Early-Stage Researcher 3-year PhD position: 
“Design and optical characterization of grating waveguide structures GWS”

GREAT - “Grating Reflectors Enabled laser Applications and Training”

ORGANISATION/COMPANY: Institutions across Europe in the GREAT ITN network

RESEARCH FIELD: Physics > Optics > Laser applications, Optical engineering, Metrology and measurement

RESEARCHER PROFILE: First Stage Researcher (R1)

APPLICATION DEADLINE: 13/12/2020 00:00 - CET

LOCATION: Germany › Stuttgart › University of Stuttgart › Institut für Strahlwerkzeuge (IFSW)

TYPE OF CONTRACT: Temporary

JOB STATUS: Full-time

HOURS PER WEEK: 35-40

OFFER STARTING DATE: Immediately

EU RESEARCH FRAMEWORK PROGRAMME: H2020 / Marie Skłodowska-Curie Actions MARIE CURIE (MSCA-ITN-ETN)

GRANT AGREEMENT NUMBER: 813159

We are pleased to advertise an Early-Stage Researcher (PhD) position to begin as soon as possible, as part of the Innovative Training Network of the European Commission GREAT “Grating Reflectors Enabled laser Applications and Training”. The position will last three years and will allow to participate in an exciting programme comprising international schools, workshops, and secondments at academic as well as industrial partners.

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

The overall aim of the GREAT (Grating Reflectors Enabled laser Applications and Training) project is to train a cohort of 15 Early-Stage Researcher (ESRs) through the completion of interconnected individual projects which will deliver innovative approaches for development and use of Grating Waveguide Structures (GWS), from design to implementation in several laser systems. GWS results from the combination of sub-wavelength gratings and planar waveguides. This combination results, by means of an appropriate design of the overall GWS resonances, which are more efficient than current grating-only devices, unique optical components that are enabling for a range of applications. The GREAT projects encompass Photonics, Micro-Nano technologies, Advanced Materials as well as
Nanotechnologies, which are among the Key Technologies defined within the H2020 framework, underpinning the competitiveness and renewal of European manufacturing. Moreover, Lasers, is identified as an important industrial sector, where the European Community is a key player, who aims to keep its competitive position.

The ESRs will be embedded within leading international institutions and trained to work collaboratively to deliver ground-breaking research solutions and novel systems, whilst responding to real-world problems. This is a crucial skill, particularly since there is an overall lack of qualified specialized personnel in this field, with a growing number of active companies worldwide. Critically, this lack of skilled workforce has been identified by the ETP Photonics21 (Photonics21 (2013), “Towards 2020 – Photonics driving economic growth in Europe-Multiannual Strategic Roadmap 2014 – 2020”), as a major challenge for the photonics community, but also highlighting a rich landscape for career progression.

Therefore, the GREAT network will provide each ESR with key learning opportunities along with project specific exposure to important modelling methods, world-leading fabrication tools, or systems development. These will be paramount for the realization of optics based upon GWS, leading to the consolidation and expansion of their use in several advanced application-themes in the field of Laser, such as pulse compression, spectral stabilization and wavelength multiplexing, as well as polarization shaping (generation of beams with radial and azimuthal polarization).

The GREAT consortium includes:

- UNIVERSITAET STUTTGART (USTUTT)
- UNIVERSITE JEAN MONNET SAINT-ETIENNE (LabHC)
- ECOLE CENTRALE DE MARSEILLE (IF)
- UNIVERSITY OF SOUTHAMPTON (ORC)
- UNIVERSITY OF EASTERN FINLAND (UEF)
- GESELLSCHAFT FUR ANGEWANDTE MIKRO UND OPTOELEKTRONIK MIT BESCHRANKTER HAFTUNG AMO GMBH (AMO)
- DILAS DIODENLASER GmbH (DILAS)
- CENTRE TECHNOLOGIQUE ALPHANOV (ALPHA)
- UNIVERSITE DE BORDEAUX (UBx)

plus private sector partners:

- FIBERCRYST SAS
- TRUMPF LASER GMBH
- MODUS RESEARCH AND INNOVATION LIMITED
- Novae
- AMPLITUDE SYSTEMES SA
Job description

Design and optical characterization of grating waveguide structures GWS

Development of design tools for precise modelling of important parameters of the GWS for the different applications (pulse compression, spectral stabilization and wavelength multiplexing, radial/azimuthal polarization shaping). Accomplishment of precise measurement of the refractive indices of coated dielectric layers using grating-based M-lines spectroscopy. Results shall be used in design routine to align simulations and experiments. Accomplishment of precise characterization results for the measurement of the polarization and wavelength dependent reflectivity, diffraction efficiencies, absorption and scattering losses of the different GWS developed in the project. Accomplishment of LIDT measurement in CW operation and @ 1030 nm.

Specific requirements: Basic knowledge in programming or simulation tools (e.g. MATLAB, python or C), basic experiences in handling of optics, fundamentals in laser physics.

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, paid in the currency of the host country, and with a correction factor applied to the host country. The approximate monthly salary before employer and statutory deductions is €3,172 plus an additional mobility allowance of €600/month. 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 for further information.

The ESRs will be enrolled in an exciting PhD programme of leading academic and industrial researchers. In addition to their individual scientific projects, all ESRs will benefit from a dedicated training program 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 not have resided or carried out their main activity (work, studies) in the country for more than 12 months in the 3 years immediately before their appointment; AND shall also be in the first four years of their research careers at the time of appointment and have not been awarded a doctoral degree.

Offer Requirements, Skills and Qualifications

- Must have Master (or equivalent) degree in Mechanical Engineering, Mathematics, Physics or Photonics with solid knowledge of optics and its applications.
- Must be in the first 4 years of his/her career, measured from the date of graduation (MSc degree or equivalent).
- Should not hold a PhD degree.
- Should not have resided or carried out their main activity (work, studies) in the country of their appointment for more than 12 months in the 3 years immediately before their appointment. For refugees under the Geneva Convention, the refugee procedure (i.e. before refugee status is conferred) will not be counted as ‘period of residence/activity in the country of the beneficiary’.
- Must be able to communicate fluently in English, in oral and written form.
Selection process

Applicants will need to submit for each application:

- Brief description of why the applicant wishes to become a PhD student within GREAT (Letter of motivation).
- Copy of transcripts and of their degree, and a copy of master's thesis and any other publications (if available).
- Curriculum vitae of three pages maximum.
- Two written recommendation letters (e.g. one by the former Master thesis supervisor and their referees contact details).

PLEASE SEND YOUR FULL APPLICATIONS TO THE FOLLOWING E-MAIL ADRESS: great@ifsw.uni-stuttgart.de

Only complete applications will be considered.