

2 PhD Positions [m/f/d, EEA, CH, UK citizens only, full stipend 18.5 k€ p.a. and EU level fees for 4 years] in **“Molecular Engineering of Functional Organic Materials”** at **Trinity College Dublin** in the **School of Chemistry**. The positions are part of the SFI Frontiers for the Future Award *PORPHYSHAPE* headed by Prof. Mathias O. Senge (Chair of Organic Chemistry, TCD and Hans Fischer Senior Fellow, TU Munich).



Project: Understanding the functions of natural enzymes and developing new catalysts is a fundamental challenge in chemistry. Porphyrins are nature's most versatile and ubiquitous class of cofactors with a wide range of chemically distinct functions - yet all these functions rely on metal chelates. *PORPHYSHAPE* challenges this limitation to metalloporphyrins. Key is the use of conformationally engineered nonplanar free base porphyrins, wherein structural macrocycle modulation gives functional access to the porphyrin core. Using targeted molecular design, which combines the aspects of conformational flexibility with rational chemical synthesis as a new concept for organocatalyst/receptor design we will: 1) use conformational cofactor control as key design principle for bench-top molecular engineering of functional porphyrins; 2) deliver enzyme mimics capable of selective activation of substrates in organocatalytic reactions; 3) develop 1D, 2D, and 3D design principles in solution, on-surface, and in framework materials to yield spatially defined multifunctional nanoarrays; 4) establish proof-of-concepts for applications in sensing and remediation.

This is a highly interdisciplinary project which brings together researchers from synthetic organic chemistry, functional materials, photochemistry, interface physics, medicinal and bioinorganic chemistry and requires a strong interest in these areas. While primarily located at TCD, the researchers will work in an international team with secondments to collaborators, e.g., at TU Munich (Germany). Participation in STEM outreach and collaborative research projects and grant initiatives is expected.

Background Information: *Chem. Commun.* **2018**, 54, 26; *Chem. Eur. J.* **2019**, 25, 4590; *Angew. Chem. Int. Ed.* **2019**, 58, 418; *Coord. Chem. Rev.* **2021**, 431, 213760; *Chem. Eur. J.* **2022**, 28, e202103879.

<http://sengegroup.eu>

<https://www.ias.tum.de/active-fellows/senge-mathias/>

Requirements: Recent B.A./B.Sc. (upper class) or M.Sc. in chemistry; strong competence in synthetic organic chemistry, enthusiasm for research, creativity and ability to work with a high degree of independence; interest in nanoscale science, sensing and remediation, functional organic materials, photochemistry, and translational science; good English language skills (> 6 IELTS test) and commitment to work in highly diverse and multicultural research groups. Applications from underrepresented groups and women are strongly encouraged.

Applications (full CV, motivation letter, 2 reference contacts, diversity statement, transcripts; if available, thesis; as a single pdf) to Mathias (sengem@tcd.ie), last possible start date March 1, 2023.



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The University of Dublin