the basis of the technique and learn the tools to know how to use it, and in consequence be available to employ it.

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

My PhD thesis project focused in the study of a sub-type of neocortical long-range inhibitory neurons: interhemispheric long range GABAergic neurons (Int-LRGNs). These neurons have their soma located in the auditory and visual cortex of one hemisphere and project long axons to the contralateral homotopic region (axons cross through the corpus callosum). They were recently described and establish an anatomical pathway for interhemispheric communication (Rock et al., 2018; Zurita et al., 2019). Although the authors characterized some properties of this neurons ex vivo, showing they co-express parvalbumin (PV) and are fast spiking neurons, how these neurons shape dynamics of cortical activity is unknown. For this reason, we propose to study the role of these neurons in the activity in the contralateral cortex and their impact in interhemispheric synchronization. In order to this, we are taking advantage of cell type-specific optogenetic manipulations, i.e., injection Adeno-Associated Virus (AAV) in transgenic mice (PV-Cre), and chronical implantation of custom – made Optrode (array of optical fibers and microelectrodes). For this project, it would be ideal recording not only the changes in network activity when we selectively stimulate Int-LRGNs, but also what things activate or inhibit these neurons. We think that using Miniscopes we can achieve this, because we will be able to visualize a larger population of neurons than with our micro-array electrode recoding system (16 to 32 cans).

Trinidad Montero Ossandón

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

have experience successfully assembling a miniscope with open-ephys assembly kit (miniscope v4.3), connecting it to the computer and obtaining resolution slide images using the miniscope software. Up to this date we have not been able yet to perform GRIN implantation surgeries or perform calcium transient imaging.

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

Miniscopes would allow us to complement our electrophysiological recordings, which we are currently performing in medial septum, dentate gyrus, hippocampal CA1 area and the suprammamillary nucleus during behavior. We are especially excited by the possibilities given by long term follow up of the same field of view during longer behavioral experiments, allowing us to understand how brain activity in our target brain areas change as the animal learns the task and how is reorganized when the rule is changed.

Federico Davoine

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

I have done calcium imaging in slices

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

Among other things, I am interested in studying the role and plasticity of electrical coupling in cerebellar interneurons. Being able to record calcium activity in freely moving animals would be a great tool to complement our traditional slice experiments and to emphasize the role of electrical synaptic transmission in the behavior of rodents.

Marcela Alsina Llanes

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

I have no previous experience with miniscopes or calcium imaging. Our line of research focuses on studying the brain areas that are recruited when adult mice encounter pups for the first time and make the decision to care vs. attack the newborns. Therefore, it would be really useful for me and our lab to incorporate the use of this technique.

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

I have recently finished my doctoral studies, in which we investigated the neural basis of two antagonistic behaviors: parental and infanticidal behavior in adult mice. Thus incorporating new techniques is something that would be very important for my consolidation as an independent researcher. I am expertise in behavioral tests, immunocytochemistry (c-fos), neurotoxic lesions, and histologic techniques, among others. I would really benefit from participating in this workshop and learn the basis of miniscope techniques used to visualize brain structure and function. Because I am also interested in the development of the neural substrate that supports maternal and infanticidal behavior, I will likely use techniques needed to study developmental changes in the brain. My training will also have a significant impact in our laboratory and help us to advance in our knowledge about the development and expression of the neural basis that supports parental and aggressive behavior toward newborns. The workshop will also give me the opportunity to interact with other scientists in other field of research and listen to others point of view something that I personally value so much.

Aída Marcotti

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

During my PhD (2015-2020) I was trained to implement in vitro calcium imaging in cell lines as well as in primary cell culture of dorsal root ganglia neurons. All the sets of experiments I did during my thesis project were using Fura 2 AM as a ratiometric calcium indicator.

Additionally, in 2019 I got a scholarship to learn the basic principles of in vivo calcium imaging recordings in different GCaMP transgenic mice lines using confocal microscopy at the University College London.

