POSITIONS OFFERED

The Nonlinear Dynamics and Fiber Optics Group at IO-CSIC invites applications for two PhD studentships, funded through the ICONE Marie Curie Training Network

Positions available: 2

Duration: 36 Months

Gross salary: approx. 33k€ to 36 k€ gross per annum, depending on family charges

Offered positions:

> **Ref:ESR6 -** Distributed amplification and optimal power management for impairment reduction in long-haul coherent optical transmission systems

> **Ref:ESR7 -** Optimization of nonlinearly-assisted technologies for coherent optical communications

Contact person: j.d.ania@csic.es (FULL APPLICATION INSTRUCTIONS AFTER PAGE 2)

Deadline: 31st July, 2014

Background

Long-distance communication is now a fundamental aspect of both economic and societal behaviour, set to strongly influence our future development. Society at large is nowadays familiar with the user interfaces of computers, televisions, smart phones and other devices, but this remarkable change in human behaviour has been brought about by the continuous evolution of communication networks over the last 65 years, and the roll out of fiber-based broadband services. The ICONE training network provides an unique opportunity for the training and education of researchers in the most advanced optical transmission systems, i.e. high capacity high constellation coherent systems using digital signal processing (DSP).

Currently, systems with capacities of about 100 Gbit/s are under widespread commercial installation in the core network around the globe. The next generation research and development focuses on system capacities of 10-100 Tbit/s or more, approaching the "nonlinear Shannon limit" of about 10 bit/s/Hz when aggregating/multiplexing the capacity of several systems in one fibre. The influence of various forms of fibre nonlinearities is a strongly hindering design factor which sets limits to the usable optical power. High capacity coherent systems are currently under investigation at universities, research institutes and leading component and system vendors. ICONE will train 10 PhD students to participate in the growing industry sector which provides the backbone for all long distance communications worldwide.

European industry is experiencing an explosive growth in demand for qualified engineers, researchers and staff well trained in these fields and in a wide variety of exciting adjacent areas. Students graduating from this program will be well placed to fill this gap.

Successful candidates will enter this program in 2014 and undertake research leading to the potential award of a PhD degree over a period of three years. In addition to on the job training at the host institution, all successful candidates will attend a series of focused seminars and workshops delivered by world leading experts from across the globe and will benefit from industrial secondments with key European companies in this sector.

<div align="center">**FULL APPLICATION INSTRUCTIONS**</div>

Project descriptions:

Ref: ESR6 - "Distributed amplification and optimal power management for impairment reduction in long-haul coherent optical transmission systems".

The PhD student will theoretically and experimentally investigate the optimal signal power management in long-haul coherent optical transmission systems and coherent sensors using complex hybrid distributed/lumped amplification schemes, ultra-long Raman fibre laser cavities and effective fibre core area management. This will require the application of advanced theoretical models in the design process and experimental demonstrations and will also involve experimental and theoretical performance analysis of optimized transmission links and sensors.

Ref: ESR7 - "Optimization of nonlinearly-assisted technologies for coherent optical communications"

The PhD candidate will study the optimisation and upgrading of existing nonlinear technologies and devices to operate under the specific requirements of coherent communications. Studies will be carried out using simulation tools operating in a full vector framework, and find optimal regimes for nonlinear polarizers, frequency converters and amplifiers, in order to reduce system impairments for specific coherent transmission formats and system specifications. Optimized designs will be experimentally validated.

Candidate requirements: Excellent academic qualifications are expected. Candidates may apply prior to obtaining their degree, but cannot begin before having received it and should reasonably expect to be awarded the degree in 2014. Candidates must comply with the EC's criteria for eligibility and mobility, specifically; they should not be in possession of a doctorate/PhD, they should have less than 4 years research experience (full-time equivalent, as measured from the diploma/qualification that 'gives the rights to embark in a doctoral degree'), they must not have resided or carried out their main activity (work, studies, etc) in the country of the host organisation to which they apply for more than 12 months in the 3 years immediately prior to their recruitment. Applicants should be free to move throughout the European Economic Area without restriction.

Candidates with experience in digital or optical communication are especially encouraged to apply. Moreover the candidate shall have additional skills including:

- Ability to work independently, to plan and carry out complicated tasks, and to be a part of a large, dynamical group with both local and geographically remote team members.
- Good communication skills in English, both written and spoken.

Industrial experience will be highly appreciated.

Application process

For consideration to any of the available positions, the candidates must send their applications via e-mail to jd.ania@csic.es before 31st July. Note that vacancies may be filled prior to this date and early application is therefore advised. Applications received after 31st July are highly unlikely to be considered.

Applications must be submitted as **one PDF file** containing all materials to be given consideration, where the file name is the candidate's full name followed by "_application".

- A letter motivating the application (cover letter).
- A letter stating the order of preference for the posts (**ESR6** or **ESR7**) accompanied by a supporting statement of less than 200 words.
- Curriculum vitae.
- Grade transcripts and BSc/MSc diploma – Non EU candidates should provide a separate accurate translation of grades into the systems employed by the host institutions selected. Inaccurate or incomplete translations may lead to automatic elimination of an application from any or all positions.
- Candidates whose native language is neither English nor the language of tuition at the host institution should provide formal evidence of competence in English language skills (eg IELTS test certificate).

This should be accompanied by an **additional PDF file** containing information on age, gender, race, disability, religion and ethnic background for monitoring purposes. The file name should be the candidate's full name followed by "_monitoring". This file will not be forwarded to any of the selection committees and will be processed by the coordinators human resources department for monitoring purposes only.

Please note that unsuccessful candidates who are shortlisted but not selected <u>will also be considered separately for any unfilled posts in the consortium</u>, so they might receive an offer to enlist as a PhD student with another of the partners of the ICONE consortium.

A general announcement for the 10 PhD positions in the ICONE network will be shortly available both at EURAXESS (http://ec.europa.eu/euraxess/index.cfm/jobs/index) and
NatureJobs (http://www.nature.com/naturejobs/science/)

Potential applicants are equally welcome to apply to the positions at IO-CSIC (Refs: **ESR6** and **ESR7**) directly to IO-CSIC (jd.ania@csic.es), as described in this document, or through the project coordination team following the procedure detailed in the EURAXESS and NatureJobs announcements.