



1. Project summary

Photonics will be the primary key enabler for future ICTs (information and communication technologies) including the so-called "IoT" (internet of things) and healthcare, to mention just two of the most pervasive and crucial future markets and technology drivers.

SYNCHRONICS' mission is to synergistically address the need for skilled researchers and new advanced materials for photonics by training a pool of future science-leaders. 15 Early Stage Researchers (ESRs) are being training in the synthesis, characterisation and application to photonics of supramolecularly-engineered functional materials, that are also incorporated within state-of-the-art nanostructures fabricated thanks to world-leading facilities and unique expertise available within the network.

check out our website



2. Project Consortium

- 12 highly-specialised and internationally-leading teams in **supramolecular nanoscience** and **nanophotonics**:

- ✓ **Coordination and management** (University College London, UCL)

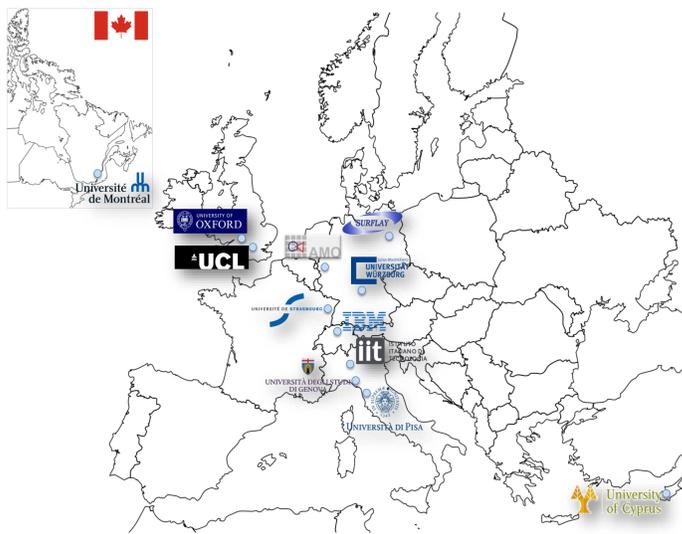
- ✓ **Theory and Simulation** (Univ. Genoa, IBM, IIT)

- ✓ **Surface Studies** (Univ. Strasbourg, UCL)

- ✓ **Organic and Supramolecular Synthesis** (Univ. Oxford, Univ. Wurzburg, SURFLAY)

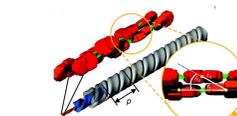
- ✓ **Photophysics** (IIT, IBM, UCL, Univ. Genoa, Univ. Cyprus, Univ. Montreal)

- ✓ **Device Fabrication and Characterisation** (UCL, IBM, AMO, SURFLAY, IIT, Univ. Pisa, Univ. Genoa)

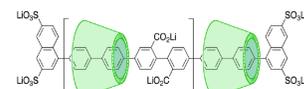


Research areas

- ✓ **Materials:**



Exploit "good" aggregation (J-aggregates)



Suppress "bad" aggregation (H-aggregates)

- ✓ **Characterisation:**

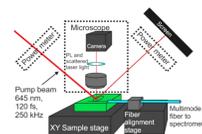
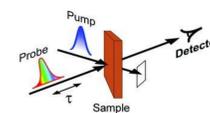
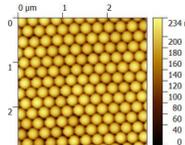
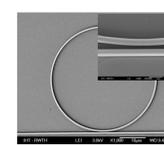
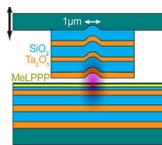
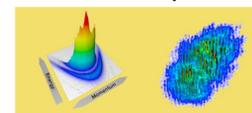


Photo- and electroluminescence and pump-probe spectroscopies

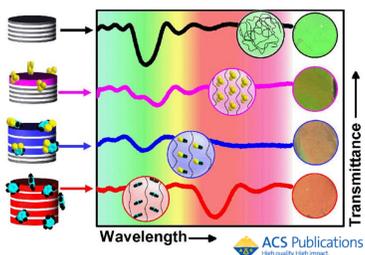
- ✓ **0D, 1D, 2D and 3D photonic structures:**



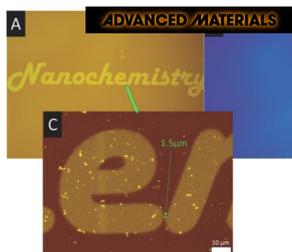
- ✓ **Bose-Einstein condensates at room temperature for simulation of quantum systems:**



3. Major breakthroughs



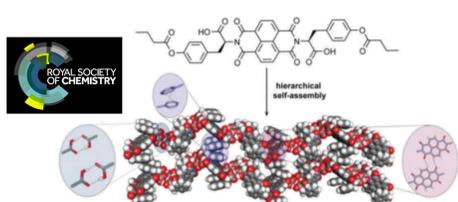
Vapour Sensor in Photonic Crystal (10.1021/acsami.6b10809)



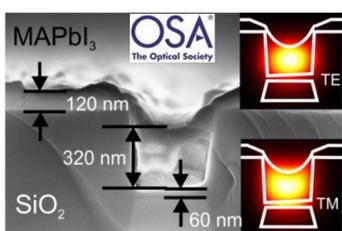
Innovative Patterning via Photolithography (10.1002/adma.201600329)



Synthesis of Novel Materials for Amplified Spontaneous Emission (10.1002/anie.201700730)



Synthesis of 1D Nanostructure for Optoelectronics Application (10.1039/C7CC04822J)



On-chip advanced LASERs in silicon nitride integrated photonics (10.1364/OE.25.013199)



Advanced Materials for red/near-infrared (NIR) emission

4. Outreach and dissemination

Dissemination through scientific publications:

- ✓ 40+ articles in high-impact factor journals (including 5 articles in Nature Publishing Group journals) with > 370 citations (Oct '17)

check out our publications



International events organised by SYNCHRONICS:

Communication skills for early stage scientists Workshop, 1 Sept 2015 Strasbourg

Exploitation and valorisation of research Workshop, 27 Sept 2016 Berlin

Advanced Optical Materials and Devices International School 1 - 3 March 2016

Photonic Devices for Bio-Components Workshop, 5-6 June 2017, Pisa

International School on Optical Characterization of Photonic Structures 6-8th June 2017, University of Pisa (Italy)

EMRS Spring Meeting '18 Symposium U Functional Material 18th-22nd June 2018, Strasbourg

Main international events attended by SYNCHRONICS:



Overall, ESRs attended >10 international conferences giving >50 poster presentations and > 15 oral presentations.

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