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

I believe implementing miniscopes technology will be very useful for my future research as a young investigator. Because of my neuropharmacological background many questions can be answered from the functional point of view. Regarding that, one of the stronger expertise in our laboratory is the study of neuron excitability through ex-vivo electrophysiological recordings, so, we believe that incorporating new tools to evaluate functional aspects in cells culture, ex-vivo preparations or in vivo conditions will give us a better understanding of our researchers lines. Additionally, it will provide a more accurate picture of what is going on in our scenery of study.

Fiamma Liz Leites

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

I don't have any experience with miniscopes or calcium imaging (I only viewed it in theorical classes)

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

Currently I am doing electrophysiological recordings in freely behaving birds while they execute their songs or listen to auditory stimuli (the bird's own song). To measure the electrophysiological signal, I fabricate my own microdrive and tetrodes, a miniature device to be able to register neural activity in these small animals. Calcium imaging is a very valuable technology which my laboratory does not have yet and there is no experience with the use of the technique, so this school is an opportunity to learn to use it. The miniscopes could help to have more information about neural activity in freely behaving birds and respond to other kinds of questions during my doctoral studies given the characteristics of the method, and thus complementing my neurophysiological work. It

could open a large list of possibilities, like doing video analysis of the neural activity and exploring its dynamics, observations in vivo of the neural activity, poblational analysis in multiple regions involved in birdsong simultaneously, and other works. For now and in the future, as a neuroscientist researcher, I consider it a very useful tool.

Julieta Andrea Correa

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

I don't have experience with these techniques.

Tell us how Miniscopes would impa

ct your current or future research (max. 300 words).*

My current thesis under the supervision of Dra. Haydee Viola is aimed to unravel the effects of spaced learning on memory persistence.

At present, I am using spatial-learning tasks in rodents to study how spaced learning sessions can promote the persistence of long term memories. Particularly, I am working to elucidate the molecular mechanisms in the hippocampus involved in this effect using a pharmacological approach.

We propose that the re-activation of the specific neural sites induced by the first training session and the use of plasticity related proteins are necessary, at the moment of the second training, to maintain the memory over time. The use of miniscopes would allow us to record the neural activity from the specific population of neurons activated during the training sessions. Using this technique we could test whether the population of cells activated by the first training coincides with that activated by the second one.

Also, participating in this workshop can be useful to extend experimental approaches of my research during the last years of my PhD. This would broaden my current background and would help me to have a more integrative understanding of behavioral neuroscience.

Lucca Salomon

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

So far I have had no experience using Miniscopes or calcium imaging, although I do understand much of the theoretical background behind the techniques. In this sense, I am

applying to ISN School on portable fluorescence microscopy in order to learn how to use them and then be able to apply them to my PhD project.

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

My PhD project consists in studying the neural circuits involved in the modulation of the olfactory cortex's activity, particularly, by experience and context. In order to address this, I use a virtual reality set-up in which head-fixed mice walk through a virtual corridor while stimulated with different odorants and visual contexts. Animal's neuronal activity is registered during different days of the training protocol with a NeuroNexus 32-channel silicon probe located in the piriform cortex (PCx). My main questions are: 1) How do the PCx representations change with learning? 2) Which is the main role of the PCx? 3) Is it necessary for the specific task I'm studying? 4) How is this task represented in other brain areas (Orbitofrontal Cortex, for example)?

Although the current approach using silicon probes allows me to register the PCx's dynamics in the temporal dimension in a very precise way, it is not possible to record the same neurons on consecutive days, which is crucial for studying how these neural representations change with learning. In this sense, I'm convinced that Miniscopes will allow me to address this issue and thus enrich the approach of my PhD questions.

Maria Florencia Acutain

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

In our Lab we study glutamatergic neurons, particularly focusing on the relevance of the NMDAR regulatory subunits during synaptic plasticity and memory processes. Briefly, the NMDA receptor (NMDAR) is composed of two obligatory and two regulatory subunits, being GluN2A and GluN2B the most abundant regulatory ones in the hippocampus and cortex. The pattern of expression of these regulatory subunits is tightly regulated, as they experiment a particular switch during development as well as during synaptic maturation, being GluN2A characteristic of mature structures. During my PhD thesis we studied the role of GluN2A subunit in hippocampal plasticity. We discovered that GluN2A reduced expression alters the GluN2A/2B ratio and induces both morphological and synaptic changes in cultured neurons. In vivo, decreased GluN2A levels impair fear contextual memory and increase seizure susceptibility. Furthermore, GluN2A reduction affects glutamate calcium response in vitro which was observed by calcium imaging using Fura2. These assays were a novel approach that we implement in the lab as well as in the institute (IBCN) during the last two years.

