Job Description
Early Stage Researcher
CAEmate Srl

CAEmate srl is seeking to appoint one high-calibre Early Stage Researcher (ESR) to join the Marie Skłodowska-Curie Innovative Training Network - European Industrial Doctorate **'LIGHTEN - Ultralight membrane structures towards a sustainable environment**'.

Position	**Early Stage Researcher 2: A novel method to determine the time and temperature-dependent onset of plasticity in structural membranes**
Location:	CAEmate Srl, Bolzano, IT
Working Time:	Full Time (40 hours per week)
Duration:	Fixed-Term – 36 months: from 1st May 2021 to 30th April 2024
Salary:	• € 40,966.50 (before employer and employee deductions – fixed for period of the appointment) per annum, plus a monthly taxable mobility allowance of € 600.00. • If applicable, an additional taxable monthly family allowance of € 500.00 subject to family status of the appointee.

About LIGHTEN

Building construction industry is the largest anthropogenic source of pollution with massive energy consumption and vast CO_2 emission. Novel fully recyclable and low-carbon structural membranes offer a green alternative to glass and other transparent cladding materials used in lightweight buildings, resulting in significant weight savings in the structures and drastically reducing the environmental impact. The remarkably incomplete scientific and technological understanding of the thermomechanical behaviour of such innovative structural skins requires the development of engineering models capable of predicting their performances and allowing their rational use in ultralightweight buildings with enhanced energy efficiency and resilience. The EU-funded LIGHTEN project aims to educate and train a new generation of highly qualified scientists and engineers to become experts in advanced design methods for sustainable construction. Experimental characterisation, modeling, computer simulation and structural design will constitute the education of the researchers within an integrated doctoral program supervised by industrial and academic partners.

For further information about the Project, please visit
https://cordis.europa.eu/project/id/956547.

The Role

ESR2 will be enrolled on the PhD programme in Mechanical Engineering at University College London (UCL) and employed on a fixed-term contract at CAEmate Srl. The ESR will perform research on the "**A novel method to determine the time and temperature-dependent onset of plasticity in structural membranes"**, supervised by Dr Massimo Penasa at CAEmate Srl and by Prof Federico Bosi at UCL.

About CAEmate: CAEmate is a rapidly growing hi-tech company active in the development of innovative software solutions and cloud applications targeted to engineering workflow automation. The company employs the most advanced technologies in object oriented programming, cloud-computing and numerical simulation (FEA, CFD, DEM) to improve efficiency and safety in the engineering design procedures. The company is located in Bolzano, in Northern Italy.

Further information about the PhD project is below:

Title: A novel method to determine the time and temperature-dependent onset of plasticity in structural membranes
Objectives: Structural membranes are ubiquitous due to their ultralow weight and ability to undergo large deformations. However, it is recognised that a reliable method to assess the onset of plasticity in thin films is missing, and therefore it limits the knowledge of the yielding conditions, thus preventing an optimal structural design. ESR2 will address this scientific challenge by developing a novel non-contact imaging technique to reliably detect the onset of irreversible deformations in structural thin films, after completing a review of the traditional methods and their limitations. This unprecedented procedure aims to detect in real-time the yield strength of materials in a membrane state. Such method will be based on novel solutions for the viscoelastoplastic inflation of circular and elliptical isotropic and orthotropic membranes, in order to assess different values of the stress biaxiality and different portions of the yield loci. Analytical, numerical and finite element approaches will be employed [at CAEmate for 12 months]. Experimental validation of the proposed method, and comparison with available techniques will follow. The novel technique will be adopted to characterise the temperature and strain rate dependency of the yield stress biaxiality for building skins. By using the obtained experimental data, yielding of structural membranes will be modelled as a thermally activated process, and plane stress yield criteria will be developed [at UCL for 16 months]. Finally, the yield functions will be implemented in commercial and open source finite element software and applied to design cases [at CAEmate for 6 months]. New guidelines for the viscoelastic design limit will be proposed [at SBP for 2 months].
Expected results: (i) development of a novel method to detect the onset of plasticity in structural membranes; (ii) viscoelastoplastic solution for the inflation of thin films with different shapes; (iii) temperature and strain-rate dependent yield criteria for building skins; (iv) validation, numerical implementation and application of the yield functions.
Planned secondments: ESR2 will spend 16 months at UCL, Department of Mechanical Engineering, London, UK (https://mecheng.ucl.ac.uk/) and 2 months at Schlaich Bergermann Partner (SBP), Stuttgart, DE (https://www.sbp.de/en/).

About UCL: the Department of Mechanical Engineering at UCL is an internationally recognised centre of excellence for the fields of advanced materials and structures, materials processing, and modelling. The Mechanical Engineering Department at UCL began in 1847 with the appointment of a "Professor of Mechanical Principles of Engineering", the first mechanical engineering chair in the country. As a PhD student at UCL you will benefit from engineering research training, high-performance computing, and experimental laboratories with state-of-the-art equipment.

