Mcib CSIC-UIMP Master on Molecular and Cellular Integrative Biology

What is the Mcib?

- *Mcib* is a research school co-organized by the *Spanish Research Council (CSIC*) and the *International University Menéndez Pelayo (UIMP)* to provide **advanced training in molecular and cellular life sciences to graduate students in a cutting-edge scientific environment**.

- *Mcib* is a **pioneer in-house research training experience at CSIC centers**, stem from the *Centro de Investigaciones Biológicas (CIB)* – the main hub of *Mcib* - as a **collective higher-education action of CSIC scientists**, bringing together a wide range of expertise and know-how.

- This training portfolio has recently been fostered by the active participation of scientists from nearby CSIC centers, particularly the *Rocasolano Physical Chemistry Institute (IQFR)*.

- This novel concept will allow the students to be exposed to the **scientific activities developed in-house**, based on the synergies among research programs on **structural, molecular, cellular, chemical and synthetic biology**, that apply **front-line technologies** to study **essential processes and systems with environmental and/or medical relevance**. These integrated studies aim at elucidating fundamental principles of biological function and at providing novel tools to improve quality of life.

- *Mcib* is based on the *Max Planck International Research School for Molecular Life Sciences* established at the MP campus in Martinsried (https://imprs-ls.opencampus.net/) which has been adapted and scaled to the Spanish research and academic system.

Mcib Program Structure and Timing

- *Mcib* will run during 3 academic semesters, starting in October until March of the second year. It comprises **90 ECTS credits**, organized in **3 academic modules (60 ECTS)** and a **master research project (30 ECTS)**. MCIB will adopt an **innovative format** in which the students will progress rapidly from intensive course instruction to research in their projects. Most of MCIB activities will be in **English**.

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Mcib III – First academic year (2018-19): Tentative Calendar. Ovierview

MCIB modules / coordinators	Content
M1 – MCIB FUNDAMENTALS (30 ECTS; semester 1 – Oct 2018 / March 2019)	
M1-1/2: Research Topics and Advanced Methods (15 + 10 ECTS) **Coordinators** *- 3DBIOCHEM: C Fdez. Tornero; D. Laurents* *- MOLCELBIO: R. Bermejo; MA Peñalva* *- BIOMED: AG Arroyo; S. Martín-Santamaría* *- BIOTEC: Ali Prieto; J. Sanz*	Lecture series (M1-1), state-of-the-art technologies (M1-2) and journal club sessions covering the 4 core *MCIB* research programs: • **3DBIOCHEM:** Structural and Chemical Biology • **MOLCELBIO:** Molecular Cell Biology • **BIOMED:** Molecular Medicine • **BIOTEC:** Molecular and Systems Biotechnology
M1-3: Lab rotations (5 ECTS) **Coordinators** *- D. Pérez-Sala; C. Vega*	3-4 one-week rotations in labs working on the 4 core *MCIB* research programs (M1AB)
M2 – MCIB FRONTIERS (15 ECTS; semesters 1 and 2 – Oct 2018 / June 2019)	
M2-1: Seminars **M2-2: Workshops** **Coordinators** *- P. Boya; (M. Jiménez) (M2-1)* *- MA. Peñalva; (M. Jiménez) (M2-2)*	Series of **specialized seminars** (10), **workshops** (3) and **journal club sessions** covering advanced *MCIB* topics.
M3 – MCIB EXTENSION (15 ECTS; semesters 1 and 2 – Oct 2018 / June 2019)	
M3-1: Scientific writing & oral presentation **M3-2: Entrepreneurship** **M3-3: Dissemination** **Coordinators** *- M. Jiménez (M3-1)* *- C Vega (M3-2)* *- E. de la Rosa(M3-3)*	Lectures and workshops covering the following topics: • How to write a scientific manuscript and give a seminar • Entrepreneurship, innovation, intellectual property, etc. Creating a spin-off • Dissemination and career development, science & society, etc. Writing a blog
M4 – MCIB MASTER RESEARCH PROJECT (30 ECTS; semesters 2 and 3)	
	The general interdisciplinary training provided by M1-M3 will be completed with a degree of specialization at the master research project (TFM).

Mcib-III (October 2018 calendar)

Most classes will be at the **-1 floor seminar room of CIB** unless indicated otherwise. For example: the dates marked by **IQFR** lecturing will be at the IQFR - Rocasolano Institute (Serrano 119; metro República Argentina)

