



ITN – ETN  
MARIE SKŁODOWSKA-CURIE ACTIONS



## Call for 15 PhD positions Network “STiBNite”



We are pleased to advertise 15 Early-Stage Researcher (PhD) positions as part of the Innovative Training Network of the European Commission **STiBNite “Tailored materials for Sustainable Technologies: programming functional molecular components through Boron-Nitrogen doping”**. The positions will all last three years and will allow all students to participate in an exciting programme comprising international schools, workshops, and secondments at academic as well as industrial partners (see the overview of the project below).

Applications deadline: **31<sup>st</sup> July 2020**

We reserve the right to close applications early should we receive a satisfactory number of applications.

### Overview of the project and of the training offered to all Early Stage Researchers of STiBNite

STiBNite is a ITN European Training Network (ITN-ETN) that has been selected for funding by the European Union’s Horizon 2020 Marie Skłodowska-Curie Actions programme (pending signature of the GA), promoting the development of the next-generation of **tailored BN-doped macromolecular organic semiconductor materials**. The ETNs provide training through doctoral research to talented early stage researchers (ESRs). Through 15 ESR research projects, STiBNite will establish an intersectoral training and research programme at the chemistry/physics/engineering interface with partners from 8 European countries. STiBNite ESRs will enrol on PhD degree programmes and be employed for 36 months in a beneficiary organisation. The consortium brings together a unique team of world-leading academic groups and industry, at the forefront of semiconductors. Through this team of experts, the ESRs will receive an intensive training in the field of organic synthesis, materials science, surface science, materials characterization, modelling and device engineering, with the final goal to shape prime researchers that have been exposed to the development of bottom-up BN-doping strategies going all the way from design, synthesis, physical characterization, modelling and device applications. The coordinator is **Prof. Davide Bonifazi** ([stibnitem20@univie.ac.at](mailto:stibnitem20@univie.ac.at)) at the Faculty of Chemistry, Institute of Organic Chemistry, University of Vienna (Austria). The positions will be hosted at the following institutions:



- **University of Vienna (UNIVIE, Austria):** 2 PhD positions, ESR 1 and ESR 2.  
For further Information: **Prof. D. Bonifazi**, Faculty of Chemistry, Institute of Organic Chemistry, email: [davide.bonifazi@univie.ac.at](mailto:davide.bonifazi@univie.ac.at)
- **University of Perugia (UNIPG, Italy):** 2 PhD positions, ESR 3 and ESR 4.  
For further Information: **Prof. Luigi Vaccaro**, Department of Chemistry, Biology and Biotechnology, email: [luigi.vaccaro@unipg.it](mailto:luigi.vaccaro@unipg.it)
- **Leiden University (ULEI, The Netherlands):** 1 PhD position, ESR 5.  
For further Information: **Dr. Irene Groot**, Leiden Institute of Chemistry, email: [i.m.n.groot@lic.leidenuniv.nl](mailto:i.m.n.groot@lic.leidenuniv.nl)
- **University of Louvain (UC Louvain, Belgium):** 2 PhD positions, ESR 6 and ESR 7.  
For further Information: **Prof. Jean-Christophe Charlier** (ESR 6) and **Prof. Sorin Melinte** (ESR 7), Institute of Condensed Matter and Nanosciences, email: [jean-christophe.charlier@uclouvain.be](mailto:jean-christophe.charlier@uclouvain.be) and [sorin.melinte@uclouvain.be](mailto:sorin.melinte@uclouvain.be)
- **Technische Universität München (TUM, Germany):** 1 PhD position, ESR 8  
For further Information: **Prof. Wilhelm Auwärter**, Physics Department, email: [wau@tum.de](mailto:wau@tum.de)
- **Technische Universität München (TUM, Germany):** 2 PhD positions, ESR 9 and ESR 10. For further Information: **Dr. Ruben Costa**, Biogenic Functional Materials Department, email: [ruben.costa@tum.de](mailto:ruben.costa@tum.de)
- **Rijksuniversiteit Groningen (RUG, The Netherlands):** 1 PhD position, ESR 11.  
For further Information: **Prof. Petra Rudolf**, Zernike Institute for Advanced Materials, email: [p.rudolf@rug.nl](mailto:p.rudolf@rug.nl)
- **University of Trieste (UNITS, Italy):** 1 PhD positions, ESR 12.  
For further Information: **Prof. Tatiana Da Ros** and **Prof Paolo Tecilla**, Department of Chemical and Pharmaceutical Sciences, email: [daros@units.it](mailto:daros@units.it) and [ptecilla@units.it](mailto:ptecilla@units.it)
- **Applied Nanolayers BV (ANL, The Netherlands):** 1 PhD position, ESR 13.  
For further Information: **Dr. Richard van Rijn**, email: [r.van.rijn@appliednanolayers.com](mailto:r.van.rijn@appliednanolayers.com)
- **Graphene-XT S.r.l. (GXT, Italy):** 1 PhD position, ESR 14.  
For further Information: **Dr. Simone Ligi**, email: [info@graphene-xt.com](mailto:info@graphene-xt.com)
- **AIMPLAS (AIM, Spain):** 1 PhD position, ESR 15.  
For further Information: **Rsr. Susana Otero**, Engineering Group of AIMPLAS, email: [sotero@aimplas.es](mailto:sotero@aimplas.es)

