Up to 3 PhD positions in Industrial Track available within the FLIGHT Fellowship Program (MSCA-COFUND action)

DESCRIPTION:

ICFO offers **PhD-fellowship positions in Industrial Track** to well-qualified graduate students, who wish to **obtain a doctoral degree in cutting-edge research fields of ICFO.**

The positions are offered in the scope of the **FLIGHT** Program, a MCSA-COFUND doctoral program explicitly **focused on intersectoral research training in collaboration with Industrial Partners.**

Our PhD Fellowship Program welcomes applications from **individuals with a degree in a field of mathematics, science or engineering related to the ICFO research activities**.

Our PhD-program brings together *top-level training and teaching for young scientists*, benefiting from the extensive course offerings of local universities and focused instruction by ICFO professors, *in a stimulating, international and interdisciplinary environment*. PhD-students have the opportunity to take advantage of our *network of excellence*, consisting in partners of national and international research institutes and universities, as well as industrial partners in the field.

Selected PhD candidates will join the **Industrial PhD Track**, developing projects in close collaboration with industrial partners. Fellows will undertake **secondments of 6–18 months** at the partner organizations, ensuring full immersion in both academic and industrial settings throughout their fellowship.

Research Projects Available

The following projects are open for this call:

IT008: How do crops avoid photodamage under the sun?

- **Supervisors:** Prof. Dr. Nicoletta Liguori (ICFO) and Dr. Marta da Silva (IRTA)

- **Objective:** The project aims to investigate how crop species and varieties balance the use of sunlight for growth while minimizing the risk of photodamage. The research will involve applying state-of-the-art biochemical and spectroscopic techniques to study photoprotection mechanisms across diverse crop species and varieties. The objective is to gain molecular-level insights into the strategies employed by crops to ensure efficient photoprotection and maintain biodiversity.

- **Candidate Requirements**:

Essential:

  - Recent graduate with a degree in Biology, Biotechnology or Chemistry with experience with protein purification or protein biochemistry.
  - Experience with research on plants or photosynthetic organisms considered a plus.
  - Experience in spectroscopic characterization is desirable.

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- Familiarity with ultrafast spectroscopy will be considered an advantage.
- Strong motivation and interest in the research area.

IT009: FPGA-Based Hardware Acceleration for Post-Quantum Cryptography (PQC) and Quantum Key Distribution (QKD) Emulation

- **Supervisors**: Prof. Dr. Valerio Pruneri (ICFO) and Dr. Pau Gomez Kabelka (LuxQuanta)

- **Objective:** Develop FPGA-based PQC codes to strengthen the classical communication channels of LuxQuanta's QKD transceivers portfolio. This includes also developing a FPGA-based emulation of the optical transmission layers used for QKD, a versatile toolchain for optical simulation and verification.

- **Candidate Requirements**:

Essential:

- Master's degree in Physics, Telecommunication, Computer Science, Electronics, or related fields.
- Master's thesis in Experimental Quantum Physics or High-Performance Computing.
- Programming expertise in Python and C.
- Hands-on experience with hardware programming, e.g., microcontrollers (Arduino), Microprocessors (Raspberry Pi).
- Strong interest in FPGA and proficiency in programming RTL languages (e.g., Verilog, VHDL).
- Strong English communication skills (spoken and written).

IT010: Development of Applications and Devices Based on Photonic Integrated Circuits (PICs)

- **Supervisors**: Prof. Dr. Valerio Pruneri (ICFO) and Dr. Norbert Kerwien (ZEISS)

- **Objective**: Collaborate on the design, fabrication, and characterization of applications and devices that incorporate photonic integrated circuits (PICs), leveraging ICFO's burgeoning infrastructure in this area and ZEISS' industry-leading expertise in this and related fields. The specific technical focus of the project will be tuned to the candidate's experience, but will involve strong elements of optical design and will result in the development of devices or components that are of common interest to both Zeiss and ICFO. We aim to focus on sensing applications, developing advanced sensors that utilize PIC technology to improve detection capabilities in areas such as environmental monitoring and healthcare diagnostics.

- **Candidate Requirements**:

Essential:

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- Master's degree in Physics, Photonics, Engineering, or related fields.
- Strong understanding of optics and photonics.
- Demonstrated programming skills, preferably in Python.
- Independent, structured working style with excellent organizational skills.
- Open-mindedness, creativity, and passion for innovation and technology.
- Strong English communication skills (spoken and written).

Preferred:

- Background in integrated photonics.
- Experience in design, simulation, and/or testing of photonic integrated circuits.
- Hands-on experience in photonics design tools, e.g., Ansys Lumerical
- Previous academic/industrial work experience or publications.

Important: During your application, you will be requested to indicate the research project you are interested in accomplishing your PhD with.

Join Us and Shape the Future

This is your chance to join a globally recognized research institute and contribute to transformative advancements in photonics, quantum technologies, and beyond. Take the leap and apply to the **FLIGHT Fellowship Program** today!

