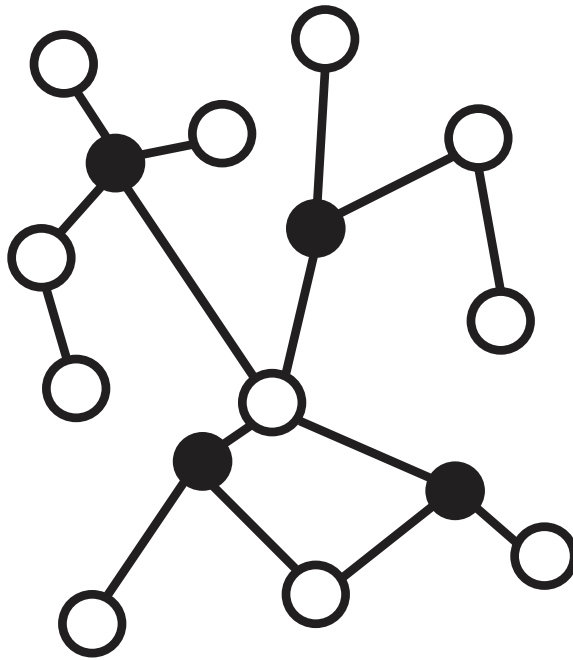


CompSysBio 2021

Advanced Lecture Course on Computational Systems Biology
Aussois – November 14-19, 2021



Sponsored by



Contacts

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Buses on Nov 14:

Coordinator Bus 1 at Lyon airport (4:15pm): Fabien Duveau +33 (0) 6 37 24 02 34

Coordinator Bus 1 at Chambéry station (5:45pm): Magali Richard +33 (0) 6 89 37 17 68

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Coordinator Bus 2 at Chambéry station (8:30pm): Nelle Varoquaux +33 (0) 6 51 33 79 23

Scientific Program

Sunday 14:

4:15pm: departure of the first shuttle bus from Lyon St Ex to Aussois (7:30pm) via Chambéry (5:35pm) and Modane (7:05pm)

7pm: departure of the second shuttle bus from Lyon St Ex to Aussois (10:20pm) via Chambéry (8:20pm) and Modane (9:50pm)

8pm: dinner

Monday 15: [Chairs: A. Crombach (morning) ; M. Richard (evening)]

8:30am: course opening (D. Jost)

8:40-10am: Lecture - **Henrik Jonsson (Univ Cambridge, UK)** *Multi-scale models of plant development*

10-10:20am: coffee break

10:20-10:40: Short talk – Maaïke Sangster (INRIA Grenoble, FR) *Development, characterization and control of E. coli communities on an automated experimental platform*

10:40-12:00am: Lecture - **Berta Verd (Univ Oxford, UK)** *Live-modelling the temporal regulation of mesoderm specification*

12:15am: Lunch

Free afternoon

4:30-6:30pm: Blackboard – **A. Goelzer (INRAE, Jouy-en-Josas, FR)** [Online], **E. Noor (Weizmann Institute Science, IS)**, **H. de Jong (INRIA Grenoble, FR)**, **D. Thieffry (ENS, Paris, FR)** - session 1

7pm: Dinner

8:30-8:50pm: Short talk – Meredith Wouters (Univ Oxford, UK) *The Yeast Metabolic Cycle, heterogeneous gene expression within synchronized cultures*

8:50-9:10pm: Short talk – Pranas Grigaitis (VU Amsterdam, NL) *Prediction of metabolic strategies in S. pombe based on optimal resource*

allocation

9:15pm: poster session 1 (odd numbers) +drinks

Tuesday 16: [Chairs: O.Gandrillon (morning) ; N. Varoquaux (evening)]

8:30-9:50am: Lecture - **Ramon Grima (Univ Edinburgh, UK)** *Building realistic models of stochastic gene expression*

9:50-10:20am: coffee break

10:20-11:40am: Online Lecture - **Aneta Koseska (CAESAR, Bonn, GE)** *Principles of biochemical computations at criticality*

11:40-12:00am: Short Talk - Mathé Telek (Univ Copenhagen, DK) *Connectivity of the Parameter Region of Multistationarity in Reaction Networks*

