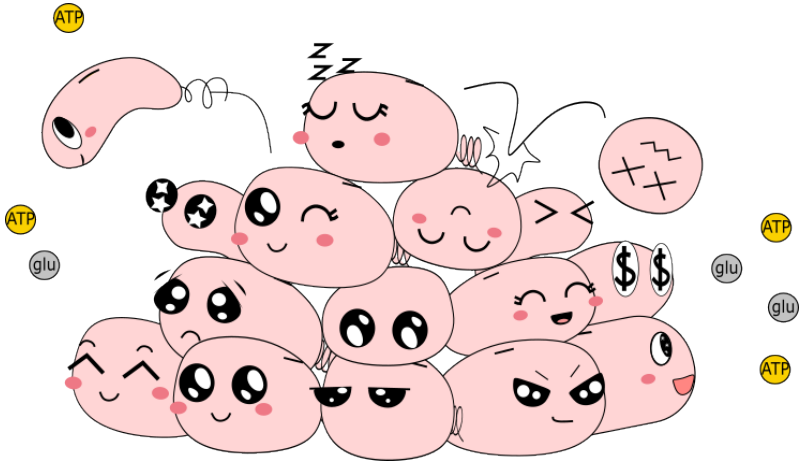
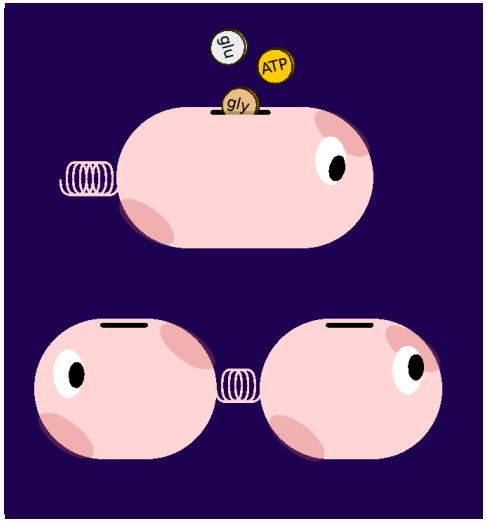
# Welcome to our summer school!



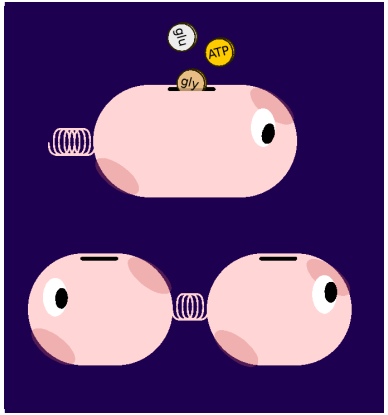
# Community activities around “Economic Principles in Cell Biology”




https://principlescellphysiology.org

# Zoom seminar “Forum Economic Principles in Cell Physiology”

The forum “Economic Principles in Cell Physiology” is a place for discussions in cell biology and mathematical modelling, organized by an open group of researchers.




We meet each month to discuss fundamental questions in our field.
**Dates:** 1st Thursday of each month

Our group is open to researchers at any stage of their career.
Students, junior faculty, advanced researchers: please feel free and welcome to join!

https://principlescellphysiology.org

# Open-access textbook “Economic Principles in Cell Biology”

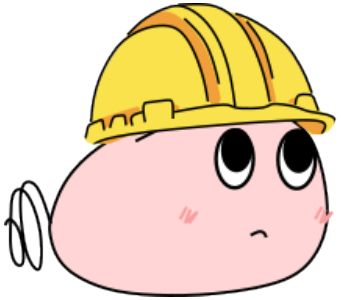
**The project: a collaborative open-access textbook**

A book for students and researchers on the economics of cells

An open resource for learning and teaching, written by the community

Writing started in 2021, currently more than 50 authors

We release an updated version (as pdf) every 3 months



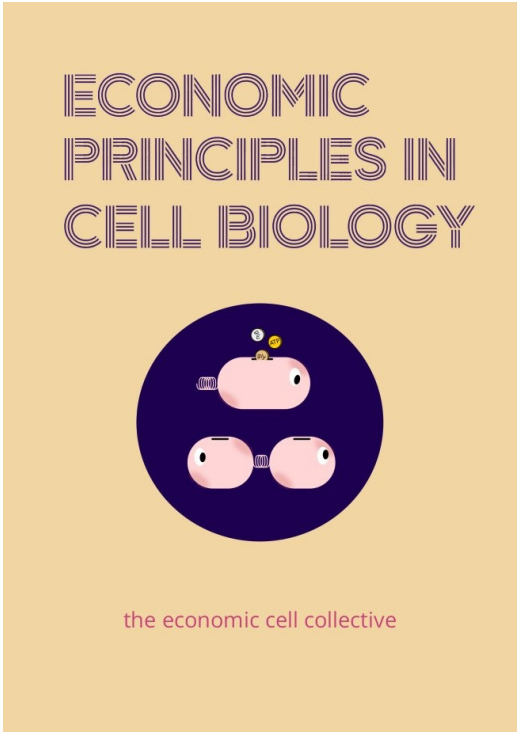
**Your contribution**

Use the book and give us your feedback!

