

Postdoctoral Position
Protein Biochemistry / Protein Biophysics
at the single molecule level



The Institut Fresnel is a research state laboratory based in Marseille / France, devoted to research and higher education. Institut Fresnel is seeking to recruit talented, enthusiastic young scientists who are highly motivated to boost their research career in the areas of nanosciences, biophysics, and related technologies.

Motivation

The successful candidate will be part of the ERC Consolidator Grant project “TryptoBoost” carried out at the Institut Fresnel under the supervision of Jérôme Wenger. Our group has acquired a wide expertise in the nanoscale control of light fields in plasmonic nanostructures and its application to enhance fluorescence spectroscopy applications including FCS and FRET [1-6].

Our next project aims at efficiently monitoring single proteins using their intrinsic tryptophan fluorescence enhanced by optical nanoantennas in the ultraviolet. Using the natural amino acid fluorescence rules out all drawbacks due to external labelling, while the optical nanoantennas enable single label-free protein analysis at the physiologically relevant micromolar concentrations thanks to the localization and enhancement of light-matter interactions at the nanoscale.

The TryptoBoost approach is broadly applicable to any protein containing aromatic amino-acids, so the project breakthroughs will benefit a wide range of biophysical, chemical, and medical applications, to improve the development of therapeutic drugs or increase the detection sensitivity and read-out speed in analytical biosensing.

Research / Job description

To strengthen our multidisciplinary team, we are seeking a biochemist or biophysicist with expertise in protein chemistry or protein biophysics.

The successful candidate will be responsible for the preparation of the protein samples with or without external fluorescence labelling. He/She will also take part in spectroscopy characterization experiments taking advantage of the most recent advances in nano-optics and single molecule fluorescence analysis using techniques such as FCS, TCSPC, FLIM and FRET.

The selected Postdoc researcher will work under the supervision of Jerome Wenger and benefit from direct mentorship to further develop his/her career.

Required qualifications – Eligibility

To apply for the postdoctoral contract, candidates must hold an internationally-recognized PhD degree in Biochemistry, Biophysics, or Chemistry.

Experience in protein biochemistry, protein biophysics, protein purification, protein-protein interactions, fluorescence labelling, single molecule fluorescence techniques, FCS, and/or FRET will be highly appreciated.

No restrictions of citizenship apply to the postdoctoral contract.

Terms of employment – Postdoc

The position is intended as full-time (38 hrs / week, 12 months / year) appointment under CNRS contract. The contracts are offered for two years and can be extended for a supplementary year.

Application procedure

Suitable candidates are requested to submit:

- a Curriculum Vitae, including a fully referenced list of publications
- a presentation letter with declaration of interests and a description of your past achievements (max. 2 pages)

- contact email of three potential references

Applications should be submitted by email to jerome.wenger@fresnel.fr.

Selection is based on merit and potential, measured in terms of the academic record and personal achievements. Proactivity, participation in community activities, and capacity for team-work are also taken into account.

The call will remain open until positions are filled.

Web Links

www.jeromewenger.com

www.fresnel.fr/mosaic

References

Selection of recent publications from the group:

1. P. M. Winkler, R. Regmi, V. Flauraud, J. Brugger, H. Rigneault, J. Wenger, M. F. García-Parajo, *Transient Nanoscopic Phase Separation in Biological Lipid Membranes Resolved by Planar Plasmonic Antennas*, ACS Nano **11**, 7241-7250 (2017).
2. V. Flauraud, R. Regmi, P. M. Winkler, D. T. L. Alexander, H. Rigneault, N. F. van Hulst, M. F. Garcia-Parajo, J. Wenger, J. Brugger, *In-Plane Plasmonic Antenna Arrays with Surface Nanogaps for Giant Fluorescence Enhancement*, Nano Lett. **17**, 1703-1710 (2017).
3. J. de Torres, M. Mivelle, S. B. Moparathi, H. Rigneault, N. F. Van Hulst, M. F. García-Parajó, E. Margeat, J. Wenger, *Plasmonic Nanoantennas Enable Forbidden Förster Dipole-Dipole Energy Transfer and Enhance the FRET Efficiency*, Nano Lett. **16**, 6222-6230 (2016).
4. P. Ghenuche, M. Mivelle, J. de Torres, S. B. Moparathi, H. Rigneault, N. F. Van Hulst, M. F. García-Parajó, J. Wenger, *Matching Nanoantenna Field Confinement to FRET Distances Enhances Förster Energy Transfer Rates*, Nano Lett **15**, 6193-6201 (2015).
5. P. Ghenuche, J. de Torres, S. B. Moparathi, V. Grigoriev, J. Wenger, *Nanophotonic Enhancement of the Förster Resonance Energy-Transfer Rate with Single Nanoapertures*, Nano Lett **14**, 4707-4714 (2014).
6. D. Punj, M. Mivelle, S. B. Moparathi, T. van Zanten, H. Rigneault, N. F. van Hulst, M. F. Garcia-Parajo, J. Wenger, *A plasmonic 'antenna-in-box' platform for enhanced single-molecule analysis at micromolar concentrations*, Nature Nanotech. **8**, 512-516 (2013).