Research Position
in Horizon-MSCA Doctoral Networks program on
Quantum Enhanced Optical Communication Network Security

About VPIphotonics
VPIphotonics sets the industry standard for end-to-end Photonic Design Automation comprising design, analysis and optimization of components, systems, and networks. Leveraging a strong history of innovation and expertise, we provide professional simulation software and design services for transmission systems, integrated photonics, optoelectronics, and fiber optics. Our award-winning solutions are used extensively in R&D and by product design and marketing teams at hundreds of corporations and academic institutions worldwide, targeting telecom, datacom, sensing, and signal processing applications. Please visit VPIphotonics.com for more information.

We seek the talents of an R&D Engineer with an emphasis on quantum and classical optics communication systems. The position is based in Berlin, Germany, and supported by QuNEST, a Marie Skłodowska-Curie Actions (MSCA) Doctoral Network.

About QuNEST
Funded by the European Marie Skłodowska-Curie Actions (MSCA) Doctoral Networks (DN) program, QuNEST (*Quantum Enhanced Optical Communication Network Security Doctoral Training*) supports eleven Doctorate Candidates. This highly interdisciplinary and intersectoral Doctoral Network comprises leading academic institutions and companies from seven European countries. The diverse consortium provides a unique and timely opportunity to train students in quantum physics and optical communications. The driving force for QuNEST is to provide high-level and highly collaborative training to the highly achieving Doctoral Candidates. The multi-disciplinary network spans areas such as quantum physics, photonics, optical transmission, Quantum Key Distribution (QKD) protocols, error correction, digital signal processing, networks, and control.

The DN program will teach technical, scientific, and transferable skills, aiming to enable the Doctoral Candidates to understand and master the challenges of quantum secure optical communications. In addition to their scientific projects, all fellows will benefit from further continuing education, including secondments, various training modules, transferable skills courses, and conference participation.

For more information, please visit QuNEST.eu.

About the Research Project
Title:
* Modelling-based design of CV/DV-QKD systems in co-existence with classical optical transmission channels

Objectives:
* Extend existing simulation framework and model library for system-level simulations of DV/CV-QKD scenarios by developing missing modeling functions and simulation concepts to support a wide range of QKD protocols.
* Investigate the impact of component imperfections and noise sources on the performance of various QKD systems over fiber- or free-space-based links.
* Study the implementation of DV/CV-QKD systems over infrastructure with co-existing classical channels.

Supervision:
* Hosting and day-to-day supervision at VPIphotonics' premises in Berlin, Germany
* Co-supervision and Ph.D. enrolment by an academic partner in the QuNEST consortium
* Several 2-3 months long research secondments at academic and industrial QuNEST partners

Requirements

We value individuals possessing a team-oriented work style, the ability to adapt quickly to new challenges, and a strong motivation to learn. We consider only candidates willing to work in our Berlin, Germany, office. Furthermore, we value the following skills and abilities:

- Master's degree in physics, electrical engineering, or similar discipline
- Excellent academic qualifications
- Solid theoretical and applied knowledge in one or several of these areas:
  quantum optics, optical communications, fiber-optic technologies, optoelectronic technologies
- Fluency in English is required; knowledge of German is a plus
- Programming experience in Python (or Matlab) is highly desired
- Knowledge of VPIphotonics simulation tools is a plus

Further, we envision that the successful candidate will have

- Strong analytical and problem-solving abilities
- Excellent presentation and communication skills
- Self-motivation, ability to conduct independent research and development
- Solid people skills, ability to work in a multi-disciplinary and multi-cultural team

VPIphotonics will provide the successful candidate with comprehensive product training, flexible work hours, occasional travels to partners and conferences, and an exciting and rewarding international career path in a multi-disciplinary and multi-cultural team.

Conditions of Employment and Eligibility

- Following the MSCA regulations for Doctoral Candidate researchers, the successful candidate will be employed full-time and provided with a gross salary of 40,200 EUR per year (including a mobility allowance). A family allowance will be added in case of eligibility.
- The period of employment is 36 months. The targeted starting date is 01-Mar-2024.
- Doctoral Candidates are expected to travel to network partners for secondments and to participate in outreach activities.
- To qualify, the candidate must not have resided or carried out his/her main activity in Germany for more than 12 months in the 36 months immediately before the recruitment date (unless as part of a compulsory national service or a procedure for obtaining refugee status under the Geneva Convention).
- The candidate must not possess a doctoral degree (Ph.D.) and needs to have less than four years of full-time equivalent research experience after graduation with a degree allowing to start a Ph.D.

Application Procedure

Documents requested:

- Complete CV (Europass format obligatory):
  https://europass.cedefop.europa.eu/documents/curriculum-vitae).
  The candidate is allowed to pursue a maximum of three positions in the QuNEST program. If more than one position is pursued, please clearly indicate with priorities all the positions applied for.
- The motivation letter (max 1 page per position applied) should state why the applicant wishes to pursue the specific research and why the applicant is an ideal candidate for the position.
- Scan of certificates showing BSc, MSc, and other courses followed, with grades and, if possible, a ranking.

- Up to three recommendation letters and/or contact e-mail addresses with a brief professional description (title, position, relationship with applicant) of the referring person.
- Up to two written scientific reports in English (e.g., MSc thesis, traineeship report or scientific paper)
- Eligibility Statement:
  For verifying the MSCA requirements, the candidate clearly indicates the country/countries of main activity (work, studies, etc.) and country/countries of residence in the last five years.

If you want to be considered for this position,
send your application **no later than 15-Dec-2023** to **jobs.QuNEST@VPIphotonics.com**.

Selection Process:
The selection process of invited candidates contains two phases:
- First, a wide range of selection practices will be applied (including expert assessment, face-to-face interviews, etc.) to evaluate the potential candidates.
- Then, QuNEST's Recruitment, Equality, Diversity & Inclusion Committee will evaluate the selected candidate. The committee addresses gender balance and diversity issues within the entire Doctoral Network and needs to approve the selected candidate.

QuNEST deals with a recruitment process based on the European principles of openness, fairness, and transparency that guarantee a selection of candidates regarding merit and gender balance. All institutions have clear equal opportunities policies ensuring equal and fair recruitment and employment of men and women. All submitted applications will be checked against the defined eligibility and mobility criteria. Applications that do not follow these criteria will not be considered.

For more information about the project and any informal inquiries,
please contact Dr. André Richter under jobs.QuNEST@VPIphotonics.com.