12:15am: Lunch

Free afternoon

4:30-6:30pm: Blackboard - **A. Goelzer (INRAE, Jouy-en-Josas, FR)** [Online], **E. Noor (Weizmann Institute Science, IS)**, **H. de Jong (INRIA Grenoble, FR)**, **D. Thieffry (ENS, Paris, FR)** - session 2

7pm: Dinner

8:20-8:30pm: Presentation of the 'Peer community in' initiative by Wolfram Liebermeister

8:30-8:50pm: Short talk – Annia Abtout (ENS, Paris, FR) *Analysis of waveform and amplitude of mouse rod and cone flash responses*

8:50-9:10pm: Short talk – Tatiana Filatova (Univ Edinburgh, UK) *Effects of time-dependent signaling pathways on gene expression and RNA life-cycle; mathematical models and analytical expressions of RNA distributions*

9:15pm: poster session 2 (even numbers) + drinks

Wednesday 17: [Chairs: G. Yvert (morning) ; D. Kahn (evening)]

8:30-9:50am: Lecture - **Anne-Florence Bitbol (EPFL, Lausanne, CH)** *Inferring interaction partners and evolutionary constraints from protein sequences*

9:50-10:20am: coffee break

10:20-11:40am: Online Lecture- **Munehiro Asally (Univ Warwick, UK)** *Electrical signalling in bacteria*

11:40-12:00am: Short talk - Miquel Anglada-Girotto (CRG, Barcelona, SP) *Repurposing cancer dependencies for systematic prioritization of splicing targets to treat cancer*

12:15am: Lunch

Free afternoon

2-3pm: extra session organized by W. Liebermeister & E. Noor on a book project on computational systems biology

4:30-6:30pm: Blackboard - **W. Liebermeister (INRAE, Jouy-en-Josas, FR), A. Weisse (Univ Edinburgh, UK), D. Gonze (Univ Libre Bruxelles, BE), F. Nédélec (Univ Cambridge, UK)** – session 1

7pm: Dinner

8:30-9:50pm: Online lecture - **Hyun Youk (Univ Massachussets Med School, USA)** *At the cusp of life: Single-cell studies of bi-directional transitions between life and “death”*

9:55pm: drinks at poster

Thursday 18: [Chair: H. de Jong (morning)]

8:30-9:50am: Online Lecture - **Marija Cvijovic (Univ Gothenburg, SW)** *Understand ageing in unicellular organisms: a systems biology approach*

9:50-10:20am: coffee break

10:20-10:40am: Short talk – Fabien Duvéau (ENS de Lyon, FR) *Mutational sources of regulatory variation in *Saccharomyces cerevisiae**

10:40-12:00am: Lecture - **Martin Howard (John Innes Center, UK)** *Dissecting epigenetic switching and memory using mathematical modelling and experiments*

12:15am: Lunch

Free afternoon

4:30-6:30pm: Blackboard - **W. Liebermeister (INRAE, Jouy-en-Josas, FR), A. Weisse (Univ Edinburgh, UK), D. Gonze (Univ Libre Bruxelles, BE), F. Nédélec (Univ Cambridge, UK)** – session 2

6:40-7pm: Short talk – Théotime Grohens (INSA Lyon, FR) *The Transcription-Supercoiling Coupling Plays an Important Role in the Evolution of Genome Structure*

7:30pm: Gala dinner + cocktail

Friday 19: [Chair: D. Jost (morning)]

8:30-9:50am: Lecture - **Ala Trusina (Niels Bohr Institute, DK)** *Bridging cell polarities with development of robust morphologies*

9:50-10:10am: Short talk – Vojtech Kumpost (Karlsruhe Inst Tech, GE) *Molecular noise facilitates population synchronization of uncoupled cellular oscillators to external signals*

11am: departure of the shuttle bus to Lyon St Ex via Modane + Taxis to Modane

2:30pm: departure of taxis to Modane

Blackboard

Monday/Tuesday

With Anne Goelzer, *Computing resource allocation of the cell*

Anglada-Girotto	de Pins	Mathé-Hubert	Pavlou	Shachar
Bougueon	Greenspoon	Milshtein	Sangster	
Clavier	Grosse-Holz	Pahl	Schnitzer	

