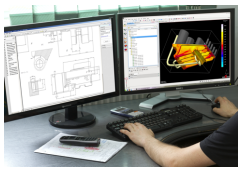
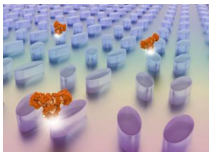
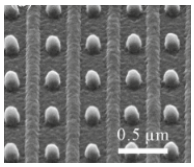
# PhD and post-doc positions in nanophotonics and metaoptics


In the Brussels Photonics (B-PHOT) group of the Vrije Universiteit Brussel, Belgium (https://www.b-phot.org/), we are looking for excellent and very motivated candidates for multiple open PhD/post-doc positions. The topics of the open positions are summarized below:

1. Small-data, adaptive-based and physics-driven generation of machine learning (supervised machine learning, unsupervised machine learning and reinforcement learning) models for nanophotonics and metaoptics. Supervised machine learning, unsupervised machine learning and reinforcement learning will be cross-fertilized with physics-based solvers to establish a disruptive design framework for nanophotonics and metaoptics. The generation of machine learning models will be automated at the sampling level as at the model architecture level.

2. Disruptive large-scale high performance computing computational electromagnetics (EM) for nanophotonics and metaoptics. The efficient solution of very large-scale EM problems that can be found in nanophotonics and metaoptics is still an open problem. The combination of ad-hoc computational EM and High Performance Computing is very promising to push forward the current boundaries of EM simulations in multiple nanophotonics and metaoptics applications and make feasible simulations that are today impossible to achieve.

3. The cross-fertilization of metaoptics and freeform optics is a very promising research directions that could provide disruptive results and revolutionize optical design. The full integration of ray tracing tools and electromagnetic simulations is a key aspect for this groundbreaking cross-fertilization. Applications such as Virtual Reality, Augmented Reality and Lab-on-a chip are of great interest, where the difficulty of design specifications (e.g., achromatic behavior, high numerical aperture and wide field of view) will be gradually increased towards extreme limits.

4. Advanced nanofabrication based on grayscale two-photon polymerization using the QuantumX (https://www.nanoscribe.com/en/products/quantum-x) equipment for grayscale lithography and sub-micron 3D structures. The objective is to investigate and significantly extend the capabilities (e.g., resolution and writing speed) of the QuantumX by the optimization of laser and material parameters. The applications are broad: coupling structures in integrated photonic circuits, lab-on-a-chip components, metasurface-based biosensors and metalenses for imaging applications.

Please, contact francesco.ferranti@vub.be if you are interested, you would like to know more details about the positions and how to apply for them.