10 PhD positions are available the EU-funded NOAH Innovative Training Network, of which 1 will be at the University of Warwick.

NOAH (Network of functional molecular containers with controlled switchable abilities) is a European training network that has received funding from the European Union’s Horizon 2020 under the Marie Skłodowska-Curie action (H2020-MSCA-ITN-2017).

The general scientific goal of the NOAH scientific research program is to develop, characterise and transfer to applications different types of molecular containers. NOAH aims to provide to selected Early-Stage Researchers (ESRs) a great variety of scientific attributes, ranging from the experimental organic and inorganic synthesis to computational chemistry. Photo- and electro-chemistry, MS/gas-phase chemistry, X-ray diffraction and optical spectroscopy techniques will be also included in the scientific formation and development of the recruited ESRs. The trainees will also receive education in complementary and transferable skills through local and network-wide dedicated training activities (e.g. dissemination, communication, organization, governance, ethics...). The training program includes the exposure of the ESRs to chemical research carried out in the non-academic sector by means of full recruitment or short stage secondments (6 months) in one of the four European companies acting as industrial partners.

The host institutions involved in NOAH ITN are ICIQ (Spain), Université de Neuchâtel (Switzerland), Freie Universität Berlin (Germany), University of Warwick (UK), ISOF CNR (Italy), ICHO PAN (Poland), Université de Strasbourg (France), Covestro Deutchland A.G. (Germany) and Mind the Byte S.L. (Spain).

Partner Organizations involved are Biolitec A.G. (Germany) and Leitat technological center (Spain).

NOAH will recruit 10 Early-Stage Researchers (ESRs) each with a 36-month contract who will have the possibility to defend a PhD thesis at the end of their individual projects. Each PhD student will be hosted in a beneficiary institution and will receive additional training by undergoing relevant secondments at the industrial and other academic partners’ facilities.

For more information about individual projects, eligibility criteria and work conditions please check the NOAH website

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 765297.
PhD project: Stimulus-responsive guest binding in coordination cages
Funding availability: EU (funded)
Planned start date: 1st October 2018

This PhD project is part of the European Training Network ‘NOAH’ (Network of functional molecular containers with controlled switchable abilities) that has received funding from the European Union’s Horizon 2020 programme.

This project concerns a range of hollow metal/ligand capsules (‘coordination cages’) which are hollow, and contain central cavities that can bind small-molecule ‘guests’ inside them. These cages have hydrophilic exteriors and are water-soluble, but have hydrophobic interior cavities which provide the basis for strong guest binding. The consequences of guest binding include catalysis of reactions of bound guests; size- and shape-selective luminescent sensing; and the ability to transport molecular ‘cargoes’.

**Fig. 1.** $10^5$-fold catalysis of an elimination reaction in the cavity of a coordination cage

**Fig. 2.** Illustrative examples of other types of coordination cage architecture based on the same ligand family

The scientific project will involve the preparation and structural characterisation of new members of the coordination cage family; and the evaluation and quantification of guest binding in the cage cavity by a combination of molecular modelling and spectroscopic measurements. In particular the ability to control guest uptake and release using external stimuli such as pH changes or an applied redox potential will be developed as the basis of new types of functional behaviour.

The work is highly multi-disciplinary and will include elements of organic and inorganic synthesis; a range of characterisation methods such as NMR spectroscopy, mass spectrometry and X-ray crystallography; and physical / analytical techniques such as luminescence spectroscopy and kinetic measurements to probe the properties of the host / guest systems. The 36-month project will include a 3-month secondment to a partner institution in Germany to perform mass spectrometric analyses of cage/guest systems.

Representative recent publications illustrating the work are as follows:


To apply please visit the NOAH website
https://euraxess.ec.europa.eu/jobs/295246