To contribute (for example, by writing, reviewing, or graphic design), please get in touch anytime!

https://principlescellphysiology.org/book-economic-principles/

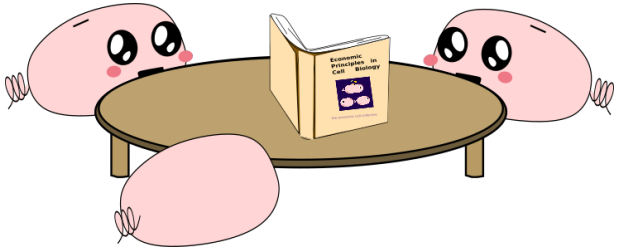
# Book edition July 2025



# Online resources

(1) Textbook, with chapters accompanied by

- Lecture slides
- Lecture recordings
- Jupyter notebooks

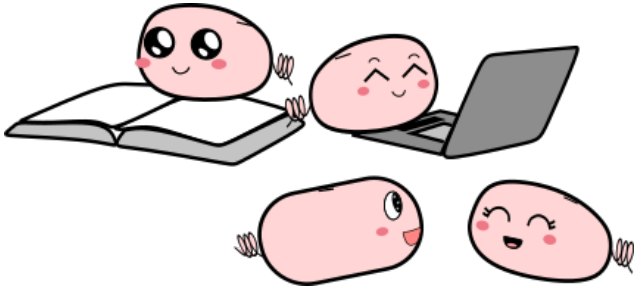


(2) Collection of teaching materials on Systems Biology

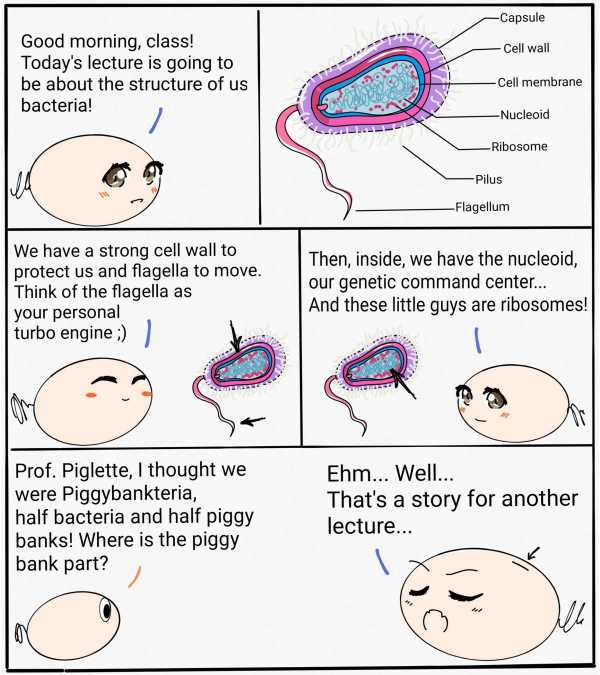
(3) Forum video recordings (upon request)

https://principlescellphysiology.org

# Young scholars group



# The summer school




An occasion to meet, learn, and talk!

An occasion for us to get feedback and improve our book!

This time, for the first time:
Practical computer exercises with Jupyter notebooks!

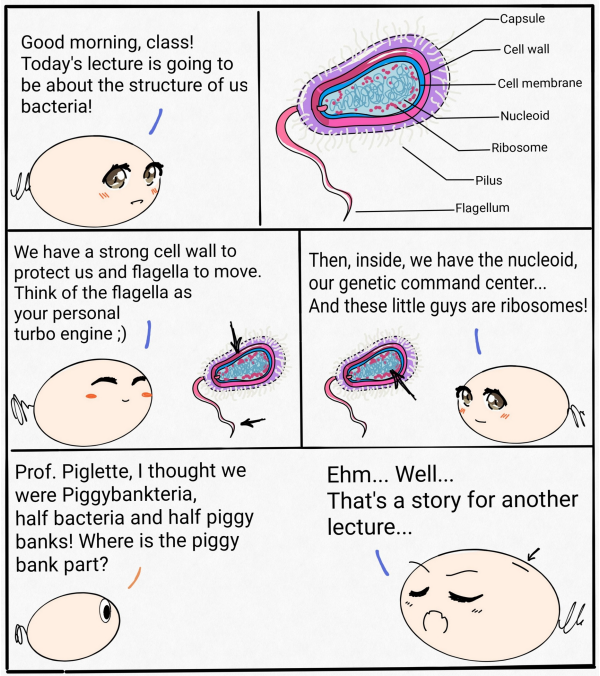
We are generously supported by:

cecam Centre Européen de Calcul Atomique et Moléculaire

universität wien

Département MathNum

# Summer school lectures




**Day 1: Basics**

- The economy of the cell
- An inventory of cell components
- Cell metabolism

**Day 2: Metabolic models**

- Optimization of metabolic fluxes
- The enzyme cost of metabolic fluxes
- Optimization of metabolic states

