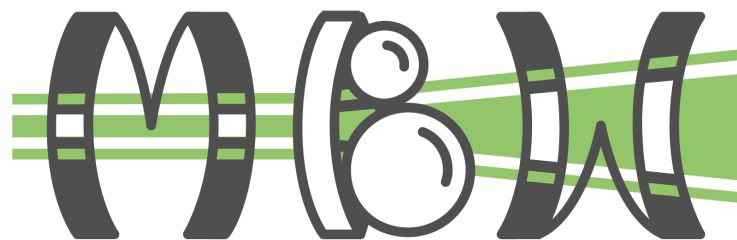

Expanding Global Access to Bioimaging Connecting the Mexican Bioimaging Community

Virtual meeting: Fundamentals of image analysis in bioimaging.

Friday 19th & Saturday 20th August 2022.

Taller virtual de fundamentos de Análisis de Imágenes en temas de bioimagen

meximagingworkshops.org.mx



Mexican Bioimaging Workshops

In this design, lenses, study elements, and the light that passes through them to obtain the image are integrated.

Graphic style is inspired by the Mayan symbols.

Gray represents technology and green life.

Connecting the Mexican bioimaging community through educational workshops

Understanding the molecular architecture of nature requires advanced microscopy techniques which demand specialized infrastructure and knowledge. Adoption of advanced imaging techniques in Mexico has historically lagged behind developed nations, and it is mostly centralized within the major cities of the country, which poses challenges to scientists to access microscopy infrastructure. This initiative will lay the groundwork for forming a Mexican bioimaging community by means of a decentralized educational workshop program based in existing core facilities which will bring together imaging and biomedical researchers. Twelve hands-on workshops on microscopy will take place within educational and governmental scientific institutions in Mexico (UNAM, CICESE, IMSS, INECOL, CICY, CIO, INCAN, INB, IBiomed, IEcol) covering the north, central and south regions of the country. Six events will focus on fundamentals of microscopy, the remaining will cover advanced topics such as laser microdissection, multidimensional imaging, and superresolution microscopy. Each workshop includes an outreach event aimed to stimulate society awareness of bioimaging as a contributor to scientific and social development. In addition, collaborative electronic education efforts address growing needs of image analysis and proper data interpretation, topics of interest will be covered, ranging from principles of image analysis to the use of artificial intelligence for advanced imaging. This programme stimulates collaboration between existing core facilities, disseminates best practice, improves service provision, and creates a platform for future growth and integration of the bioimaging community in Mexico, and explicitly, will result in the creation of a legally-constituted entity to represent and oversee its further development.

Fundamentals of image analysis in bioimaging

Goals and objectives

The development and application of tools for handling, analysis and interpretation of experimental data has taken on a central role in various areas of knowledge. The objective of this course is to provide a first approach to image analysis taken in the context of studying biological systems. Lectures will be focused on the use of image analysis tools that do not require specialized programming knowledge and at the same time, students will gather fundamental knowledge of digital image processing in the context of bioimaging. It is expected that at the end of the course: (i) Students understand basic aspects of digital image processing in the field of bioimaging, (ii) become familiar with free and commercial image analysis tools, i.e. ImageJ/FIJI and MATLAB. It is intended to create a space that facilitates the establishment of links and synergies among the participants in order to contribute to the strengthening of the Mexican bioimaging community. The course is aimed at Spanish-speaking professionals or students in professional training who are interested in or related to the field of bioimaging.

Resumen en español

El desarrollo y aplicación de herramientas para manejo, análisis e interpretación de datos experimentales ha cobrado un papel central en diversas áreas del conocimiento. El objetivo de este curso es proporcionar una primera aproximación al análisis de imágenes de microscopía en sistemas biológicos mediante el uso de herramientas que no requieren de conocimientos especializados de programación y al mismo tiempo revisar conceptos básicos del procesamiento digital de imágenes en el contexto de la bioimagenología. Se espera que al finalizar el curso: (i) Los estudiantes comprendan aspectos básicos del procesamiento digital de imágenes en el campo de la bioimagen., (ii) se familiaricen con herramientas de análisis de imágenes de acceso libre y comerciales (ImageJ/FIJI, MATLAB). Se pretende generar un espacio que facilite establecer vínculos y sinergias entre los participantes con la finalidad de coadyuvar al fortalecimiento de la comunidad mexicana de bioimagen. El curso va dirigido a profesionales o estudiantes en formación profesional de habla hispana que estén interesados o relacionados al campo de la bioimagen.

