

PhD in Computational Physical Chemistry applied to biomolecular systems (Barcelona)

Is it possible to predict how the biochemistry of organisms unable to regulate their body temperature respond to environmental temperature changes? Day/Night, Summer/Winter, and now global climate change... what are the possible paths for the complex chemistry of life to robustly adapt and thrive?

The group of Oriol Gallego opens a 4-year PhD position to investigate the physical principles underlying the adaptation of molecular systems in cells exposed to variable temperatures. This project aims to understand and to predict the cellular response to thermal changes. **The PhD student will develop computational tools** based on physical modeling, stochastic simulations (Chemical Master Equation), Bayesian statistics... **to unravel the physical principles driving the adaptation of cellular chemistry to environmental temperature.** Theoretical predictions will be compared to experimental measurements, especially quantitative data extracted from live fluorescence microscopy. For this we developed a unique method capable to estimate reaction rates associated to protein function in living cells. **The student will also model protein structures with machine learning tools to hypothesize the underlying molecular mechanisms related to the evolution of new forms of life.** This research could have applications in understanding the impact of climate change in biodiversity, the origin of new species, and industrial processes.

The student will join a group of 9 researchers from 6 different countries, at the frontier between cell biology and physics. With state-of-the-art research facilities, we investigate the principles that rule the spatio-temporal organization of biomolecular systems (Puig-Tintó *et al*, 2026, Cell; Picco *et al*, 2017, Cell).

If you are interested, please send a short cover letter, your CV and the contact details of 2-3 referees to oriol.gallego@upf.edu (please indicate “PhD in Computational Physical Chemistry” in the subject)

Deadline: until the position is filled or end of February 2026

Starting date: Spring-Summer 2026

What we are looking for:

- BSc or MSc in chemistry, physics, math, computer sciences, biotechnology, or related disciplines.
- Expertise in computer programming (Python, R or Matlab) is required.
- Expertise in at least one of the following: computational chemistry, data modelling or computational structural biology, is required.
- Experience in fluorescence imaging and image analysis is a plus but not strictly required.
- Excellent track-record is required ($\geq 8/10$ GPA for Spanish students).