About SBP: SBP designs and develops innovative structures that include longspan lightweight roofs, a wide range of bridge types, slender towers and innovative membrane buildings, and pioneering solar power plants. Schlaich Bergermann Partner has branches in several countries across the world (Stuttgart, Berlin, New York, São Paulo, Shanghai, Paris).

The successful candidate will be a team player, prepared to work closely with the Project's senior staff and other ESRs. The successful candidate will receive a prestigious fellowship and will benefit from a wide-ranging training programme and activities, which will encompass:

a) Being part of a network of leading scholars working on innovative technologies for lightweight tension building constructions.
b) Regular training schools pertaining to both, technical skills on topics in lightweight membrane structures relevant to the scope of the LIGHTEN project, and a range of transferrable skills (research management, communication, dissemination, etc.).
c) A secondment to one of the partners in the LIGHTEN consortium.
d) Establishing a professional network in academia and industry.

Duties & Responsibilities

1. Undertake postgraduate research in support of the agreed doctoral research project.
2. Work closely with the academic and industrial supervisors to ensure the compatibility of the individual project with the overall goals of LIGHTEN.
3. Disseminate the research outputs through publications in international journals
4. Present the research at major international conferences to both academic and non-academic audiences.
5. Communicate the results of project through outreach activities.
6. Attend and participate in academic and non-academic conferences, events and seminars.
7. Attend and participate in all training events and supervisory meetings.
8. Be seconded to other network partners as necessary to fulfil the grant obligations.
9. Prepare progress reports and similar documents on research for funding bodies, as required.
10. Contribute to the delivery and management of the wider Programme, including attending and participating in programme committee meetings.

As job descriptions cannot be exhaustive, the ESR may be required to undertake other duties, which are broadly in line with the above duties responsibilities.

Person Specification

1. A first-class Master's degree (or equivalent) in Solid and Structural Mechanics, Civil/Structural/Mechanical Engineering, Software Engineering or a related discipline.
2. Experience with material and structural modelling, programming languages (e.g. Python, C++, FORTRAN, JavaScript) and numerical simulations is a significant advantage.
3. Excellent written and verbal communication, including presentation skills.
4. Highly proficient English language skills.
5. Excellent organisational skills, attention to detail and the ability to meet deadlines.
6. Ability to think logically, create solutions and make informed decisions.
7. Willingness to work collaboratively in a research environment.
8. A strong commitment to your own continuous professional development.
9. Ability to travel and work across Europe.

Eligibility Requirements

All candidates must meet the following requirements to be considered for this post:

a) Early-Stage Researchers (ESRs) shall at the time of recruitment by the host organisation be in the first four years (full-time equivalent research experience) of their research careers and not yet have been awarded a doctoral degree. Full-time equivalent research experience is measured from the date when a researcher obtained the degree which would formally entitle him or her to embark on a doctorate, either in the country in which the degree was obtained or in the country in which the researcher is recruited.
b) At the time of recruitment by the host organisation, researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of their host organisation for more than **12** months in the three years immediately prior to the recruitment date. Compulsory national service and/or short stays such as holidays are not taken into account.
c) Please also refer to the following website for eligibility criteria: https://www.ucl.ac.uk/prospective-students/graduate/research-degrees/mechanical-engineering-mphil-phd

How to apply

Application must be must submitted to info@caemate.com with the subject "Application for LIGHTEN ESR position"

The application must include:
a) A cover letter explaining your motivation for applying, maximum 2 pages long.
b) A Curriculum Vitae setting out your educational qualifications as well as any additional scientific achievements and publications.
c) Highly proficient English language skills. See also: https://www.ucl.ac.uk/prospective-students/graduate/learning-and-living-ucl/international-students/english-language-requirements.
d) Electronic copy of your Master's certificate (or equivalent) or certificate of graduation.

e) Electronic copies of academic transcript of the completed subjects and grades achieved in the course of the Master's and Bachelor's programmes.
f) At least one reference letter from a former researcher familiar with your academic activities, e.g. the advisor of your Master's thesis. Contact details for two additional referees.

Selection process

The selection and recruitment processes of the ESRs will be in accordance with the European Charter and Code of Conduct for the Recruitment of Researchers and guidelines described in the Grant Agreement of the LIGHTEN project. The recruitment process will be open, transparent, impartial, equitable, and merit-based. There will be no overt/covert discrimination based on race, gender, sexual orientation, religion or belief, disability or age. To this end, the following selection criteria for the recruitment of the ESRs will be considered:

1) Curriculum vitae
2) Academic performance (diplomas, university transcripts, etc.)
3) Research and industrial experience
4) Awards and fellowships
5) Publications and patents
6) Research, leadership, and creativity potential
7) English knowledge
8) Reference letter
9) Other relevant items based on the specific candidate

The applications will be reviewed after **15th December 2020**, and the shortlisted candidates will be invited to a Skype/MS Teams/Zoom interview in December 2020 or January 2021. The position remains open until filled.

Further Information

For more information about the post, please contact: Dr M. Penasa (info@caemate.com).

Disclaimer

By applying to this position, you give consent to circulate your application within the consortium members.