Text in black: research topics lectures

Text in blue: advanced methods and practical sessions

Text in grey: Journal club sessions and lab rotations

Text in red: holidays

DAY	TIME	CLASS	TEACHER
OCTOBER 2018			
Mon 01-10	9:30 – 10:30	Welcome (part 1) at main hall of CIB	Mcib
	11:00 – 11:45	Pre-seminar session	
	12:00 – 13:00	**OPENING SEMINAR – Hyman**	Hyman (MPI-Dresden)
	13:00 – 14:00	Post-seminar session	
	15:00 – 17:00	Welcome (part 2)	
3DBIOCHEM – Structural and Chemical Biology			
1A. Basic Concepts			
Tue 02-10	09:30 – 11:00	Interactions in biology	SM Santamaría
	11:30 – 13:00	Thermodynamics and kinetics	G Rivas
	15:00 – 17:00	**Journal Club introduction**	CF Tornero / G Rivas
1B. Molecular Interactions			
Wed 03-10	**09:00 – 11:30**	Biomolecules of life	R Giraldo
	11:00 – 13:00	Spectroscopy	D Laurents
	15:00 – 17:00	Fluorescence	S Zorrilla
Thu 04-10	09:30 – 11:00	Machineries of life	JM Valpuesta (CNB)
	11:30 – 13:00	Circular dichroism	B Monterroso
	15:00 – 17:00		
Fri 05-10	09:30 – 11:00	Analytical ultracentrifugation and light scattering	C Alfonso / JR Luque
	11:30 – 13:00	Analytical ultracentrifugation and light scattering	C Alfonso / JR Luque
	15:00 – 17:00	Journal Club session	CF Tornero / G Rivas
		Beer session at CIB	
2B. Nuclear Magnetic Resonance			
Mon 08-10	09:30 – 11:00	NMR - Principles	FJ Cañada
	11:30 – 13:00	Peptides	MA Jiménez
	15:00 – 17:00	NMR – Practical session 1	FJ Cañada
2A. The Macromolecules of Life			
Tue 09-10 (IQFR)	09:30 – 11:00	Protein structure	J Oroz
	11:30 – 13:00	Folding & unfolding	M Mompeán
	15:00 – 17:00	NMR – Practical session 2	MA Jiménez

Wed 10-10 (IQFR)	09:30 – 11:00	Intrinsically disordered proteins	D Laurents
	11:30 – 13:00	Protein diversity	M Gasset
	15:00 – 17:00	NMR – Practical session 3	JMP Cañadillas
Thu 11-10 (IQFR)	09:30 – 11:00	RNA	JMP Cañadillas
	11:30 – 13:00	Calorimetry	JM Sánchez-Ruiz
	15:00 – 17:00	Nucleic acids	C González
		Beer session at IQFR	
Fri 12-10		No classes	
3B. X-ray crystallography			
Mon 15-10 (IQFR)	09:30 – 11:00	XRC - Principles	MM Ripoll
	11:30 – 13:00	XRC – Practical 1	A Albert / B González
	15:00 – 17:00	XRC – Practical 2	JM Mancheño / L Infantes
Tue 16-10	09:30 – 11:00	Biomembranes / protein-lipid complexes	D Lietha
	11:30 – 13:00	Carbohydrates	FJ Cañada
	15:00 – 17:00	XRC – Practical 3	C Vega
Wed 17-10 (IQFR)	09:30 – 11:00	Carbohydrate-active enzymes	J Aparicio
	11:30 – 13:00	Protein-sugar complexes	JM Mancheño
	15:00 – 17:00	XRC – Practical 4	CF Tornero / A Albert
3A. Macromolecular function			
Thu 18-10	09:30 – 11:00	Enzymatic systems	JM Mancheño
	11:30 – 13:00	Kinetic and dynamics	TBA
	15:00 – 17:00		
Fri 19-10	09:30 – 11:00	Regulation	C Vega
	11:30 – 13:00	Crowding and liquid-phase condensation	G Rivas
	15:00 – 17:00		
4B. Electron microscopy			
Mon 22-10	09:30 – 11:00	Cryo.EM - principles	CF Tornero
	11:30 – 13:00	Cryo-EM – practical 1	R Núñez / F Escolar
	15:00 – 17:00	Cryo-EM – practical 2	R Núñez / F Escolar
4A1. Molecular modelling			
Tue 23-10	09:30 – 11:00	Cryo-EM – practical 3	R Núñez / B Pou
	11:30 – 13:00	Cryo-EM – practical 4	R Núñez / B Pou
	15:00 – 17:00	Molecular modelling	SM Santamaría
Wed 24-10 (IQFR)	09:30 – 11:00	Macromolecular fitting	P Chacón
	11:30 – 13:00	Multi-scale dynamics	P Chacón
	15:00 – 17:00	Modelling	P Chacón
4A2. Chemical biology			
Thu 25-10	09:30 – 11:00	Chemical biology 1	R Pérez-Fernández
	11:30 – 13:00	Chemical biology 2	SM Santamaría
	15:00 – 17:00	Simulations	SM Santamaría

Fri 26-10	09:30 – 11:00	Chemical biology 3	E Vázquez
	11:30 – 13:00	Chemical biology – practical	R Pérez-Fernández
	15:00 – 17:00		
Mon 29-10	09:30 – 11:00	**Mcib Workshop: Plant Biotechnology**	
	11:30 – 13:00		
	15:00 – 17:00		
Tue 30-10	09:30 – 11:00		
	11:30 – 13:00		
	15:00 – 17:00		
Wed 31-10	09:30 – 11:00	Journal club	
	11:30 – 13:00	Journal club	
	15:00 – 17:00		
Thu 01-11		No classes	
Fri 02-11		No classes	
NOVEMBER 2018			
Mon 05-11	09:30 – 11:00	Lab rotations (LR)	
	11:30 – 13:00	LR	
	15:00 – 17:00		
Tue 06-11	09:30 – 11:00	Lab rotations	
	11:30 – 13:00	LR	
	15:00 – 17:00		
Wed 07-11	09:30 – 11:00	Lab rotations	
	11:30 – 13:00	LR	
	15:00 – 17:00		
Thu 08-11	09:30 – 11:00	Lab rotations	
	11:30 – 13:00	LR	
	15:00 – 17:00		
Fri 09-11		No classes	
Mon 12-11	09:30 – 11:00	Lab rotations	
	11:30 – 13:00	LR	
	15:00 – 17:00		
Tue 13-11	09:30 – 11:00	**EXAM**	
	11:30 – 13:00	**EXAM**	
	15:00 – 17:00		