

# A Fully Funded PhD Scholarship

## in machine learning and data science

We invite highly motivated candidates to apply for a [fully funded PhD scholarship](#) to join PD. Dr Nazanin Sédille' (<https://www.chuv.ch/fr/laboratoires/dl-home/le-departement-en-bref/unites/service-de-chimie-clinique>) and Professor Oliver Y. Chén's teams ([www.oliverychen.com](http://www.oliverychen.com)). We work on projects related to: (a) building new [machine learning](#) and [statistical methods](#) for studying large-scale biological and medical data; (b) [disease prediction](#); (c) [digital health](#). For this PhD scholarship in particular, please see details below. The student will have joint affiliations with the [Lausanne University Hospital \(CHUV\)](#) and the [University of Lausanne](#).

### I. Contexte: What does our groups do?

We develop new machine-learning and statistical methods and study large-scale data in health and disease. Our data are from diverse sources from the Service of Clinical Chemistry (<https://www.chuv.ch/fr/laboratoires/dl-home/le-departement-en-bref/unites/service-de-chimie-clinique>).

Our focus is threefold. (a) Building new, methodologically exciting [models](#) to address real-world problems; (b) using these methods to (i) study the interplays between [large-scale multimodal, multivariate, high-dimensional](#) features, and when/how they may be associated with [diseases](#) cross-sectionally and longitudinally and (ii) [identify markers](#) that support patient diagnosis and prognosis; (c) translating our algorithms into [clinical decision support](#) and patient health management [apps](#).

### II. Mission

With this full scholarship, the PhD student will primarily work on three interlinked projects in collaboration between CHUV and UNIL on data related to proteomic and metabolomic profilings in immunological and haematological diseases.

1. [Automated biomarker discovery and disease prediction](#). We design machine learning methods to identify biomarkers associated with and predictive of disease outcomes (disease status, disease severity/clinical score, and longitudinal disease progression/fluctuation) in an automated way.
2. [Discovering latent biomarkers to improve disease prediction and biological explanation](#). We design machine learning frameworks to identify, from multivariate, multimodal, and potentially high-dimensional data for latent, potentially nonlinear biomarkers that could better explain and predict the disease. We have data from metabolic diseases but the methods can be generalised to other diseases.
3. [Longitudinal, personalised disease prediction](#). In addition to discovering population-level biomarkers (that are shared across subjects), we design methodological frameworks that incorporate, yet, distinguish, population-level and subject-specific information to capture not only the idiosyncratic information but also inform personalised assessment of individual longitudinal disease profiles. This may also potentially advance personalised medicine. We have data from blood diseases, multiple Myeloma and minimal residual disease; we also have data from wearable devices (digital health). The methods can be generalised to other disease territories. Automated biomarker discovery and disease prediction.

- The students will, if interested, [collaborate](#) with colleagues in other projects within and across teams.
- The students [have the freedom](#) to propose and develop [independent studies](#) within the broader aims of this Scholarship and collaborate with or visit other teams.
- The students will work in an [interdisciplinary](#), [multicultural](#) environment.
- The positions, once filled, may start immediately.

### III. Profile: What are we looking for?

#### Minimum qualifications:

- A [master's degree](#) and an [undergraduate degree](#) in disciplines relevant to (applied) mathematics, computer science, engineering, machine learning, or statistics.
- An interest in developing [new methods](#) and [applications](#) and employing them to address [real-world healthcare-related problems](#).
- An interest in [data visualisation](#).
- A [team player](#).
- The working language of the group is [English](#).

#### Desired qualifications:

- Strong programming skills related to machine learning and longitudinal methods.
- Experience in machine learning, statistical modelling, and version control.

### IV. Nous offrons: What do we offer?

- Full scholarships that cover your [tuition](#) plus an [annual salary](#) (SNF salary scale).
- Joint affiliations with the [Lausanne University Hospital \(CHUV\)](#) and the [University of Lausanne](#).
- An [interdisciplinary](#) environment, and a [supportive](#) team. We strive for [equality](#), [diversity](#), and [inclusion](#). Our team is interdisciplinary and multicultural, and we encourage underrepresented students to apply.
- Possibility to collaborate with and visit [external colleagues](#) at Johns Hopkins University, KU Leuven, University of Bristol, University of Oxford, University of Pennsylvania, Vrije Universiteit Brussel, and Yale University.
- Access to [courses](#) from the CHUV and the University of Lausanne.

### V. Contact et envoi de candidature: How to apply?

Please send PD. Dr. Nazanin Sédille ([nazanin.sedille@chuv.ch](mailto:nazanin.sedille@chuv.ch)) and Professor Oliver Y. Chén ([olivery.chen@chuv.ch](mailto:olivery.chen@chuv.ch)) the following.

1. A motivation letter (no more than one page).
2. A CV.
3. Copies of your undergraduate and master's theses.
4. Contact information for three references.