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Post-doctorate in immersive scientific visualization of membrane proteins and their assemblies. (M/F)

Project description

The LBT has developed original tools for visualization and analysis of protein structures, ported to advanced environments such as virtual reality headsets and display walls. This project aims to apply and improve the Unitymol approach to the study of membrane proteins and their assemblies. In particular, we plan to provide broader support for the variety of structural data available today, especially for cryo-EM datasets, and to partner with the company PaleBlue and Prof. Lutz Eichacker at the University of Stavanger, Norway, to apply additional components of innovative and immersive drug discovery tools to membrane proteins of interest.

Supervision: Marc Baaden baaden@smplinux.de and Antoine Taly, taly@ibpc.fr

Collaborations : [PaleBlue company, Norway](#) and Prof. Lutz Eichacker at the University of Stavanger, Norway

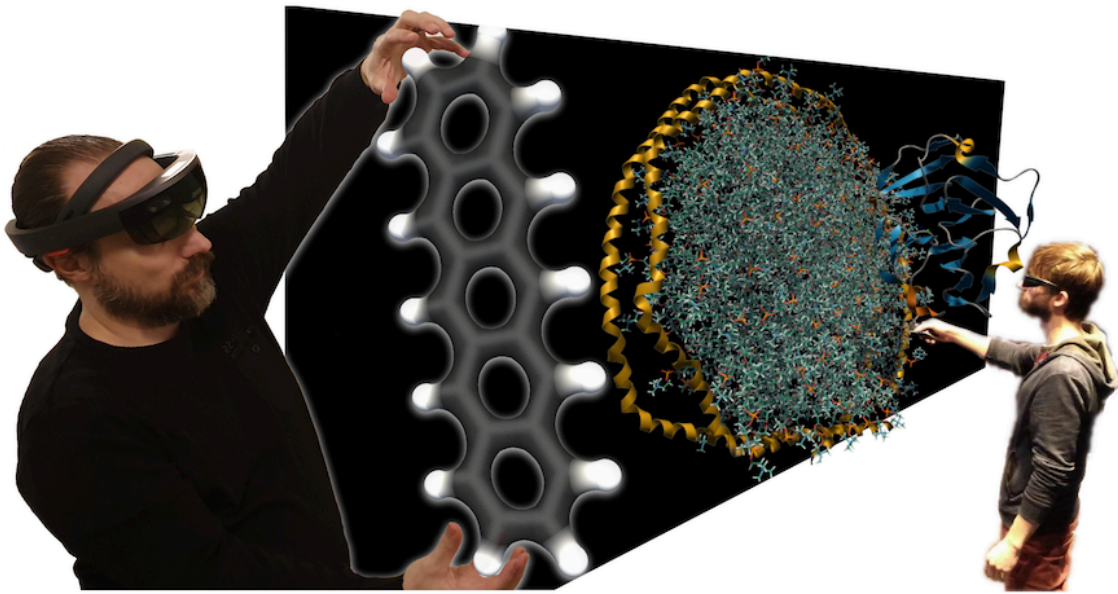
Some literature references linked to the project:

[1] Lv et al., PLOS One (2013), 8(3): e57990 [PDF VERSION](#)

[2] Taly, Expert Opin Drug Discov (2013), 8, 1285-1296

[3] Brandner, et al. Mitochondrion (2019), 49, 234-244. Esmenjaud, et al. (2019). The EMBO journal, 38(2), e99894.

[4] Martinez & Baaden, Acta Cryst D (2021), D77, 746-754 [PDF VERSION](#)



Activities

- Development of ideas and prototypes for the immersive study of membrane proteins and their assemblies
- Development and implementation of this application in the UnityMol project, based on the Unity3D game engine.
- Application of the developed tool to concrete biological cases of membrane proteins using the virtual reality material and the existing 3D image wall.
- write scientific articles for international peer-reviewed journals

Skills knowledge:

- General knowledge of the combination of computer science and biology (bioinformatics, biophysics or chemistry).
- In-depth knowledge of molecular modeling and / or scientific / molecular visualization.
- Proficiency in scientific English (reading and writing)
- Basic knowledge of virtual reality
- Experience with game engines and similar development environments is an advantage
- Knowledge in the field of membrane systems is an advantage

know-how

- Design and implementation of scientific software.
- Software programming and technical skills to manage developments well (tools like git, doxygen,...).
- Information analysis and retrieval skills (keeping a lab notebook, preparing results tables, preparing oral presentations).
- Preparation of articles for publication in international peer-reviewed journals.

skills

- work in a team, especially in multi-laboratory collaboration
- organise and plan your work independently;
- present results in the form of clear and detailed scientific reports.

Context Most of the work will be carried out in the laboratory of Theoretical Biochemistry, a UPR 9080 unit of the CNRS led by Marc Baaden at the Institute of Physical-Chimic Biology in Paris, with regular exchanges with our Norwegian partners, including extended stays. Just over 29 people, including 15 statutory members, work in this laboratory, which is located in the heart of Latin Quarter. The project is led by Marc Baaden and Antoine Taly. The dual academic and industrial aspects are discussed. High quality material (virtual reality helmets, advanced display walls,...) will be provided. The work will be carried out in a multidisciplinary team.

