Title	Description	Research Area	Registering University and Industry Partner	Job Offer Link and Deadline
Capturing additive manufacturing's laser-matter interactions	The student will join ID19's team at the ESRF. Working with UCL, ILL and Rolls-Royce plc, the PhD project will be to help develop, build and use *in situ* additive manufacturing (AM) rigs which can be used on the ESRF/ILL beamlines to perform *in situ* and operando imaging that will help develop new processes, materials and monitoring systems.	Engineering, physics, materials science	University College London; Rolls-Royce	InnovaXN_1 15/03/2020
Synchrotron microscopic study of historical and industrial paintings	This is a collaborative project between the ESRF, AkzoNobel, Rijksmuseum and University of Amsterdam. The goal is to study short-term and long-term drying reactions, and notably reactivity between metallic catalysts and alkyd binders. The analyses will be mainly based on 2D micro-imaging techniques (in particular infrared and synchrotron-based X-ray analyses such as X-ray fluorescence and X-ray diffraction), performed in Grenoble at ESRF beamline ID21 and in the Netherlands (UVA, Rijksmuseum and AkzoNobel).	Chemistry	University of Amsterdam; Rijksmuseum; AkzoNobel	InnovaXN_11 15/03/2020
Hydrogen fuel cells and water electrolyzers	The student will join the team of beamline ID31 at the ESRF to develop a new generation of materials used as catalysts in hydrogen fuel cells and water electrolysers. The aim of the PhD project is to systematically investigate the stability of state-of-the-art catalyst materials, which are now being evaluated for commercial use, using high energy X-rays. This is to better understand the underlying principles leading to catalyst activity and degradation so that the future R&D directions for hydrogen production and fuel cell technologies can be developed.	Physics, materials science, chemistry	Technische Universität Berlin; Johnson Matthey	InnovaXN_14 15/03/2020
Structural basis of melanogenesis enzymes	This thesis project aims to unveil the melanin biosynthesis pathway, in particular, the catalytic mechanism of tyrosinases. In partnership with ImmuSmol, it will focus on the profiling of tyrosinase metabolites and their pathway activites in melanocytes. Furthermore, X-ray crystallography will be used in the Structural Biology Group at the ESRF to determine the 3D structures of tyrosinases in complex with relevant metabolites. This work aims to shed light on the molecular basis of melanogenesis, key for the analysis and design of efficient compounds to treat melanogenic diseases and pigmentation disorders.	Biology, biochemistry	Université Grenoble Alpes; ImmuSmol	InnovaXN_17 15/03/2020
Operando XAS for deNOx catalysis	The student will join the team of BM23 and ID24 beamlines at the ESRF, in a collaboration project with the University of Turin (Italy) and Umicore, a leading European producer of automotive catalysts. The project will involve X-ray spectroscopy of Cu-exchanged zeolites – novel nanoporous catalysts for abatement of harmful nitrogen oxides from the exhaust fumes of cars, ships and industrial plants. The goal will be to reveal the mechanisms of their hydrothermal aging and sulphur poisoning, which are the two main processes that lead to deactivation of the catalysts.	Chemistry, physics, materials science	University of Turin; Umicore	InnovaXN_10 15/03/2020
Catalytic removal of nitrogen monoxide, carbon monoxide and hydrocarbons from exhaust gas	The student will join the team at ESRF beamline ID26. This PhD project will involve the synthesis, testing and in-depth characterization of noble metal based exhaust gas after treatment catalysts. Catalyst preparation and testing will be conducted at KIT while an element-specific study of the electronic structure and local coordination will be achieved by photon-in/photon-out spectroscopy at the ESRF.	Physics, materials science, chemistry	Karlsruhe Institute of Technology; Umicore	InnovaXN_18 15/03/2020

