

# PhD in cancer systems biology

In many patients, anti-cancer therapy struggles with resistance and metastases. To address these, treatments aimed at unleashing the immune system against cancer cells are being developed, with encouraging results. But developing such treatments is challenging: not all patients see benefits from immunotherapy and side-effects can be severe.

Developing immuno-therapies is challenging because of the complexity of the immune system. Immunity depends on the interaction between dozens of cell types with multiple phenotypes, controlled by hundreds of molecular signals. In particular, the rules of how molecular signals combine to control immune response is only partially known. Not knowing these rules is a major obstacle to designing effective interventions with limited side-effects.

As a research lab, we aim to identify such rules by combining large-scale cancer data analysis, experiments in mouse cancer models, and theory. Accordingly, we are a team of bioinformaticians, immunologists and theorists. We are based at the Department of Cellular and Molecular Biology at Karolinska Institutet and at SciLifeLab (<https://www.hausserlab.org>) in Stockholm, Sweden.

## Your mission

We are looking for a PhD student to research how signaling molecules control the states of the immune system in tumors, and investigate therapeutic alterations in these signals that could change the state of the immune system, for example from tolerating a tumor to rejecting it.

Through your research, you will learn

- a research approach that combines theory and experiments to find hidden simplicity in biological systems, in this case tumors
- how to perform experiments to characterize the behavior of the immune system in cancer
- how to analyze large biological datasets to find essential patterns in them
- how to develop quantitative theories to explain these patterns

Your responsibilities will also include collaborating with your colleagues in the lab, authoring manuscripts and presenting your findings at conferences, and punctually helping to run the lab.

Upon graduating your PhD, you will have a rare combination of experimental and theoretical skills that will position you favorably for a career in research or in industry (medtech, biotech, pharma).

## Your profile

To qualify, you should have:

- solid quantitative education: multivariable calculus, linear algebra, dynamical systems, basic

physics, ...

- practical experience with data analysis packages (R or python), programming/scripting and the Unix/Linux environment
- university-level education in biology; previous coursework in immunology or physiology will be valued
- while not an absolute requirement, practical experience in the lab, with mouse experiments or cell biology is a plus

In addition, your personal skills will be highly valued.

## We offer

- Exciting science in a lab ideally positioned for you to learn how to do research at the interface between experimental and computational biology, in an area of direct medical relevance.
- A stimulating scientific environment and top research infrastructure. KI is among the world's top medical universities and KI's faculty awards the Nobel Prize in physiology and medicine. SciLifeLab is the Swedish national center for large-scale molecular bioscience, with stimulating researchers and top facilities in-house.
- High life quality. Stockholm consistently tops the rankings of cities with highest quality of life worldwide.

## Application process

Email the following documents to Jean ([jean.hausser@scilifelab.se](mailto:jean.hausser@scilifelab.se)):

- A cover email (1000 words max.) that includes answers to these questions: what course or projects you most enjoyed in your studies so far, and why? If you could choose any topic, what would you like to work on in the future? What research questions have you worked on, what methods have you used to answer these questions, and what have you found?
- A curriculum vitae with a list of publications (if any)
- 3 references (name, institution, email)