**Interested applicants are strongly encouraged to contact the scientists in charge of the projects as soon as possible.**



## Available projects:

**ESR1** (UNIVIE, Vienna): Preparation of BN-doped molecular modules, doped polyphenylenes and extended PAHs. Different synthetic strategies will be explored to achieve the target BN doped compounds, investigating how the doping pattern and peripheral functionalities affect the properties of the final 2D materials. A Master's degree in organic chemistry with a strong experience in heterocyclic and multistep synthesis would be a suitable background for this position.

**ESR2** (UNIVIE, Vienna): Synthetic developments of suitable annulation protocols and functionalization of solid supports. Innovative sustainable synthetic methodologies will be developed for the preparation of 2D BN-doped materials, and their covalent and non-covalent assembly investigated on surfaces. A Master's degree in organic chemistry with a strong experience in heterocyclic and multistep synthesis would be a suitable background for this position.

**ESR3** (UNIPG, Perugia): Sustainable synthetic methodologies for accessing boron nitride materials. The project will aim at the identification of novel starting materials, catalytic systems, reaction media and conditions to optimize the preparation of B–N materials. A Master's degree in a field such as organic chemistry would be a suitable background for this position.

**ESR4** (UNIPG, Perugia): Flow technologies for preparation and decoration of BN modules. The project will aim at the definition of continuous-flow reactors for the access B–N materials and their decoration using cross-coupling and C–H functionalization technologies. A Master's degree in a field such as organic chemistry would be a suitable background for this position.

**ESR5** (ULEI, Leiden): Engineering of 2DMs on metal surfaces. Using in situ microscopy and spectroscopy techniques, the growth of 2D materials on metal surfaces will be investigated at the atomic scale. A Master's degree in Physical Chemistry or Condensed-Matter Physics would be a suitable background for this position.

**ESR6** (UCLouvain, Louvain-La-Neuve): Theoretical modelling of BNC hybrid nanomaterials. The PhD research will focus on the prediction of the structural, electronic, optical and transport properties of BN-doped carbon-based 2D materials using both state-of-the-art *ab initio* simulations and Green's function techniques based on a *tight-binding* approach. A Master degree in Materials Science or Physics would be a suitable background for this position which requires previous exposure to quantum mechanics and condensed matter physics. Experience in the use of DFT-based codes or in developing simulation software is a plus, as well as a strong personal motivation to work in a diverse international research team and to collaborate with experimentalists.

**ESR7** (UCLouvain, Louvain-La-Neuve): Micro- and nano-integrated BNC materials as thermal interfaces, monolithic thermocouples and electrothermal actuators. We aim to set the first steps towards the development of new, scalable fabrication approaches for functional thermal interfaces with BNC molecular modules on nano-structured glass and mechanically flexible substrates, like structural hydrogels and elastomers. Experience accumulated during a Master Degree thesis in the electronics and electro-mechanical engineering fields or, equivalently, in the chemistry of 2D materials and quantum chemistry areas is required.

**ESR8** (TUM, Garching): *In-situ* fabrication of well-defined BNC architectures on surfaces under UHV. In this PhD project, self-assembly and on-surface synthesis protocols will be applied to develop atomically precise BN-doped carbon nanostructures that will be characterized by scanning probe microscopy, spectroscopy, and complementary surface science tools. A Master's





degree in physics or physical chemistry and a solid background in surface science, as well as previous experience using STM or other UHV-based analysis techniques would be a suitable background for this position.

**ESR9** (TUM, Straubing): Rainbow light-emitting electrochemical cells based on BN-doped materials as emitters. TUM seeks a PhD with experience and interest in cutting-edge approaches on light-emitting electrochemical cells combining BN-doped nanographenes and ionic electrolytes. She/he will learn i) fabrication and characterization (microscopy/spectroscopy/electrochemistry) of thin films, and ii) characterization and optimization of small- and large-area lighting devices operating under in-/out-door conditions. Candidates should hold a Bachelor/Master in Materials Science, Physics, Chemistry or related disciplines. Experience in organic electronics, lighting, photophysics, and electrochemistry will be positively judged.

