



Creating is Understanding: Synthetic Biology Masters Complexity

EMBO WORKSHOP



We have moved our website to embl.org/events. The content below is no longer being updated.

EMBL Courses and Conferences during the Coronavirus pandemic

With the onsite programme paused, many of our events are now being offered in virtual formats.

Registration is open as usual for many events, with back-up plans in place to move further courses and conferences online as necessary. Registration fees for any events affected by the COVID-19 disruption are fully refundable.

More information for participants of events at EMBL Heidelberg can be found [here](#).

Programme

Got something to say? Tweet it! [#EMBOSynBio](#)

Day 1 - Sunday 22 September 2019

Time	Speaker
17:00-18:45	Registration and dinner
17:30-18:30	Pre-conference Workshop
18:45-19:00	Welcome remarks

Time	Speaker
19:00-20:00	<p>Keynote lecture: Quantitative understanding of a living system and its engineering for human therapy Luis Serrano - Centre for Genomic Regulation, Spain</p>
20:00-21:30	Poster Preview

Day 2 - Monday 23 September 2019

Time	Speaker
	<p>Session 1 - Engineering as an interpretative frame for Biology Chair: Victor de Lorenzo</p>
09:00-09:25	<p>Multi-scale design of synthetic gene circuits Jörg Stelling - ETH Zürich, Switzerland</p>
09:25-09:50	<p>Synthetic transcription factors tuneable synthetic control of the complex bacterial <i>ntr</i> regulon Jörg Schumacher - Imperial College London, UK</p>
09:50-10:05	<p>Enzyme-level perturbations by CRISPRi reveal control principles of <i>E. coli</i> primary metabolism Stefano Donati - Max Planck Institute for Terrestrial Microbiology, Germany</p>
10:05-10:30	<p>Decoding development: From cis-regulatory structure to function Justin Crocker - EMBL Heidelberg, Germany</p>
10:30-10:45	<p>A large-scale exploration of cell-free compositions to maximize protein production using reinforcement learning Oliver Borkowski - French National Institute of Agricultural Research, France</p>
10:45-11:15	Coffee break
11:15-11:40	<p>Optogenetic control of protein amyloidogenesis in bacteria Rafael Giraldo - National Centre for Biotechnology, Spain</p>
11:40-12:05	<p>Towards model-guided assembly of synthetic microbial communities Kiran Patil - EMBL Heidelberg, Germany</p>
12:05-12:20	<p>A novel platform for generating artificial gene expression systems in bacteria and yeast Rahmi Lale - Norwegian University of Science and Technology, Norway</p>

Extended Discussion, Engineering as an interpretative frame for Biology, including selected oral poster presentation by

Wiggert Altenburg #37

Stefano Fedi #49

Eunice Azevedo Ferreira #50

12:20-12:50

Adrien Fleck #51

Cécile Jacry #55

Shivangi Mishra #62

Tina Petric #67

Reem Swidah #74

Isaac Wong #77

12:50-13:50

Lunch**Session 2 - Interfacing Biology with our software and hardware****Chair: Jean-Loup Faulon - MICALIS, INRA, France**

13:50-14:15

Turning genetic switches into alternative metabolic regimes

Victor de Lorenzo - Centro National de Biotecnologia, Spain

14:15-14:40

Ohm's Law for emergent gene expression under fitness pressure

Mark Isalan - Imperial College London, UK

14:40-14:55

Synthetic Optogenetic Differentiation System for Bioproduction in Budding Yeast

Chetan Aditya - INRIA-Saclay & Institut Pasteur, France

14:55-15:20

Engineering bacterial electroactivity

Robert Bradley - Imperial College London, UK

15:20-15:35

Towards a circular carbon economy - interfacing electrochemistry and (synthetic) microbial metabolism

Nico Claassens - Max Planck Institute of Molecular Plant Physiology, Germany

15:35-16:05

Coffee break

16:05-16:30

Interfacing Machine Learning with Biological Systems

Jean-Loup Faulon - MICALIS, INRA, France

16:30-16:45

Molecular upgrading of the performance limits of bacterial sensors for the remote detection of buried explosive devices

Benjamin Shemer - Hebrew University of Jerusalem, Israel

	Extended Discussion, Interfacing Biology with our software and hardware, including selected oral poster presentation by
16:45-17:15	Melchior du Lac #46 Natalie Farny #48 Amir Pandi #66 Hari Krishna Salila Vijayalal Mohan #69
17:15-19:45	Poster Session 1 (odd numbers)
19:45-21:00	Dinner in the EMBL Canteen