With Elad Noor, *The laws of thermodynamics: applications in models of metabolism*

Abitbol	Lakrisenko	Öcal	Sequeiros-Ferreiro	Topno
Arpin	Lepetit	Orlova	Skates	
Genthon	Mercadal	Persson	Spinicci	
Grigaitis	Morvan	Reginato	Telek	

With Hidde de Jong, *Dynamic models integrating metabolism and gene expression*

About	Chabrier	Duveau	Kastylevsky	Segretain
Arcila-Galvis	Connolley	Filatova	Kumpost	Sukys
Basini	D'Asaro	Gascon	Moro	Wouters
Cancino	Dobranici	Grohens	Nahali	Zhu

With Denis Thieffry, *Qualitative dynamical modeling of cellular networks*

Abdulla	Di Pietro	Golan	Koehler	Mei
Braichenko	Dufour	Headley	Lemaire	Sender
Casajus	Dursoniah	Iakovliev	Lieb	Weissbart
Cortes Garcia	Duguet	Knaiir Al Douaihy	Quesnel	

Wednesday/Thursday

With Wolfram Liebermeister, *Enzyme economy in metabolic models*

Arpin	de Pins	Lakrisenko	Öcal	Sangster
Bougueon	Dufour	Mathé-Hubert	Orlova	Shachar
Cancino	Genthon	Milshtein	Pavlou	Spinicci
Clavier	Grigaitis	Moro	Persson	Wouters

With Didier Gonze, *Multistability, bifurcation, and differentiation*

Abdulla	Chabrier	Golan	Mei	Zhu
Arcila-Galvis	Cortes Garcia	Grosse-Holz	Sequeiros-Ferreiro	
Basini	Di Pietro	Koehler	Sukys	
Braichenko	Dobranici	Lemaire	Telek	
Casajus	Dursoniah	Quesnel	Topno	

With François Nédélec, *Simulation of intracellular mechanics*

Abitbol	Gascon	Lepetit	Reginato	Weissbart
Connolley	Grohens	Lieb	Segretain	
D'Asaro	Headley	Nahali	Skates	

With Andrea Weisse, *Modeling cellular growth*

About	Duveau	Iakovliev	Kumpost	Pahl
Anglada Girotto	Filatova	Kastylevsky	Mercadal	Schnitzer
Duguet	Greenspoon	Knaiir Al Douaihy	Morvan	Sender

Posters

1. Abdulla *Probing epigenetic memory using chromatin state dynamical model*
2. Abtout *Analysis of waveform and amplitude of mouse rod and cone flash responses*
3. Anglada-Girotto *Repurposing cancer dependencies for systematic prioritization of splicing targets to treat cancer*
4. Arcila-Davis *Are microbes hidden influencers? Unravelling the epigenomic network of host-microbe interactions*
5. Basini *Landscape modelling approaches in developmental biology*
6. Bougueon *A Kappa model for hepatic stellate cells activation by TGFB1*
7. Braichenko *Distinguishing between models of mammalian gene expression: telegraph-like models versus mechanistic models*
8. Casajus *Signaling Dynamics in the Notch Pathway*
9. Connolley *The quantitative basis for the redistribution of immobile bacterial lipoproteins to division septa*
10. Cortes Garcia *Dynamics for conjugation efficiency in Bacillus Subtilis bacteria*
11. D'Asaro *Polymer modelling to describe the coupling between DNA Replication and 3D chromosome organization*
12. Di Pietro *Modelling of a regulatory network controlling the fruit-fly's head development*
13. De Pins *RuBisCOlympics: searching for the fastest RuBisCO in the biosphere*
14. Dobranici *Epigenetic changes associated with human adipose-derived stem cells' neuronal differentiation on magnetic scaffolds*
15. Dufour *Early response of individual cells to a specific gene loss (or gain)*
16. Dursoniah *Limits of a Glucose-Insulin Model to Investigate Intestinal Absorption in Type 2 Diabetes*
17. Duveau *Mutational sources of regulatory variation in Saccharomyces cerevisiae*
18. Filatova *Effects of time-dependent signaling pathways on gene expression and RNA life-cycle; mathematical models and analytical expressions of RNA distributions*
19. Gascon *A mechanical hotspot for the cell plate insertion, near an adjacent tricellular junction*
20. Genthon *Thermodynamics of branching processes with resetting constrains models of cell division*
21. Golan *Metabolism of multiple nutrients*
22. Greenspoon *The Global Biomass of Wild Mammals*
23. Grigaitis *Prediction of metabolic strategies in Schizosaccharomyces pombe based on optimal resource allocation*
24. Grohens *The Transcription-Supercoiling Coupling Plays an Important Role in the Evolution of Genome Structure*
25. Kastylevsky *Tools to study a case of morphological convergence at the molecular level*
26. Knaiir-al-Douaihy *Stochastic Modeling of gene expression in space and time*
27. Kumpost *Molecular noise facilitates population synchronization of uncoupled cellular oscillators to external signals*
28. Lakrisenko *Data-driven mechanistic modelling of N-acetylaspartate metabolism*
29. Lieb *Dynamic single cell analysis of a MAPK signaling cascade and its impact on transcriptional output*
30. Mathé-Hubert *EvoSymbiose, a model for the study of zoonoses evolution*