**ESR10** (TUM, Straubing): Ionic-based OPVs based on BN-doped materials. TUM seeks a PhD with experience and interest in cutting-edge approaches in ionic-based multifunctional solar cells. The candidate will learn the fabrication and characterization of photoactive films prepared with ionic donor/acceptors blends, as well as the solar cell assembly and analysis combining different spectroscopic and electrochemical techniques. Candidates should hold a Bachelor/Master in Materials Science, Physics, Chemistry or related disciplines. Experience in organic electronics, photovoltaics, photophysics, and electrochemistry will be positively judged.

**ESR11** (RUG, Groningen): BNC architectures on metal and insulator surfaces from self-assembled monolayers through photopolymerization and thermal conversion. Tasks will be to fabricate the BNC architectures and to characterize them by different spectroscopies (XPS, XAS, ARPES, FTIR, Raman, UV-vis) to determine composition, bonding environments, and electronic structure. A Master's degree in Physics, Physical Chemistry, Nanoscience would be a suitable background for this position. Prior knowledge of Surface Science analysis tools is a plus.

**ESR12** (UNITS, Trieste): Preparation of BNC nanodots and investigation of their photophysical and electrochromic properties. Different starting materials and various preparation strategies will be explored to prepare and optimize the production of the dots. A Master's degree in organic chemistry and experience in the nanotechnology field would be a suitable background for this position.

**ESR13** (ANL, Delft): Engineering of an industrial protocol for preparing BN-patterned materials. Development of growth and transfer processes and tools for BN related 2D materials by CVD. A Master's degree in a field such as physics, chemistry, physical chemistry, surface science, or material science would be a suitable background for this position.

**ESR14** (GXT, Bologna): Preparation of BNC-bulk materials for coating applications. We plan to deposit the material with ink-jet printing and, when scaled-up, roll-to-roll technologies. Product and process scalability will be studied following by a basic potential market application. Background on applied or industrial chemistry is recommended but non mandatory, basic chemical laboratory experience is required.

**ESR15** (AIMPLAS, Valencia): Large area deposition of BNC based 2D layered materials for optoelectronic devices. Development of optoelectronic devices (OPV, LECs and ECDs) through functional printing technologies. A Master's degree in a field such as organic materials for printed electronics would be a suitable background for this position.





### **Additional information:**

The successful candidates will receive a 36 month, full-time employment contract as per Marie Skłodowska-Curie Actions (MSCA) regulations for early stage researchers. The monthly salary will be confirmed upon offer by each institution, paid in the currency of the host country, and with a correction factor applied to the host country. Researchers may also qualify for a family allowance of €500/month depending on family situation at the time of recruitment. Please visit the [EU MSCA website](#) or contact the local institutions (see contacts) for further information.

The ESRs will be enrolled in a vibrant PhD programme of leading academic and industrial researchers. In addition to their individual scientific projects, all ESRs will benefit from a dedicated training programme comprising an integrated curriculum of local and intensive network courses, schools, workshops and engagement with cutting-edge research.

### **Eligibility criteria:**

There are strict eligibility requirements within Marie Skłodowska-Curie Innovative Training Networks. At the time of appointment, applicants:

- **MUST** at the date of recruitment, be in the first four years (full-time equivalent research experience) of their research careers and have not been awarded a doctoral degree. 'Date of Recruitment' means the first day of the employment of the researcher (i.e. contract starting date). 'Full-Time Equivalent Research Experience' is measured from the date when the researcher obtained the degree entitling him/her to embark on a doctoral degree programme.
- **MUST NOT** have resided or carried out their main activity (work, studies, etc.) in the country of the recruiting organisation for more than 12 months in the 3 years immediately before the recruitment date. Compulsory national service, short stays such as holidays, and time spent as part of a procedure for obtaining refugee status under the Geneva Convention<sup>1</sup> are not taken into account.
- It is a requirement that network ESRs have an ability to understand and express themselves in both written and spoken English to a level that is sufficiently high for them to derive full benefit from the network training.

### **Application Process:**

Applicants should email a **cover letter**, a **CV**, a **short summary of the research accomplishments**, and **names of two references** to: [stibnitem20@univie.ac.at](mailto:stibnitem20@univie.ac.at). **In the Cover Letter please indicate for which project you are applying and provide a brief motivation as to why you wish to become an ESR within STiBNite.** Failing to provide any of the above documents will make your application ineligible. Please be aware that your application will be reviewed by the STiBNite committee, and your CV will be shared with the named beneficiaries within the consortium, as part of the application review process, to ensure an open, transparent and merit-based recruitment.