From ink structure to proton exchange membrane fuel cell electrode performance	The aim of the PhD project is to study the relationships between ink composition, electrode structure, properties and performance for PEM fuel cells. The evolution of the ink during the drying process and the so obtained electrode will be characterized using neutron and X-ray scattering, as complementary tools to unravel the organization of the catalyst material and of the polymer. By correlating these results with operando electrochemical, structural and imaging measurements, the project aims at rationalizing the design of the electrodes.	Physics, materials science, chemistry	University Grenoble Alpes; Toyota Motors Europe	InnovaXN_21 15/03/2020
Molecular engineering of green polymer-surfactants by microfluidic SAS	This project will investigate the phase behaviour and non-equilibrium properties of a new class of naturally-derived polymers, and their interaction with a model surfactant in solution. Studies will employ microfluidics coupled with small angle neutron and X-ray scattering. Small angle-neutron and x-ray scattering (SANS and SAXS resp.) play a key role in establishing the fundamental knowledge (beyond empirical correlations) of such model formulations, increase the agility and resilience of this multi-billion £ industry and enable the next-generation of high-performance, greener, and tailored complex fluids.	Physics, materials science, chemistry, chemical engineering	Imperial College London; Procter and Gamble	InnovaXN_22 15/03/2020
Investigation of dye-surfactant solution mixtures	The student will join the D11 team at the ILL to work on the impact of surfactants on the solution behaviour of dyes in aqueous solution at variable pH and at different amounts of metal cations. The focus of the work will lie on SANS with its technique of contrast variation by varying the D2O/H2O ratio, which shall be applied to investigate the morphology of the micelles loaded with dyes and the distribution of the dye molecules within the mixed aggregates. Complementary SAXS experiments will be used at ESRF beamline.	Physics, materials science, chemistry	University of Paderborn; Kao	InnovaXN_23 15/03/2020
Lunar application regolith study	The student will will be based at ILL instrument D20 and join a new research project between ILL, ESRF, TU Braunschweig (moon regolith simulants) and the company OHB (space technology), close to Munich. The objective of the project is the characterization of moon regolith in view of a use as construction material for future infrastructures (shelters) on the moon. As access to original lunar regolith is difficult, most work will be done on simulants as developed at TUB, although a benchmarking with Apollo samples shall be attempted. The characterization methods are those available at ILL and ESRF.	Physics, materials science, chemistry, mineralogy	TU Braunschweig; OHB	InnovaXN_24 15/03/2020
Interaction of intelligent drug delivery vehicles with model biomembranes	The aim of this PhD project is to gain a fundamental understanding of the interaction of a range of 'intelligent' delivery systems with various cellular/sub-cellular membranes. Specifically, the project will combine the use of a variety of interfacial techniques, including neutron reflectometry and ellipsometry, to achieve this understanding. Four advanced delivery systems, namely lipid nanoparticles, polymeric nanoparticles, vesicles and nanoemulsions will be examined by studying their interaction of lipid monolayers mimicking the composition of the various cell and sub-cellular membranes. Significantly, the results of the study will be used to aid in the design of improved delivery systems to target the desired intracellular site of action. The student will join the Large Scales Structures group at the Institut Laue-Langevin (Grenoble, France).	Physics, chemistry, biochemistry	University of Manchester; AstraZeneca	InnovaXN_25 15/03/2020
Microscopic dynamic properties of antibody solutions	Studying immunoglobulin antibody protein solutions, this project will be hosted by the ILL. It will apply both static and dynamic X-ray and neutron scattering techniques, including small-angle scattering, neutron backscattering and spin-echo spectroscopy, and X-ray photon correlation spectroscopy. Based on these experiments as well as on modelling, the link between microscopic interactions and phase behaviour relevant for pharmaceutical applicability of antibody protein solutions will be established, involving the fundamentally important link between macroscopic viscosity and diffusion on nanosecond time and nanometre length scales.	Physics, physical chemistry, biology, biochemistry , chemistry	University of Tübingen; Lonza AG	InnovaXN_29 15/03/2020