REQUIREMENTS AND CONDITIONS:

To be **eligible** for an ICFO PhD position, candidates must:

- Have an internationally-recognized Master-equivalent degree. The degree must be completed by the start of your prospective PhD at ICFO, at the latest, and must be in a field of mathematics, science, engineering or medical sciences related to the ICFO research activities. Degrees issued within the European Higher Education Area (EHEA) must have an equivalent to 300 ECTS, out of which a minimum of 60 ECTS must have been obtained in postgraduate studies. Please, if in doubt regarding your academic eligibility, contact us at jobs@icfo.eu
- Have an excellent academic record, previous research experience and a strong commitment to scientific research.
- Have a high working knowledge of English.
- Candidates who have already been awarded a PhD are not eligible to apply.
- Candidates who have been already admitted into the ICFO doctoral program may apply if they have not previously applied to any equivalent ICFO PhD Fellowships call (this includes, for example, the Spring and Fall PhD fellowship calls and previous FLIGHT calls).

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- Candidates who have not been admitted into the ICFO doctoral program and **have previously applied to any previous call for equivalent ICFO PhD fellowships** (this includes, for example, the Spring and Fall PhD fellowship calls and previous FLIGHT calls), may only apply again if they can **demonstrate a substantial change in circumstances in their application**. For example, candidates who applied while completing their Master program, who have subsequently completed their degree and corresponding master's thesis research project with significant output (grades, research results) that was not included in their previous application may apply again. Candidates should also explicitly describe any updates to their candidacy in their application documentation.

Specific Eligibility Requirements for FLIGHT

In addition to the general eligibility criteria defined above, candidates for the FLIGHT COFUND PhD positions must comply with the following EU-rules by the corresponding call deadline:

- Fulfil the MSCA mobility requirements: the candidate must not have resided or carried out their main activity (work, studies, etc.) in Spain for more than 12 months during the last 3 years by the call deadline. Compulsory national service and/or short stays such as holidays are not counted.

ICFO is an equal employment opportunity employer. Candidates are selected exclusively on merit and potential on the basis of submitted application material. No restrictions of persons with disabilities, citizenship or gender apply to ICFO positions. ICFO abides by the principles of openness, efficiency, transparency, supportiveness, and international comparability as stated in the European Charter for Researchers and the European Code of Conduct for the Recruitment of Researchers.

FLIGHT aims to recruit outstanding international Fellows from a wide range of backgrounds. ICFO will ensure equal opportunities among the potential applicants and encourage applications from candidates from under-represented groups, and non-standard career paths.

Candidates with disabilities or other special needs are strongly encouraged to apply to the program. ICFO will provide all possible assistance to ensure the candidate's application is fairly assessed.

Candidates who have extenuating circumstances that may explain gaps in the academic career or other potentially negatively evaluated aspects of their application are invited to volunteer, if they wish, personal information that the selection panel may consider in their evaluation. Such information may include details of family obligations, severe illness or disability, refugee situation, etc. If the selection panel decides to shortlist a candidate based in part on such extenuating circumstances, it may require the candidate to provide reasonable supporting documentation.

CONDITIONS

ICFO PhD Fellowships are offered for a period of 4.5 years. The **conditions** of the positions awarded in the scope of the ICFO PhD fellowship program are as follows:

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- Initial ICFO contract for a period of 6 months, while being pre-admitted to the PhD Program, with a follow-up/ renewal procedure at the end of this first stage. (1) During this period, students are fully integrated into an ICFO research group, take part in the ICFO working environment and training programs, and work with their supervisor to define and commence a research project. The annual gross salary subject to the stipulated fiscal and social security deductions during this period is 26.200€.
- After this initial period, students are formally enrolled in the UPC PhD Program in Photonics (2), and the FLIGHT COFUND PhD Fellowship is activated for a period of three years. Fellowships are renewable for an additional fourth year with ICFO Funding, and are formalized via a PhD-contract. Continuity and renewal are subject to satisfactory performance in the PhD studies and related research activities, evaluated annually by the Thesis Director and the ICFO PhD Committee.
- The annual gross salary subject to the stipulated fiscal and social security deductions is 26.200€ for 4 years of the PhD Fellowship. (3)
- All ICFO fellowships include medical care coverage and work accident insurance through the Spanish Social Security system, providing access to the Spanish public health care system.
- Relocation Allowance: a one-off payment of up to 2.000€ to cover relocation expenses at activation of the fellowship recruitment.
- Family Allowance: a one-off payment of up to 2.000€ for Fellows with family commitments to cover additional relocation expenses at recruitment. Eligibility will follow MSCA rules.
- Training and Other Costs: up to 1.800€ per year to cover training and related costs, such as registration fees, travel, and subsistence costs for participation in national or international events, conference, meetings, schools, and/or other training activities.
- Research Costs: up to 5.935,20€ per year for laboratory-based research projects. Funds can be used for consumables and other materials and equipment deemed necessary to carry out the research project.