Registration and meeting links

**Closed caption is available during all Zoom sessions*

Venue

50th participants, registration at: meximagingworkshops.org.mx

Language: Spanish (slides in english).

Classroom and Zoom links will be provided via email to all accepted participants.

Attendees

[Attendee list](#)

Fundamentals of image analysis in bioimaging

Friday, August 19th	
Time (CST).	Session
8:25 - 8:30 hrs.	Welcome & Opening. Adán Guerrero & Mario Gonzalez.
8:30 - 8:55 hrs.	Connecting the Mexican Bioimaging Community. Diego Delgado.
8:55 - 9:00 hrs.	Q & A.
9:00 - 9:30 hrs.	Ice breaking rooms. Haydee Hernández.
9:30 - 9:55 hrs.	Properties and representations of the digital image. David Torres.
9:55 - 10:20 hrs.	Practical session: Exploring images within the ImageJ/FIJIs engine. Diana Vazquez.
10:20 - 10:30 hrs.	Q & A.
10:30 - 10:55 hrs.	The image formation process. Adán Guerrero.
10:55 - 11:05 hrs.	Q & A.
11:05 - 11:25 hrs.	Ice breaking rooms. Haydee Hernández.
11:25 - 11:50 hrs.	Image descriptors and image filtering. <i>(The Kernel and convolution concepts, filtering spatial frequencies).</i> Raúl Pinto.
11:50 - 12:15 hrs.	Practical session: Processing images within the ImageJ/FIJIs engine. Raúl Pinto.
12:15 - 12:25 hrs.	Q & A.
12:25 - 12:35 hrs.	Break.
12:00 - 13:15 hrs.	Invited speaker: Image processing and statistical analysis with MATLAB. Victoria Barba.
13:15 - 13:30 hrs.	Q & A.
13:30 - 15:00 hrs.	Lunch.
	Practical applications of image analysis in bioimaging.
15:00 - 15:15 hrs.	Sarahí de León.

15:15 - 15:30 hrs.	Computer vision for microscopy image analysis Carlos Cabrera.
15:30 - 15:45 hrs.	Martina Jabłoński.
15:45 - 16:00 hrs.	Q & A.
16:00 - 16:30 hrs.	Chilling session.

Session moderator: Mario González.

Saturday, August 20th	
Time (CST)	Session
	Segmentation in digital images
8:30 - 8:55 hrs.	Global or local thresholding. Paul Hernandez.
8:55 - 9:20 hrs.	Mathematical morphology. Paul Hernandez.
9:20 - 9:30 hrs.	Q & A.
9:30 - 9:55 hrs.	Practical session: Tools for image segmentation at ImageJ/FIJI. Paul Hernandez.
9:55 - 10:05 hrs.	Break.
10:05 - 10:30 hrs	Edge detection. Adán Guerrero.
10:30 - 10:55 hrs	Region- and context-based image segmentation techniques. Adán Guerrero.
10:55 - 11:05 hrs.	Q & A.
11:05 - 11:30 hrs.	Practical session: Edge detection and context-based segmentation. Adán Guerrero.
11:30 - 11:40 hrs.	Break.
	Selected topics of image analysis.
11:40 - 11:55 hrs.	Colocalization in fluorescence microscopy imaging. Alma Alva.
11:55 - 12:10 hrs.	Number and Brightness. Alejandro Linares.
12:10 - 12:25 hrs.	Extending spatial resolution using edge detectors. Raul Pinto.
12:25 - 12:35 hrs.	Q & A.
12:35 - 13:30 hrs	Selected Student's projects - hacking rooms.
13:30 - 15:00 hrs.	Lunch.
	Practical applications of image analysis in bioimaging.
15:00 - 15:15 hrs.	Image processing: a tool for emerging diseases diagnosis (COVID -19). Haydee Hernández.
15:15 - 15:30 hrs.	Applications of image analysis in structural biology: an example of rotavirus replication machineries. David Torres.

15:30 - 15:40 hrs.	Q & A.
15:40 - 16:15 hrs.	Plenary closing lecture. Paul Hernandez.
16:15 - 16:25 hrs.	Q & A.
16:25 - 16:30 hrs.	Closing & Remarks. Adán Guerrero.

Session moderator: Victor Abonza.

Attendees list

Name	Organization	Email	Participation <i>T: Teacher, S: Student, A: Assistant</i>
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Carlos Cabrera			T
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