31. Mercadal *A regulatory circuit controlling stem cell quiescence in Arabidopsis roots*
32. Milshtein *From heterotroph to autotroph: design principles revealed by characterizing lab-evolved E. coli*
33. Nahali *Effect of confinement on the associations of heterochromatin-like crosslinked semi-flexible filaments*
34. Ocal *Accurate Uncertainty Quantification in Stochastic Biological Systems via Synthetic Models*
35. Orlova *How do metabolic networks gain their complexity?*
36. Pahl *Regulatory metabolites buffer perturbations of enzyme levels in E. coli metabolism*
37. Pavlou *Insights into bacterial resource allocation in dynamically changing environments using a combination of experimental and mathematical approaches*
38. Persson *Scalable and exible inference framework for stochastic dynamic single-cell models*
39. Quesnel *Using DamID to study 3D epigenetic regulation*
40. Reginato *Modelling and inference of cell division dynamics with application to stochastic gene expression*
41. Sangster *Development, characterization and control of E.coli communities on an automated experimental platform*
42. Schnitzer *Integrated model of yeast metabolism and replicative ageing reveals importance of metabolic phases during ageing*
43. Segretain *Exploring the ways organisms evolve. Artificial life simulation with Sign Boolean Networks*
44. Sender *The distribution of cellular turnover in the human body*
45. SequeirosFerrero *Optimization-based automated design of biocircuits in presence of molecular noise*
46. Skates *Thioflavin T indicates membrane potential in mammalian cells and can affect it in a blue light dependent manner*
47. Spinicci *Computational and mathematical approaches to understand cancer cells metabolism reprogramming and consequences for therapeutic optimization*
48. Telek *Connectivity of the Parameter Region of Multistationarity in Reaction Networks*
49. Topno *Extrinsic and intrinsic transcriptional noise in the control of HIV-1 latency*
50. Wouters *The Yeast Metabolic Cycle, heterogeneous gene expression within synchronized cultures*
51. Zhu *Studying variant U1 snRNA's role in recursive splicing with RNAseq*
52. Koehler *Quantitative evaluation of models of bacterial spatial organization*
53. Gross-Holz *Bayesian Inference of Chromatin Looping*
54. Shachar *Increasing CO2 consumption in E. coli through a functional carbon concentrating mechanism*
55. Weissbart *Cellular organization in the Arabidopsis leaf epidermis*

