



Internship proposal – Machine Learning and Computer Vision

Description

Saber Bio is a young, fast-growing biotech company located in the iPEPS incubator of Paris Brain Institute (ICM). We are a spin off from ESPCI, with more than 10 years of scientific and industrial experience in combining droplet microfluidics, deep single-cell characterization using single-cell droplet microfluidics technologies for high throughput and high content single cell profiling.

We are developing robust single-cell screening instruments, assays, consumables, and software for advancing therapeutics discovery and development. Our platforms will accelerate complex biology understanding, drug discoveries, and enhance accuracy in precision medicine.

Saber Bio has raised so far, several million euros of fundings coming from strategic investors and BPI (winner of prestigious national contest: iLab-2022, Deeptech grant, Aide au Development grant...). The successful candidate under this internship will get the opportunity to be part of a dynamic, multi-discipline fast moving pace environment. S.he will have a unique opportunity to work with our first alpha instruments and provide inputs to the new systems in development.

Our technology

Our team works on development of two benchtop instruments, each offering a complete solution with a unique combination of features:

- **EnSorCell**, an instrument that can encapsulate and sort cells based on their deep phenotype and function. This system integrates kinetics, imaging, and sorting – powering cell line selection, development, and quality control.
- **Ascella**, a modular platform which analyzes millions of single cell functions in a few hours is particularly suited for antibody discovery and T-cell screening. It consists of three modules:
 - o Nebula: Droplet Generator
 - o Comet: Droplet Sorter
 - o Nightsky: Phenotype-Genotype Linker

Required profile.

At Saber Bio we are looking for a motivated and open-minded candidate who is curious to work in a multi-disciplinary environment. He/she shall be interested in developing end-to-end image processing and deep learning (DL) tools for analysis of biology and microscopy images.

Good programming skills in Python and experience in machine learning is mandatory. Experience in any of the following topics is a plus:

- Deep learning frameworks, such as Pytorch or Tensorflow,
- Data and Machine Learning Operations (DataOps, MLOps), data management, machine learning lifecycle, model versioning.
- Web application development and deployment (react, vue, flask).
- Cloud architecture (infrastructure-as-code, database design).

Excellent communication skills in spoken/written English are mandatory.



Objectives

We are interested in developing computer vision tools which will help us to gain deep insights into our single cell droplet assay data. The student will thus work with Saber Bio scientists on the set-up and development of a pipeline to train models and utilize AI models and workflows for image segmentation, object detection and classification.

To achieve those goals, the candidate will work with data acquired using Saber Bio's proprietary droplet microfluidics instruments for single cell encapsulations in microdroplets.

The student will learn how to implement and use state of the art deep learning-based image analysis methods, and how to use cloud resources to deploy such methods. He/she will also learn how to communicate and to work with a multi-disciplinary team (molecular biology, fluidic, optic, software engineers...). The student must be meticulous in documenting experimental data, protocols, and results as per Saber Bio's internal guidelines.

The student shall be willing to interact with colleagues and present results to the team and collaborators.

Missions

- Familiarization with single cell droplet imaging and handling fluorescence microscopy data,
- Review of existing datasets and existing methods (clustering and convolutional neural network) for segmentation and object detection,
- Implementation of data management tools to dynamically gain insights from Saber's existing datasets,
- Deployment and testing of image analysis pipelines (via transfer learning and/or supervised model training)
- Weekly updates and presentations to the engineering and scientific teams. Disclose achievements, propose solutions for next steps, identify backups and blockers.

Useful information

The student will work in the Saber Bio offices and lab spaces, located at the iPEPS startup incubator of Paris Brain Institute (ICM), at La Pitié Salpêtrière hospital, Paris 13. It is a few minutes' walk from the metro Chevaleret (line 6) and Saint-Marcel (line 5).

Like any other Saber Bio employee, the student will benefit from 50% public transportation reimbursement and all necessary IT equipment. Saber Bio provides "Swile" card as well (10 EUR value per working day, 50% paid by the company).

More information on Saber Bio website: www.saber-bio.com

Please send your CV and motivation letter to: HR@saber-bio.com