**Day 3: Cell models**

- Principles of cell growth
- Growth balance analysis
- Modeling of microbial communities

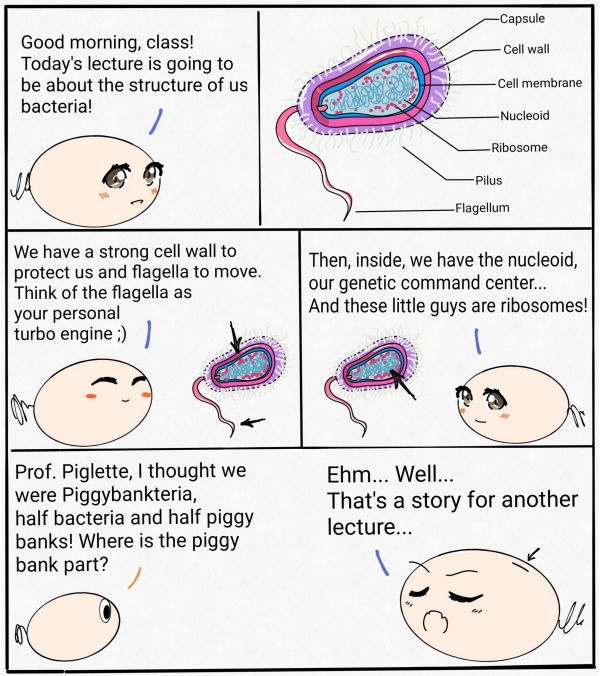
**Day 4: Advanced topics**

- Optimal cell behavior in time
- Diversity of metabolic flux distributions
- Economy of organ form and function

**Practical sessions**

- Introduction to Python & Jupyter
- Flux Balance Analysis
- Elementary Flux Modes
- Optimal enzyme profiles
- Optimal metabolic states
- Self-replicating cells
- Flux variability and entropy
- Dynamic Flux Balance Analysis

# Summer school teachers




**Teachers / authors present in Vienna**

Diana Széliová, Universität Wien
Elad Noor, Weizmann Institute of Science
Felipe Scott, Universidad de los Andes
Hidde de Jong, INRIA
Hollie J. Hindley, University of Edinburgh
Hugo Dourado, HHU Düsseldorf
Marcelo Rivas Astroza, UTEM Chile
Markus Köbis, NTNU Trondheim
Meike Wortel, Universiteit van Amsterdam
Michael Predl, Universität Wien
Michela Pauletti, Universitätsklinikum Würzburg
Pranas Grigaitis, Vrije Universiteit Amsterdam
Roberto Mulet, Universidad de La Habana
Stefan Müller, Universität Wien
Steffen Waldherr, Universität Wien

**Teachers online**

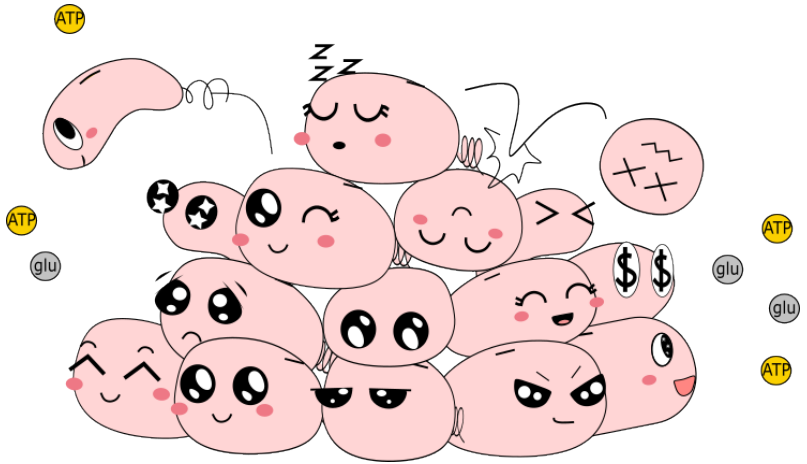
Wolfram Liebermeister, INRAE
Martin Lercher, HHU Düsseldorf
Frédérique Noël, Sorbonne Université

# Join our community!

Join us for the Forum meetings!

Join us for writing the book!

Let’s build a community!

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