

15:30 h | Workshop (II). Do-it-yourself portable lab: microfluidics in synthetic biology

Begoña Monterroso

Centro de Investigaciones Biológicas (CIB-CSIC)

Alfonso Rodríguez-Patón

Viernes 30

09:30 h | SYNTHETIC CELLS: A EUROPEAN SCIENTIFIC CHALLENGE (II)

Synthetic tissues from communicating droplet networks

Hagan Bayley

Oxford University, UK

Building minimal mitotic spindles in artificial cells

Marileen Dogterom

Technical University, Delft, NL

12:00 h | Closing lecture

The elephant in the SynBio room: what we need to face for making bioengineering a reality

Víctor de Lorenzo

Departamento de Biología de Sistemas, CNB-CSIC, Madrid

13:00 h | Closing ceremony

Synthetic biology (SynBio) is one of the most dynamic areas of the life sciences that involves a radically new approach by introducing the application of engineering principles to study biological problems. Its objective is the design and construction of new biological entities or the redesign of existing biological systems to reprogram organisms and generate products of high added value for society in areas such as health or the environment. However, SynBio still has little presence in the Spanish university academic system. For this reason, the UIMP-CSIC Summer School on Integrative Molecular Cell Biology already tackled this subject in the 2015 and 2018 editions, with outstanding success. In this new edition, the school will address, for the first time, one of the most ambitious challenges of SynBio and modern science: the construction of a synthetic cell from its constituent molecular components. These explorations will enable us to answer fundamental questions about the functioning of life and its origin. These advances could eventually establish a new generation of biotechnological processes and bio-factories based on synthetic cell constructions.

**Student Profile:** We aim to connect brilliant young graduates and postgraduates in science and technology (Biology, Medicine, Pharmacy, Chemistry, Physics, Mathematics, and Engineering) with experts in the disciplines covered in the course. This edition of the School will allow students to get a broad and solid idea about the state of this emerging discipline and possible career opportunities in the field of synthetic biology and related areas.

[www.uimp.es](http://www.uimp.es)



## INFORMACIÓN GENERAL

Hasta el 14 de junio de 2019

### Santander

Campus de Las Llamas  
Avda. de los Castros, 42  
39005 Santander  
Tel. 942 29 87 00 / 942 29 87 10

### Madrid

C/ Isaac Peral, 23  
28040 Madrid  
Tel. 91 592 06 31 / 91 592 06 33

A partir del 17 de junio de 2019

### Santander

Palacio de la Magdalena  
39005 Santander  
Tel. 942 29 88 00 / 942 29 88 10

[alumnos@uimp.es](mailto:alumnos@uimp.es)

## PLAZOS

### Solicitud de becas

Hasta el día 27 de mayo,  
para los cursos que comiencen  
antes del 5 de julio de 2019

Hasta el día 14 de junio,  
para los cursos que comiencen a  
partir del 8 de julio de 2019

### Apertura de matrícula

Desde el 6 de mayo de 2019  
(plazas limitadas)

### Horario general

de 9:00 a 14:00 h  
de 16:00 a 18:00 h  
(excepto viernes)

Código 64AZ / Tarifa: C / ECTS: 1

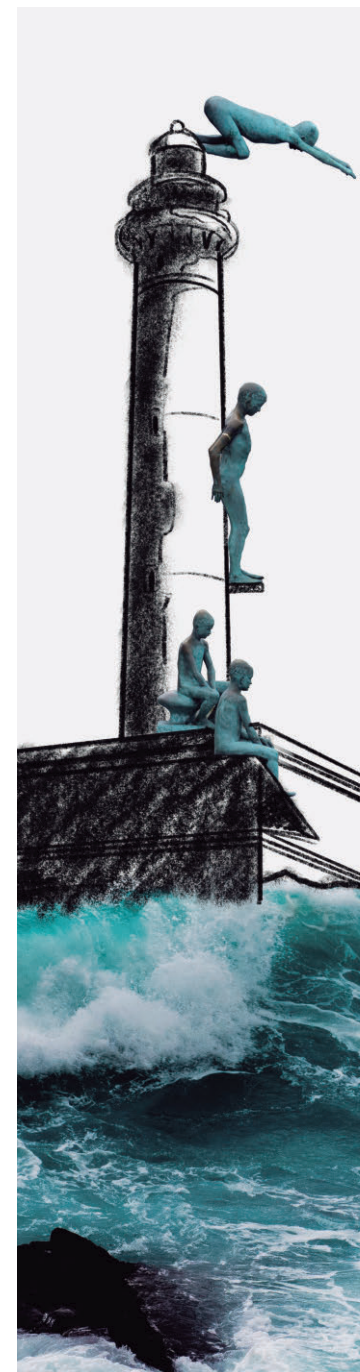
Patrocinio:



