FSMB: **F**luorescence **S**uperresolution **M**icroscopy in **B**ioimaging meeting
Rio de Janeiro on August 22nd-23rd, 2024

Thursday, August 22 morning *Session 1 - Super resolution microscopy in Latin America*	
Río de Janeiro Brazil	This opening session will delve into Fluorescence Superresolution Microscopy in Bioimaging in the Latin American context, aiming to enlighten the community on the state of the art in this field within the region. It is designed to display the foundational work in super-resolution microscopy spanning research, education, and bridging the technological and educational gap among imaging scientists. Discussions will transition from introductory concepts to the advancements and potential of fluorescence nanoscopy in bioimaging within Latin America. Moreover, the session will feature the recent educational endeavors at promoting knowledge exchange, skill development, and fostering collaborations in Latin America, thereby significantly propelling super-resolution microscopy advancement in the region.
	Breakfast
	Welcome and announcements
	Fundamentals: An Intro to Fluorescence Super-Resolution Microscopy
	Expanding Global Access to Boimaging in LatAm- The Fluorescence Nanoscopy in Bioimaging foundational project.
	Q&A
	Educational endeavors fostering Super-Resolution Microscopy in LatAm
	Q&A
	Break
	Plenary talk 1. The beginning of optical Super-Resolution Microscopy A distinguished speaker will share insights on the inception of optical superresolution microscopy, tracing their professional journey and recent research contributions. The discourse will encapsulate the speaker's vision on the burgeoning field of Fluorescence Super-Resolution Microscopy. This session aims to foster a deeper understanding of SRM's evolution, inspiring attendees while providing a glimpse into the future trajectories this rapidly advancing field might undertake.
	Q&A
	Lunch & Having lunch with…? (students<->selected speakers activity)
Thursday, August 22, evening *Session 2 - Single molecule localization microscopy*	
Río de Janeiro Brazil	Highlighting the transformational impact of Single Molecule Localization

	Microscopy (SMLM) on unraveling biological intricacies, this session offers a foray into the molecular realm. It navigates the imaging evolution from observing isolated blinking or wandering fluorescent molecules to exploring tissues and organismal levels. The session elucidates SMLM's potential as a springboard for innovative diagnostic tools, forming a nexus between foundational research and clinical application. Prominent methodologies like STORM, PAINT, and SPT, devised to decode cell biology intricacies, will be accentuated, underlining their pivotal role in advancing molecular imaging. A focal point will be the evolutionary trajectory and prospective horizons of SMLM, particularly in spatial transcriptomics and whole brain imaging. Additionally, the session explores the promise of SMLM as a clinical diagnostic tool, foreshadowing a future where molecular details significantly bolster disease diagnosis and comprehension.
	Selected students taks
	Q&A
	Plenary talk 2. PAINT Origins, present and future *A journey through the evolution of the Point Accumulation for Imaging in Nanoscale Topography (PAINT) technique. From its genesis to its current applications and onward to future potentials, the talk aims to provide a comprehensive overview. Emphasizing the technique's significance in revealing intricate cellular and molecular landscapes, it will explore PAINT's transformative impact on nanoscale imaging and its promise in advancing molecular and cellular biology understanding.*
	Q&A
	Break
	Single-Molecule Insights into Cell Architecture
	PAINT spatial transcriptomics, whole brain,...
	Q&A
	Industrial talk
	Q&A
	Posters session

Friday, August 23, 2024 ***Session 3- Boosting Optical Fluorescence Microscopy with Structured Light***	
Río de Janeiro Brazil	The session explores contemporary advancements in structured light microscopy, instrumental for significant scientific discoveries. Initially, confocal microscopy was crucial for enhancing contrast through structured illumination.

	The focus now transitions towards overcoming the diffraction barrier by channeling more information within the imaging system, refining spatial sampling of signals, or segregating information from its source. The session highlights the principles and potentials of various innovative techniques, demonstrating their invaluable utility for biological discovery, notably in elevating resolution in confocal microscopy and leading the charge in super-resolution multidimensional imaging. Methodologies that are redefining benchmarks in super-resolution microscopy will be unfolded. Attendees will gain insights into their application for probing the nano intricacies of life.
	Breakfast
	Increase the resolution in confocal microscopy (SPLIT PIN)
	Unlocking Biology Through Structured Image-Based Insights
	Q&A
	Group photo
	Extended SPIM, STED imaging
	Mapping the Nicotinic Acetylcholine Receptor Nanocluster Topography
	Q&A
	Break
	Plenary Talk 3. TBD: i.e. Nanometric scales imaging with low photon budgets
	Q&A
	Industrial talk

Friday, August 23, 2024 Evening *Session 4- Expanding worldwide access to Super Resolution Microscopy*	
Río de Janeiro Brazil	This session will emphasize widening global access to nanoscale imaging, particularly in resource-limited areas, by utilizing accessible technology like conventional fluorescence microscopes and chemical reagents. It will explore harnessing brightness fluctuations of fluorescent molecules or isotropically expanding samples to generate sharper super-resolved images. The introduction of FAIR imaging protocols and image enhancement tools will be highlighted. These advances aim to unlock high-fidelity multidimensional superresolution microscopy without hefty costs, benefiting the research community. The session will also venture into integrating machine learning with super-resolution microscopy and merging it with electron microscopy for enhanced imaging, opening avenues for deeper understanding of biological systems at the nanoscale.
	High-fidelity 3D live-cell nanoscopy through data-driven optimization
	Unfolding Space and Time with Single Frame Super-Resolution Microscopy

	Q&A
	Superres Winners Talks - Winners of the superres workshops
	Q&A
	Break
	Machine Learning in Super resolution microscopy
	Bridging Scales in Imaging (CLEM)
	Q&A
	Plenary talk 4. Expanding optical microscopy to visualize protein shapes.
	Q&A
	Closing ceremony & final remarks
	Closure dinner