



**POLITECNICO
DI TORINO**



POST-DOC OPENING: Modeling of soap-film based membranes for artificial photosynthesis



"Ievgenii Biletskyi© 123RF.com"

Intro: Applications are welcome for one postdoc position at the Department of Energy (DENERG) of Politecnico di Torino (Turin, Italy - www.polito.it) on Modeling of soap-film based membranes for artificial photosynthesis. The fellowship stems from an exciting interdisciplinary research project (Soap Film based Artificial Photosynthesis - SoFiA supported by a recently funded European H2020-FETOPEN grant). SoFiA proponents aim at introducing a radically new technology for renewable solar fuel production, relying upon the unique self-assembling property of surfactants, and proton transport in soap films. Here, it is introduced and investigated the new concept of economic artificial photosynthetic membrane in the form of stable soap film with engineered photocatalytic surfaces. More specifically, the selected candidate for the present position will work with Prof. Eliodoro Chiavazzo and other members of the multi-Scale ModeLing Laboratory - SMaLL (www.polito.it/small). The fellowship has a duration of one year, and it can be extended one year more upon a positive review of the research activities carried out during the first year.

Requested activities: The successful candidate will focus on computational and theoretical investigation of the following phenomena:

- Heat and mass transport of species within the water core of engineered soap films;
- Sorption/desorption of gases at the gas/water interface in soap films;
- Effective chemical kinetics leading to fuel production at the interface of engineered soap films.

The successful candidate will mostly perform numerical simulations thus setting up a multi-physics model including all the above phenomena. The numerical model needs to be fine-tuned for interpreting and supporting the experimental results obtained by other partners of the SoFiA research project. If necessary, the proposed numerical activity will be complemented by “ad-hoc” molecular dynamics simulations (performed with the help of other expert members in the lab or other project partners) for estimating possibly missing information at the micro-scale (e.g. transport coefficients) to be included into the multi-physics model.

Requested skills: The candidate is expected to have successfully terminated relevant doctoral studies in Engineering, Chemistry or Physics. Proficiency in high-level programming language (e.g. Matlab, Python) and thermodynamics is requested. The candidate is expected to have significant experience on modeling, especially on transport phenomena in the presence of reacting species. We do expect a strong will and attitude to collaborate and interact with experimentalists as well as with experts on atomistic simulations. Previous experience with multi-physics simulations (e.g. by COMSOL Multiphysics) is highly desirable, whereas previous experience on classical molecular dynamics simulations (e.g. by means of GROMACS, LAMMPS), good understanding of condensed matter physics and High-Performing Computing will be a plus. Preferential communication language will be English.

How to apply: If the above description matches your expertise and you are dreaming on being part of an international, truly interdisciplinary and vibrant team committed to next generation renewable energy technology, we strongly encourage you to apply for this position. Applications will be reviewed on a rolling basis until **30 January 2019**, and we will keep on with selection until the position is filled. Eligible candidates will be timely contacted for an online interview. Applications (and inquiries) must be sent to **Eliodoro Chiavazzo** (e-mail address: eliodoro.chiavazzo@polito.it), and must include:

1. **Academic CV** with all relevant scientific publications and experience;
2. 1-page **motivation letter**;
3. Up to three **reference letters**.

E-mails must have “SoFiA post-doc position” as **e-mail subject**. Salary is to be decided depending on the experience level.