List of Participants

Name	First Name	Affiliation
Abdulla	Amith Zafal	ENS de Lyon
Abitbol-Spangaro	Jeanne	ENS Lyon - CNRS
Abtout	Annia	ENS Paris
Aneta	Koseska	caesar - an associate of the Max Planck Society
Anglada Girotto	Miquel	Centre for Genomic Regulation CRG
Arcila-Galvis	Juliana Estefania	Newcastle University
Arpin	Christophe	LBMC, ENS de Lyon
Bitbol	Anne-Florence	Ecole Polytechnique Federale de Lausanne EPFL
Braichenko	Svitlana	University of Edinburgh
Cancino	Ignacia	INRIA
Casajus	Sergio	Universitat de Barcelona
Christian Camilo	Cortes Garcia	Centro Nacional de Biotecnologia
Chabrier	Lisa	INRIA
Clavier	Thibault	INRIA
Connolley	Lara	Max Planck Institute for Terrestrial Microbiology
Crombach	Anton	Inria
Cvijovic	Marija	Chalmers Univ Tech. & Univ Gothenburg
D Asaro	Dario	LBMC - ENS de Lyon - CNRS
de Jong	Hidde	Inria
De Pins	Benoit	Weizmann Institute of Science
Di Pietro	Lucas	Institut Curie
Dobranici	Alexandra-Elena	University of Bucharest Faculty of Biology
Dufour	Alice	LBMC, CNRS, ENS de Lyon
Duguet	Landry	RDP, ENS de Lyon
Dursoniah	Danilo	CRISAL University of Lille
Duveau	Fabien	LBMC, CNRS, ENS de Lyon
Filatova	Tatiana	University of Edinburgh
Gandrillon	Olivier	LBMC, CNRS, ENS de Lyon
Gascon	Elsa	RDP, ENS de Lyon
Genthon	Arthur	ESPCI
Golan	Ohad	ETH Zurich
Gonze	Didier	Université Libre de Bruxelles
Greenspoon	Lior	Weizmann Institute of Science
Grigaitis	Pranas	Vrije Universiteit Amsterdam
Grima	Ramon	University of Edinburgh
Grohens	Théotime	INSA Lyon
Grosse-Holz	Simon	MIT
Howard	Martin	John Innes Centre
Iakovliev	Andrii	University of Edinburgh
Jonsson	Henrik	University of Cambridge
Josep	Mercadal	Universitat de Barcelona

Jost	Daniel	LBMC, CNRS, ENS de Lyon
Kahn	Daniel	INRAE
Kastylevsky	Timothée	LBMC ENS de Lyon
Knair al douaihy	Maria	IGMM/CNRS
Köhler	Robin	Max Planck institute for terrestrial microbiology
Kumpost	Vojtech	Karlsruhe Institute of Technology
Lakrisenko	Polina	Helmholtz Zentrum Munich
Lemaire	Sébastien	Institut Curie
Lepetit	Maxime	LBMC, ENS de Lyon
Lieb	Guillaume	Université de Lausanne
Liebermeister	Wolfram	INRAE
Louis	Headley	The University of Edinburgh
Mathé-Hubert	Hugo	CNRS
Matthieu	Bougueon	Inserm
Mei	Taoyu	University of Cologne
Milshtein	Eliya	Weizmann Institute of Science
Moro	Francesco	Vrije Universiteit Amsterdam
Morvan	Micks	EPHE / INSERM
Nahali	Negar	UiO, Denmark
Nedelec	François	Cambridge University
Noor	Elad	Weizmann Institute of Science
Öcal	Kaan	University of Edinburgh
Orlova	Yuliia	University of Amsterdam
Pahl	Vanessa	University Tübingen Cluster of Excellence CMFI
Pavlou	Antrea	INRIA
Persson	Sebastian	University of Gothenburg
Reginato	Emrys	INRIA
Sangster	Maaïke	INRIA Montbonnot
Schnitzer	Barbara	University of Gothenburg
Segretain	Rémi	Université Grenoble Alpes
Sender	Ron	Weizmann Institute of Science
Sequeiros Ferreiro	Carlos Xosé	Spanish National Research Council CSIC
Shachar	Lior	Weizmann Institute of Science
Skates	Emily	University of Warwick
Spinicci	Kévin	TIMC, Grenoble
Sukys	Augustinas	The University of Edinburgh / The Alan Turing Institute
Telek	Máté László	University of Copenhagen
Thieffry	Denis	Ecole Normale Supérieure, Paris
Topno	Rachel	Institute of human genetics
Trusina	Ala	University of Copenhagen
Varoquaux	Nelle	TIMC, Grenoble
Verd	Berta	University of oxford
Weissbart	Gauthier	Max-Planck-Institute for Plant Breeding research
Weisse	Andrea	University of Edinburgh
Wouters	Meredith	Department of Biochemistry University of Oxford
Zhu	Yajie	UMG University of Göttingen