# UIMP

Universidad Internacional  
Menéndez Pelayo

SANTANDER 2019



VI ESCUELA DE BIOLOGÍA  
MOLECULAR Y CELULAR  
INTEGRATIVA

Fronteras en  
Biología Sintética  
(III)-Constructing a  
synthetic cell

Rafael Giraldo

Germán Rivas

Del 26 al 30 de agosto

[www.uimp.es](http://www.uimp.es)

## Fronteras en Biología Sintética (III)- Constructing a synthetic cell

Dirección

[Rafael Giraldo](#)

Profesor de Investigación

Centro Nacional de Biotecnología (CNB)

Consejo Superior de Investigaciones Científicas (CSIC)

[Germán Rivas](#)

Profesor de Investigación

Centro de Investigaciones Biológicas (CIB)

Consejo Superior de Investigaciones Científicas (CSIC)

Del 26 al 30 de agosto

Lunes 26

### OPENING CEREMONY

10:00 h | PROTOCELLS (MOLECULAR ORIGINS OF LIFE)

MINIMAL CELLS AND ARTIFICIAL CELLS (I)

Simple models of metabolic closure: Rosen revisited

[Federico Morán](#)

Departamento de Bioquímica, Facultad de Ciencias Químicas

Universidad Complutense de Madrid

Building minimal metabolisms

[Juli Peretó](#)

Instituto de Biología Integrativa y de Sistemas - I2SysBio; CSIC

Universidad de Valencia

15:30 h | PROTOCELLS (MOLECULAR ORIGINS OF LIFE)

MINIMAL CELLS AND ARTIFICIAL CELLS (II)

On the “bottom-up” construction of protocells and its limitations: some recent in vitro and in silico models

[Kepa Ruiz-Mirazo](#)

Instituto de Biofísica, CSIC-Univ. País Vasco, Bilbao

16:30 h | ROUND TABLE (I)

Bottom-up SynBio - from understanding to improving life

[Federico Morán](#)

[Juli Peretó](#)

[Kepa Ruiz-Mirazo](#)

Moderación

[Germán Rivas](#)

Martes 27

09:30 h | CHEMISTRY AND PHYSICS OF LIFE-LIKE SYSTEMS (I)

Synthetic supramolecular strategies for primitive cytoskeleton models

[Javier Montenegro](#)

CIQUS, Universidad de Santiago de Compostela

Membrane mechanics: Mechanisms of membrane curvature generation and remodelling

[Félix Campelo](#)

Instituto de Ciencias Fotónicas - IFCO, Barcelona

12:00 h | CHEMISTRY AND PHYSICS OF LIFE-LIKE SYSTEMS (II)

Chemical roots of biological evolution: A theoretical and experimental approach to understand abiogenesis

[Andrés de la Escosura](#)

Departamento de Química Orgánica

Facultad de Ciencias, UAM, Madrid

15:30 h | Workshop (I): In silico synthetic biology

[Raúl Fernández-López](#)

Instituto de Biomedicina y Biotecnología (IBBTEC)-CSIC - U. Cantabria

[Alfonso Rodríguez-Patón](#)

Laboratorio Inteligencia Artificial, ETS-Informática; UPM, Madrid

Miércoles 28

09:30 h | MASTERING BIOLOGICAL COMPLEXITY:

TOWARDS A NEW BIOLOGY? (I)

Symbionts as natural machines

[Amparo Latorre](#)

Departamento de Genética, U. Valencia / I2SysBio, CSIC-UV

Bacterial computing by plasmid transmission

[Fernando de la Cruz](#)

Instituto de Biomedicina y Biotecnología de Cantabria

(IBBTEC)-CSIC-U. Cantabria

12:00 h | MASTERING BIOLOGICAL COMPLEXITY:

TOWARDS A NEW BIOLOGY? (II)

Self-organization of microtubules, motors and bundlers

[Thomas Surrey](#)

Francis Crick Institute, London 7 CRG-Barcelona

15:30 h | ROUND TABLE (II)

Biology 2.0?

[Fernando de la Cruz](#)

[Amparo Latorre](#)

[Thomas Surrey](#)

Moderación

[Rafael Giraldo](#)

16:30 h | Preparing the next generation of molecular cell biologists: The UIMP-CSIC Master Molecular and Cellular Integrative Biology (Mcb)

[Adrián Merino](#)

MPI-Biochemistry, Martinsried

[Irene Tomico](#)

TV Vienna

Moderación

[Rafael Giraldo](#)

[Germán Rivas](#)

Jueves 29

09:30 h | SYNTHETIC CELLS: A EUROPEAN SCIENTIFIC CHALLENGE (I)

Minimal machinery to controllably divide a protocell

[Petra Schwill](#)

Max Planck Inst. Biochemistry, Martinsried, Germany

12:00 h | Synthetic cells - from academy to industry

Enzyme directed evolution: an awarded and invaluable technology to develop industrial biocatalysts and creative chemistry

[Susana Camarero](#)

Centro de Investigaciones Biológicas (CIB-CSIC)

Assembly and disassembly of membrane microdomains in bacteria to fight antibiotic resistant infections

[Daniel López](#)

CNB-CSIC, Madrid