The COFUND FP-DYNAMO-PARIS programme offers a unique interdisciplinary environment and a fundamental research initiative in the centre of Paris to train the scientists of tomorrow in the field of physico-chemical biology. The goal of the research programme is to integrate knowledge on gene expression, structural and membrane biology, and bioenergetics in bacteria, chloroplasts and mitochondria in the general context of improving our understanding the biogenesis of energy-transducing membranes. These studies will involve cutting-edge technologies including structural biology (NMR, X-ray crystallography and CryoEM), RNA sequencing, mass-spectrometry, synthetic biology, microfluidics, computational modelling and visualization. Post-doctoral fellows will have the opportunity of developing their research projects in a dynamic scientific environment covering three main research themes: i) RNA biology from bacteria to chloroplasts, ii) Membrane system dynamics and iii) computational modelling of molecular assemblies. They will benefit from the supervision of internationally-recognised experts in their fields, a world-wide network of renowned institutions, cutting-edge research infrastructure and state-of-the-art technical know-how that will allow them to hone their scientific skills, make themselves known and increase their competitiveness on the labour market. Specific training will be proposed to ERs through attendance of the EMBO course on “Laboratory Leadership for Postdocs” included in a retreat in Padua, and involvement in dedicated complementary soft skill training events

Constraints: The contract must start between 1 January 2022 and 31 May.

Salary Gross salary will vary with candidate's experience starting at 3106€/month before taxes (around 2500€ after taxes) for candidate with less than 2 years post-doctoral experience. See the official CNRS salary table for researcher at <http://labexdynamo.ibpc.fr/fp-dynamo-paris/>

Additional informationThe application should be written in English and uploaded at <https://emploi.cnrs.fr/>. It should include a detailed CV, a minimum of two letters of reference, a letter of motivation describing your short and long term career objectives, and a signed declaration stating that you are in compliance with the mobility rule which stipulates that you have not resided or carried out your main activity (work or studies) in France for more than 12 months during the three years preceding the date of recruitment. In addition, the complete file must also be sent to Bruno MIROUX & Magdalena TORTYNA, respectively director and manager of the project at the following email address DYNAMOcofund@ibpc.fr (Tel: 33 1 58 41 50 64). See details on the website <http://labexdynamo.ibpc.fr/fp-dynamo-paris/> The position is intended as an initial step in a research career, and the assessment of the applicants will primarily be based on their research qualifications and their potential as researchers with skills that complement and strengthen on-going research within the partner institutions. Step 1. The applications of each eligible candidate will be evaluated by independent international experts within the relevant research theme. Eligible applicants will be evaluated based on merits, motivation for the program, academic excellence and personal qualifications such as collaborative and communication skills. Step 2. A maximum of three candidates will be retained for a video interview with the independent experts for each open position (Nov 2021). After the interview, candidates on the short list will be invited to a conference call with the project supervisor and a DYNAMO board member to define the general scope of the project, the training and the research environment. Candidates will be asked to draft a 3-page project proposal, bringing their own original ideas and will be given 2 weeks to submit it. Step 3. Each project proposal will be evaluated by one of the independent experts and the DYNAMO board member who evaluated the candidate in the previous steps. The final selection will be made based on the scores obtained at steps 1, 2 and 3. The minimum score must be above 20/40. Top candidate will be offered the postdoc position with a starting date from January 1- May 31, 2022.

The CNRS (Centre National de la Recherche Scientifique) is an equal opportunity employer. Furthermore, FP-DYNAMO-PARIS is committed to promoting the role of women in science and thus explicitly encourages women to apply.

Research facilities: This LBT CNRS research unit is located in central Paris and conducts research on scientific visualization and computational biology. LBT participates in Equipex and Labex excellence in science programs. As part of the **CACSICE Equipex**, the candidate will have access to a **large high-resolution display wall**.

About the host institute: The "Institut de Biologie Physico-Chimique" was created in 1930 by the Foundation Edmond de Rothschild. It is associated with the **CNRS** (Centre National

de la Recherche Scientifique), a leading international scientific institution offering an exceptional environment to scientists early in their career, with a dynamic international exposure animated by regular seminars and meetings.

Qualification and experience: A PhD or engineer degree in relevant fields (Computer Science, Visualization, Biophysics/Bioinformatics,..) and at least one publication in a peer reviewed journal or at a leading conference are required. The successful applicant should have excellent developer skills and a strong background in software development (graphics, shader programming, real time applications) with significant experience either in 3D visualization or in modelling, animation or game design software (Unity, Blender, Unreal). The candidate should also be familiar with at least one modern programming language. Evidence of the ability to undertake advanced software development is essential, as are good communication and organizational skills.

Executive summary:

When? 18 months starting ASAP

Where? Laboratoire de Biochimie Théorique, Paris, France.

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Team Leader: Marc Baaden - Follow @baam93 -  [View Marc Baaden's profile](#)

HOW TO APPLY? go through the CNRS employment portal using the following link: <https://bit.ly/2XqL9qh>

Websites:

- <http://www.baaden.ibpc.fr>
- <http://unitymol.sourceforge.net>