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

As I mentioned before, we investigate the role of the NMDAR regulatory subunits (GluN2A and GluN2B) during synaptic plasticity and memory processes. We performed

experiments in two models: in vivo in Wistar rats and in vitro, in hippocampal cultured neurons, studying the implications of GluN2A reduced expression. The results showed that, in both models GluN2A/2B ratio is reduced, affecting the total amount of the obligatory subunit (GluN1), necessary for the receptor assembly. Moreover, in vivo GluN2A reduced expression induced impairment in contextual fear memory and an increase in induced seizure susceptibility. The possibility to attend this workshop will give me the necessary tools to start working with Miniscopes in the near future and explore how neuronal firing is affected in our GluN2A knockdown model. This is a unique opportunity to learn about this new and exciting open-source device to monitor neural activity in behaving rodents. Also, the possibility to learn from the experts on this field how to assembly and use this technology, as well as the teaching assist to analyze the possible experiments became this event an extraordinary workshop. With this knowledge and after we acquire the Miniscope device, we are going to perform assays in our GluN2A knockdown model in order to evaluate the neuronal activity during different tasks and during a pharmacologic induced seizure.

Agostina Stahl

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

I learnt about it in courses and seminars, but I didn't have a hands on experience with them.

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

My PhD project focuses on studying alterations in the activity of striatal interneurons in a mouse model of Parkinson's disease (PD) and their contribution to their symptoms and to the L-dopa-induced dyskinesia (LID), with the ultimate goal of developing new therapeutic alternatives both for PD and LID. I am currently carrying out experiments where I modulate the activity of different types of striatal interneurons through DREADDs expression and evaluate the animals behavior. Some preliminary results suggest that chemogenetic inhibition of somatostatinergic striatal interneurons reduces LID. As a next step, we want to use imaging techniques to study the activity of these interneurons while animals experiment LID. In my lab we have a few miniscopes (v3), however my expertise in imaging field is scarce, so I believe this course will be extremely helpful to give me the tools I need to start that next experiment.

Paula Ospital

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

I performed calcium imaging experiments in honeybees, to sense neuron activation of glomeruli in response to an odorant (or mix). Each odorant evokes a specific pattern of glomeruli activation, which could be identified by using this technique.

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

I'm deeply interested in understanding how Lateral Habenula-centered circuits are involved in fear and aversion processing. I believe Miniscope is the ideal tool to answer that question, giving us the opportunity to record in vivo activity during the presentation of aversive stimuli and investigate the related memories elicited.

María Jesús Trujillo

If you have any experience with Miniscopes or calcium imaging, tell us about it (max. 300 words).*

Although this course will be my first approach to miniscopes technology I'm currently interested in use this technique during my PhD

Tell us how Miniscopes would impact your current or future research (max. 300 words).*

During my PhD I will be studying cortico-striatal functional plasticity in a chronic pain rodent model. Since my bachelor's degree I've been using in vitro techniques to do so but, I'm currently interested in complementing my in vitro studies with in vivo experiments. By dominating In vivo techniques I will be able to not only know how certain cortical neurons change their electrophysiological properties during the transition to chronic pain, but also have a bigger picture of these changes during a behavioral task.

My group already possess miniscopes and for the last month we were perfecting the placement of lenses at the site of interest as well as designing the behavior task that we will use. We are expecting to start recording in the near future. It will be really enriching having, not only the opportunity to learn from Dr. Aharoni team but also become well versed in the assemble and all of the uses of miniscopes personally. This will give me the tools to start my own recordings and be able to share knowledge acquired during the course with my pairs.