Day 3 - Tuesday 24 September 2019

Time	Speaker
	Session 3 - Engineering for understanding Chair: Justin Crocker
09:00-09:25	Gut Feelings: Quantifying bacterial growth in the mammalian gut using a single-cell synthetic oscillator David Riglar - Imperial College London, UK
09:25-09:40	Spatial pattern formation in morphogen gradients controlled by the toggle switch Yolanda Schaeferli - University of Lausanne, Switzerland
09:40-10:05	Modulating Gene Expression using Ribonucleases, small RNAs and portable RNA stabilizing sequences Cecilia Arraiano - Universidade Nova de Lisboa, Portugal
10:05-10:20	Engineering synthetic methylotrophy to gain insight into C1 metabolism and more Stephanie Heux - National Institute of Applied Sciences, France
10:20-10:50	Extended discussion, Minimal Systems, including selected oral poster presentation by Hafna Ahmed #36 Reza Amini Hounjani #38 Kimberly Arnold #40 Mary Aubry #41 Dirk Benzinger #42 Ashok Kumar Bhagat #43 Sara Castaño-Cerezo #44 Escarlet Díaz-Galicia #45
10:50-11:20	Coffee break

- 11:20-11:45 **Divide et impera**
Barbara di Ventura - University of Freiburg, Germany
- 11:45-12:00 **Decoding the combinatorial logic of BMP signaling**
Heidi Klumpe - California Institute of Technology, USA
- 12:00-12:25 **Precision and Plasticity in Animal Transcription**
Angela De Pace - Harvard Medical School, USA
- Extended discussion, Cell engineering, including selected oral poster presentation by**
Kristoffer Falkenberg #47
Rafael Giraldo #52
Shubhasish Goswami #53
Yash Jawale #56
Ekaterina Kozaeva #57
Brijesh Kumar #58
Alaro Lara #59
Renu Maan #60
- 12:25-13:00
- 13:00-14:00 **Lunch**
- 14:00-14:25 **Synthetic toxin-intein combinations as novel genetic weapons for specific killing of pathogenic bacteria**
Didier Mazel, Institut Pasteur, France
- 14:25-14:40 **On the feasibility of complex synthetic biological circuits**
Carlos Toscano-Ochoa - Universitat Pompeu Fabra, Spain
- 14:40-15:05 **In vivo assessment of enzymatic activities in a synthetic pathway**
Gilles Truan - National Institute of Applied Sciences, France
- Extended discussion, Cell engineering /Protein design**
Isabel Martinez Ferrando #61
Lummy Maria Oliveira Monteiro #63
Mihkel Örd #65
Viktor Stein #72
Ruud Stoof #73
- 15:05-15:35
- 15:35-16:05 **Coffee break**
- 16:05-16:30 **Engineering synthetic bacterial genome architectures towards exploring organizational principles**
Anke Becker - LOEWE Center for Synthetic Microbiology, Germany
- 16:30-16:45 **A symmetric toggle switch explains the onset of random X inactivation in different mammals**
Edda Schulz - Max Planck Institute for Molecular Genetics, Germany

	Extended Discussion, Cell consortia engineering including selected oral poster presentation by
	Patrícia Apura #39
	Angeles Hueso-Gil #54
16:45-17:15	Amira Moussa #64
	Christopher Reinkemeier #68
	Yolanda Schaerli #70
	Ada Scarrott #71
	Vyacheslav Tretyachenko #75
	Sophie Tschripke #76
17:15-19:45	Poster Session 2 (even numbers)
19:45-21:15	Gala Dinner
21:15-24:00	Party with DJ Jenz

Day 4 - Wednesday 25 September 2019

Time	Speaker
	Session 4 - Other Biology is possible Chair: Anke Becker
09:00-09:25	Reprogramming the Genetic Code Jason Chin - MRC Laboratory of Molecular Biology, UK
09:25-09:40	Modularity in gene regulation: shadow enhancers as building blocks of a modular design of gene regulatory systems Ezzat El-Sherif - Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany
09:40-10:05	A Semi-synthetic organism that stores and retrieves increased genetic information Floyd Romesberg - Synthorx, Inc., USA
10:05-10:20	Unraveling neural circuit function by building new synthetic connections in the brain Ithai Rabinowitch - Hebrew University of Jerusalem, Israel
10:20-10:45	Re-inventing photosynthesis with synthetic biology: Developing an artificial Chloroplast drop-by-drop Tobias Erb - Max Planck Institute for Terrestrial Microbiology, Germany

10:45-11:00	Minimal cell systems created, manipulated and analysed using microfluidics Naresh Yandrapalli - Max Planck Institute of Colloids and Interfaces, Germany
11:00-11:30	Extended discussion, Prebiotic biochemistry and xenobiology and poster prize announcements
11:30-12:00	Coffee break
12:00-13:00	Keynote lecture: Mammalian Synthetic Biology: Foundation and Therapeutic Applications Ron Weiss, Massachusetts Institute of Technology, USA
13:00-13:15	Closing remarks
13:15-13:30	Lunch to go and departure
13:30	Bus downtown and Frankfurt Airport