Hosting offer for Marie Sklodowska-Curie Postdoctoral Fellowships (PF) 2022 at University of Cyprus / Research group: Molecular Spectroscopy Laboratory, Dept. of Chemistry/ EMPHASIS Centre

MSCA Postdoctoral Fellowships are individual research grants offering excellent postdoctoral researchers the chance to develop their skills by means of international mobility. Through the implementation of an original and personalised research project, MSCA Postdoctoral Fellowships aim to foster excellence through training and mobility and to equip researchers with new skills and competences in order to identify solutions to current and future challenges.

University of Cyprus/Molecular Spectroscopy Laboratory (MSL) invites motivated postdoctoral researchers to jointly prepare an application for the MSCA-PF-2022 call Marie Skłodowska-Curie Postdoctoral Fellowships call (MSCA-PF-2022) with them as host organisation.

Description of Hosting organisation/group

Dr Sophia C. Hayes (SCH) is an Associate Professor and Director of the Molecular Spectroscopy Laboratory (MSL) in the Department of Chemistry, UCY. Her expertise is in Molecular Spectroscopy, especially Resonance Raman (RR) and Time-Resolved RR, Ultrafast Spectroscopy (pump-probe techniques), and Photoluminescence (PL) spectroscopy, applied to various chemical systems. Her present work expands in two different fields, biophysics and organic semiconductors, with a common thread the understanding of interactions between molecules and their environment using vibrational spectroscopy as a structural probe. Dr Hayes has been working on deciphering the effect of structure on the photophysics of conjugated molecules and polymers with resonance Raman as the primary tool. This work let to publications in Nature Communications and Nature Materials among others. Within the biophysics field, she is interested in the interactions between small molecules and biomolecules (proteins and DNA) for inhibition of aggregation that can lead to many neurodegenerative diseases, or for stabilization of the G-quadruplex, for the development of cancer drugs. The two fields come together in very recent work on biosensors, where conjugated polyelectrolytes complex with DNA to detect base mismatches, but at the same time to template specific polymer conformations for nanotechnology.

The MSL, directed by SCH, is hosted in the UCY Department of Chemistry, and is fully equipped for spectroscopic characterization of organic semiconductor thin films. The laboratory is equipped with a state-of-the-art UV and visible Resonance Raman system which includes: (1) two high power Q-switched Nd:YAG lasers, equipped with all the harmonic generation crystals, (2) three Raman shifters for generation of a large range of excitation wavelengths from 190nm-1.9 μm, (3) solid state lasers with emission at 408, 473 and 532 nm, (4) a high resolution dispersive spectrograph equipped with three different diffraction gratings for choice of spectral resolution, (5) high quantum efficiency CCD cameras for a large range of wavelengths (deep UV – near IR), which are liquid-nitrogen-cooled for the collection of dark noise-free Raman spectra, (6) a Raman microscope with excitation at 532 nm and fiberoptic coupling to a dispersive 300 mm spectrograph and equipped with XYZ stage for sample

adjustment, and (7) a photoluminescence setup with laser excitation that spans the above wavelengths with capability of nanosecond time-resolved PL with the use of an intensified CCD camera.

Webpage: https://www.ucy.ac.cy/dir/el/component/comprofiler/userprofile/shayes

The MSL is part of the EMPHASIS center: http://www.emphasis.ucy.ac.cy/

Selected recent publications of the MSL group:

1. Peterhans, E. Nicolaidou, P. Diamantis, E. Alloa, M. Leclerc, Mathieu Surin, Sébastien Clément, U. Rothlisberger, Natalie Banerji, and S. C. Hayes, "Structural and photophysical templating of conjugated polyelectrolytes with single-stranded DNA," ***Chem. Mat.*** 2020, 32, 17, 7347.
2. E. Alloa, V. Grande, R. Dilmurat, D. Beljonne, F. Wuerthner and S. C. Hayes, "Resonance Raman study of the J-type aggregation process of a water soluble perylene bisimide," ***Phys. Chem. Chem. Phys***. 2019, 21, 18300.
3. L. Peterhans, E. Alloa, Y. Sheima, L. Vannay, M. Leclerc, C. Corminboeuf, S. C. Hayes, N. Banerji, "Salt-induced thermochromism of a conjugated polyelectrolyte" ***Phys. Chem. Chem. Phys.***, 2017, 19, 28853.
4. M. S. Vezie, S. Few, I. Meager, G. Pieridou, B. Dörling, R. S. Ashraf, A. R. Goñi, H. Bronstein,, I. McCulloch, S. C. Hayes, M. Campoy-Quiles, and J. Nelson, "Exploring the origin of high optical absorption in conjugated polymers," ***Nat. Mater*.** 2016, 15, 746.
5. F. Provencher, N. Bérubé, A. W. Parker, G. M. Greetham, M. Towrie, C. Hellmann, M. Côté, N. Stingelin, C. Silva, and S. C. Hayes, "Direct observation of ultrafast long-range charge separation at polymer:fullerene heterojunctions," ***Nat. Comm***. 2014, 5, 4288.

Topics/expertise

Organic electronics:

1. Organic conjugated polymers and doping for use in bioelectronics
2. Ternary photovoltaic solar cells
3. Organic spintronics

Your profile

Postdoctoral candidates for an MSCA-PF application are welcome to apply to work within the above three different topics within the organic semiconductor field. In all cases, we will use resonance Raman spectroscopy to probe molecular conformation under various conditions (temperature, film processing conditions, chemical/electrochemical doping) in order to investigate its role in the optical properties / photophysics / charge and spin transport properties of conjugated polymers, and to produce design rules for their use in various optoelectronic / spintronic devices.

- Expected qualifications/expertise of the candidate: Organic semiconductors and spectroscopy
    - Please specify the required PhD degrees: PhD in Chemistry or Physics
- You must have a completed PhD at the time of the call deadline (14 September 2022).
- Candidates must have a maximum of 8 years full-time research experience from the PhD award date until September 14, 2022. Periods of inactivity in research (e.g. unemployment, periods of employment outside research, parental or sick leave) do not count towards the time of research experience.

- For European fellowships, candidates can be of any nationality and must not have resided or carried out their main activity (work, studies, etc.) in Cyprus for more than 12 months in the 36 months immediately before September 14, 2022.
- Highly motivated candidate with an excellent research track record appropriate to career stage, as evidenced by academic publications and other scientific output.

What we offer

- Support and guidance for the preparation of your MSCA PF proposal
- A stimulating, interdisciplinary environment for high-level research.

How to apply?

Indicate your interest by contacting the host institution as follows:

Please contact Dr. Hayes by email (shayes@ucy.ac.cy) with a short CV and motivation to indicate your interest to prepare a MSCA-PF application under her supervision.

After the supervisor agrees to support you as a MSCA-PF candidate, you can start preparation of MSCA PF project proposal and will be supported further by the Research and Innovation Support Office of UCY.

For more information please contact the MSCA coordinator of the host institution at rss@ucy.ac.cy

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