The allocated funding for research, training, and other costs will be managed by the Group Leader of the group that hosts the Fellow and must be used in expenditures associated to the Fellow's research activities.

(1) Note that in exceptional cases, e.g. when the candidate's degree that gives access to the doctoral studies is older than three years, complying with the labor law in force, the initial trainee period might be shortened or not offered.

(2) In exceptional circumstances, a student may be enrolled in another local PhD program.

(3) The Gross remuneration for the FLIGHT COFUND PhD Fellowship is 33.600€ per year covering the full cost of the Living + Mobility Allowances, including salaries, social security contributions, taxes and other costs or compulsory deductions under national legislation linked to in the remuneration, and the mobility costs. This includes the employer's contributions to social security etc. The corresponding

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gross salary, including living and mobility allowance and subject to the stipulated fiscal and social security deductions, is 26.200€.

APPLICATION PROCESS:

The formal application should be submitted online via https://jobs.icfo.eu/?detail=960

To **apply**, suitable candidates are requested to **submit (in English) online the following material**:

- A Cover Letter addressing research interests and motivation for application, as well as specific indication of a project and an ICFO research group of interest,
- A Curriculum Vitae, including contact details.
- Scanned copies of the complete (Bachelor and Master equivalent) official academic transcripts in English or Spanish,
- Scanned copies of the degree certificates, if available at the time of application,
- Holders of degrees issued within European Higher Education Area outside Spain shall also submit the European Diploma supplement, if available. If not submitted during the application, this will be compulsory to be submitted in further steps of the selection process.
- Holders of degrees issued in outside European Higher Education Area shall submit documentation that explicitly indicate equivalence of degree and/or admissibility in a PhD program in the country where it was issued. If not submitted during the application, this will be compulsory to be submitted in further steps of the selection process. Examples of documents we accept are:
  - Official document or website from the degree granting university
  - Academic transcript including this explicit description
  - Letter or certificate from faculty, school or department, addressed to ICFO on official letter-head, signed by a person responsible for admissions into the PhD program
- If available, scanned copy of standardized test results (GRE, TOEFL, etc.). Note that submission of test results is optional, but they can be particularly helpful for evaluating candidates with degrees obtained outside the European Higher Education Area.
- The names and contact details of 2 referees. **IMPORTANT**: These referees will be automatically contacted by ICFO requesting them to complete a standardized evaluation form and submit a letter of support for the candidates one week of the application deadline. When they do so, the applicant will receive an email confirming that the corresponding reference letter has been submitted.
- Extenuating circumstances (optional; 1-page max). Candidates may submit a statement regarding any career interruptions (care of dependents, birth of children, etc.) or any other aspects, which will be taken-into-account in evaluating their applications.

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All required application material, including letters of reference, must be complete and submitted by deadline in order for the application to be considered.

The **deadline** for submission of applications for the present call is January 30, 2025 and the deadline for referees to submit the reference letters is February 2, 2025.

Applicants with a legally recognized disability, equal to or greater than 33%, have the right to be considered in the applicable reserved quota for the corresponding position, and to have the necessary adaptations for selection & evaluation, as well as for the assigned workplace, if necessary. They must provide the assessment or accreditation of the degree of disability issued or officially recognized by the authorities in the area where the workplace is established, along with the rest of the documentation when applying. Failure to present the accreditation for causes attributable to the applicant will entail their participation in this selection process without any reservation and on equal terms with the rest of the candidates.

SELECTION PROCESS:

In a first step of the selection procedure, applications will be assessed by the Selection Committee based on merit and potential, measured in terms of the academic record and personal achievements. Academic excellence is a must. Pro-activity, participation in community activities, and capacity for team-work are also taken into account.

In the second step of the selection procedure, applications will be reviewed by External Selection Committee.

Applicants will be notified the results of these two first steps of the selection procedure by the beginning of February 2025.

Online interviews with the Selection Committee and Matching Interview Panels are planned to take place by mid-February 2025.

The final list with candidates recommended for fellowship concession, as well as reserve candidates, will be available **by the end of February 2025.** Being the last condition that shortlisted candidates find a hosting group at ICFO, candidates are then asked to contact the Group Leader(s) of choice to negotiate directly a potential PhD in their group, on a fellowship. Candidates and Group Leader should confirm within two weeks whether an agreement has been reached. Candidates without a match cannot be confirmed the fellowship.

A dedicated, external and independent Appeals Panel will be established to rule on the outcome of appeals from the applicants.

At all stages of the process, candidates may contact ICFO Human Resources and Education via jobs@icfo.eu; for complete information about the PhD Admissions process at ICFO, please see https://www.icfo.eu/studies/phd-program/

For complete information visit the FLIGHT fellowship program website.

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