A Fully Funded PhD Scholarship

in machine learning and federated learning

We invite highly motivated candidates to apply for a fully funded PhD scholarship to join Professor Oliver Y. Chén's team (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; and (d) federated learning. For this PhD scholarship in particular, please see details below. The students will have joint affiliations with the Lausanne University Hospital (CHUV) and the University of Lausanne.

I. Contexte: What does our group 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 brain imaging (*e.g.*, MRI and EEG), sequencing, mass cytometry/spectrometry, and health records, to data from digital devices such as smartphones.

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 projects:

    1. Building better biomarkers for predicting disease onset and severity via federated learning (FL). Inventing new machine learning methods, via a FL network of Electronic Health Record data, to identify clinical variables for early identification of patients with cardiometabolic, infectious, immunological, neurological, and oncological diseases and to predict disease severity.
    2. Integrating sites into a federated learning network. Working as part of a team to establish a new FL network using existing relationships with healthcare providers to ensure best practices for data processing and curation and to equip the sites with new methods and algorithms.
    3. Generalized federated learning (GFL). Leveraging insights from (1) and the infrastructure built via (2) to establish a technical and methodological framework for developing and validating new algorithms.

- The student will have the freedom to propose and develop independent studies or join other projects within the broader aims of this scholarship and collaborate with or visit other teams.
- The students will work in an interdisciplinary, multicultural environment.
- The position, 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 problems.
- An interest in data visualization.
- A team player.
- Proficiency in English.

Desired qualifications:

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

IV. Nous offrons: What do we offer?

- Full scholarships that cover the 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 F. Hoffmann-La Roche, 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 Professor Oliver Y. Chén (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.