Adhesion and interactions with hair biomolecules – a cosmetic perspective	The student will join the ILL and use the Super ADAM and FIGARO reflectometers. The project is designed to study adsorption to the lipid palisade that forms the boundary of hair. Such knowledge is crucial for the design of protective and restorative coatings and is thus vital for cosmetic industry.	Physics, materials science, nanotechnology, chemistry	KTH Royal Institute of Technology; L'Oréal	InnovaXN_30 15/03/2020
Lithium battery positive electrode material structure and function	The student will join ID01's team at the ESRF. The aim of the D.Sc (equiv. PhD) project is to formulate, test and characterise novel lithium ion battery materials with a focus on the doping step during the synthesis of positive electrode materials. Structure – functionality relations will be elucidated for the effect of heteroatoms on the structure and electrochemical behaviour. Electrochemical properties will be investigated and characterisation will include a variety of X-ray techniques such as high-energy XRD and EXAFS.	Materials science, physics, chemistry	Aalto University; Umicore	InnovaXN_5 15/03/2020
Alkane/alkene separation by silver-containing molecular sieves	The interaction of alkenes (ethene and propene) adsorbed on Ag-zeolites will be studied with different Si/Al ratio and silver loading. A multidisciplinary approach will combine inelastic neutron spectroscopy with theoretical calculations, solid state nuclear magnetic resonance (NMR) and X-ray absorption (XAS) studies. The student will join the Spectroscopy Group at the ILL and the experiments will be mainly performed on the Neutron Vibrational Spectrometer Lagrange.	Physics, materials science, chemistry	Universidad Politècnica de València; CEPSA	InnovaXN_26 15/03/2020
Silicon/rubber polymer nanocomposites under dynamic load	The student will join ID02's team at the ESRF. The aim of the PhD project is to understand nanocavitation upon loading and unloading in cross-linked nanocomposites (rubbers) on a molecular level by using in-situ scattering techniques. The novelty of the project will be to study how the phase morphology of different polymer blends affects the damage mechanisms (cavitation) in the bulk and around a crack tip.	Chemistry	Hannover University; Continental Tyres	InnovaXN_8 15/03/2020
Chemo-hydro-mechanical response of carbonatable cement binders	The aim of the PhD project is to study cement binders with CO2-consuming hydration processes. Neutron and X-ray imaging will serve as an input for the development of chemo-hydric models essential to the understanding and ensuing optimization of the process. The student will join NeXT/ID19's team at the ILL/ESRF.	Civil engineering, materials science, physics, chemistry	Université Grenoble Alpes; Lafarge/Holcim	InnovaXN_31 15/03/2020
Formation of Liposomes	Based at instrument IN15 at the ILL, this project will study first the phase behaviour and the mesoscopic structure (light and neutron scattering) of pure phospholipids together with different alcohols before and after mixing, and then after a subsequent shear treatment. To gain insight into the kinetics of the injection (and thereby formation) process, stopped-flow turbidity, SANS, and SAXS/WAXS experiments will done.	Physics, materials science, chemistry	TU Berlin; Evonik Nutrition&Care	InnovaXN_32 15/03/2020
Advanced diffraction methods for characterization of li-ion battery materials	The student will join ID15A's team at the ESRF. The aim of the PhD project is to utilize high-speed diffraction and high spatial resolution diffraction tomography to understand the degradation processes occurring over extended cycling in novel Li-ion batteries.	Physics, materials science, chemistry	University College London; Johnson Matthey	InnovaXN_13 15/03/2020
Aerospace aluminium alloy evolution	The student will join ID16B's team at the ESRF. The aim of the PhD project is to determine the relationship between thermo-mechanical loading paths and pores evolution, in aerospace aluminum alloys, using a multi-scale approach coupling high-resolution ultrasound technique, neutron tomography and in situ X-ray nanotomography.	Physics, materials science, chemistry	Université Grenoble Alpes; Constellium	InnovaXN_4 15/03/2020

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