

Cemosis, University of Strasbourg

7 rue René Descartes
67084 Strasbourg

Research Engineer Job

February 04, 2020

Where: Cemosis, the platform in Mathematics of Strasbourg University, Strasbourg, France

When: April 2020

Salary: 2200/2300 Euros net per month

Profile: The expected profile for the Research Engineer is to have a Ph.D. in preferably Applied Mathematics with a strong background in multiscale multiphysics modeling as well as in numerical simulation and taste for programming. Data processing skills, not necessarily medical data, as well as validation methodology and experience in sensitivity analysis, are expected. Experience in collaboration with multiple disciplines is a plus as well as communication skills.

Cemosis looks for a research engineer in data science for 18 months eventually renewable.

Applications (CV, recommendation and motivation letters) should be sent to

christophe.prudhomme@cemosis.fr.

Partners: U Strasbourg(Cemosis,France), U. Missouri(USA), Mount Sinai(USA), U. de Paris(France), Imperial College(UK) and Politecnico di Milano(Italy).

Context

Cemosis (<http://www.cemosis.fr>) is the Center for Modeling and Simulation at the University of Strasbourg. Composed of twenty people, it consists of a project center, a training center, and a software center. Its aim is to bring together not only Strasbourg's applied mathematics skills but also to collaborate with mechanics, engineers, physicists, biologists and doctors to offer a portal (unique at term) to interdisciplinary collaborations and companies in the Alsace region in modeling, simulation, and optimization.

In this context, Cemosis is part of an international effort to develop an Ocular Mathematical Virtual Simulator to help biomathematical modelers and clinicians in following-up and compare patients in clinical research.

Nowadays the interest in mathematical models applied to biomedical problems has greatly increased; in particular, the need for a better understanding and knowledge of quantities in the medical context has raised exponentially the complexity of mathematics that is employed for the description of such physical systems.

Thanks to its special connection to the brain and its accessibility to measurements, the eye provides a unique window on the brain, thereby offering non-invasive access to a large set of potential biomarkers that might help in the early diagnosis and clinical care of Neuro-Degenerative Diseases.

This project aims at developing a reliable and efficient computational framework(OMVS) to simulate and predict the functioning and the connection between the eye and the brain.

The ocular contribution is devoted to implementing the tissue perfusion, the biomechanics and the fluid dynamics within the eye. These three different aspects of the same physical problem have to be properly connected and every step has to be verified and validated in the interest of a medical application.

Missions

Develop the Ocular Mathematical Virtual Simulator(OMVS) as a product that can be used by clinical technicians and ophthalmologists and participate in the research group working on the OMVS.

Activities

- Develop the computational framework
- Add and improve mathematical models
- Work on sensitivity analysis and validation within the medical context
- Participate in the development of the business plan
- Writing of project reports in French and/or in English
- Coordinate the activities of the group and the partners

Skills

Knowledge in the professional environment:

- The organization of research at the national and international level
- Knowledge of the organization and operation of a large university
- The scientific and technological fields of the University of Strasbourg
- Knowledge of the regulation of contracts and data protection.

Operational know-how:

- Understanding mathematical modeling in Health
- Expertise in solving partial differential equations, in particular, using the finite element method, knowledge in the HDG methods is a big plus
- Understanding multiscale coupling either spatially e.g. 3D-0D or in time using time splitting methods

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- Data processing and analysis
- Mastery of programming languages such as Python, C / C ++
- Mastery of mathematical tools in linear algebra, analysis, optimization
- Software engineering skills
- Knowing dialogue with management, scientific leaders and customers more generally, analyze their needs
- Knowledge to communicate and demonstrate pedagogy
- Working in interaction with users and a chargé d'affaires
- Essential editorial skills.

Behavioral know-how:

- Ability to adapt, negotiate and dialogue
- Establish dynamic relations
- Autonomy in actions
- Spirit, openness, and listening
- Mastery of collaborative work and associated tools as well as the sense of organization, rigor, and method.

Language skills:

- English: fluency in writing and oral