Position Description

Group of research topics: Integrated Nonlinear optics

Position is funded by	- COFUND, Marie Sklodowska-Curie Actions (MSCA), Horizon 2020, European Union - École Centrale de Lyon (EC Lyon), France - RMIT University (RMIT), Australia
Research Host	École Centrale de Lyon (EC Lyon), France
PhD awarding institution/s:	Dual PhD awarded by EC Lyon and RMIT
Locations	- Primary: Lyon, France - Secondary: Melbourne, Australia - Annual workshops in Barcelona, Spain
Contract	Full time, fixed term (36 months, extendable up to 48 months in duly justified cases),
Gross annual salary	26.340 EUR salary (gross amount for the employee before tax)
Preferred start date	03/10/2022
Deadline for applications	30/4/2022 (Reference: ECLyon-DC2)

Your choice of research topics (only one of these projects will be funded):

Project 1: Pulse laser deposition lift-off-based integration for nonlinear applications	**Project 2: Novel Nonlinear optical devices for bio-chemical detection**	**Project 3: Reconfigurable Mid-IR broadband nonlinear sources**
Pulsed Laser Deposition is a very promising technics for integrated optics since it can provide high quality materials and micro structuration without etching. In this topic, we want to fully explore the potential of these methods for different integrated devices (operating mainly around telecom wavelength but also in the mid-infrared), like etched less waveguides, rare-earth doped materials for gain or wavelength conversion-on-chip, Yttria-Stabilized Zirconia for non-linear optics applications. *Further information may be obtained from the Supervisors.*	Detection of (bio-) chemicals is of utmost importance in a broad range of applications, from bio-sensing to environmental monitoring. This endeavour requires new concepts with emphasis towards the IR spectral domain where compounds have a distinct fingerprint. The project aims at conceiving, manufacturing (exploiting both nano manufacturing capabilities in Lyon and Melbourne) and characterising new nonlinear integrated devices, exploiting quadratic and third order nonlinear materials. *Further information may be obtained from the Supervisors*	The mid infrared range (between 3 and 15 um) wavelength domain is gaining a significant momentum across a whole range of applications from highly sensitive (bio-) chemical sensors for security, industrial and environmental monitoring. This project aims at creating reconfigurable on-chip nonlinear broadband mid-IR sources, e.g., COMBs and supercontinuum, with electrically-controlled 'on-demand' properties using CMOS compatible platform and phase-changed materials. *Further information may be obtained from the Supervisors.*
Supervisors:	**Supervisors:**	**Supervisors:**

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Dr. Alban Gassenq (iLM - Project 1), Prof. Christelle Monat, Dr. Christian Grillet and: Prof. Arnan Mitchell (RMIT)	Prof. Pierre-Francois Brevet (iLM - Project 2), Prof. Christelle Monat, Dr. Christian Grillet and: Prof. Arnan Mitchell (RMIT)	Dr. Sebastien Cueff (INL - Project 3); Prof. Christelle Monat, Dr. Christian Grillet] and: Prof. Arnan Mitchell (RMIT)
Research Fields: Photonics, integrated optics, nonlinear optics, bio-sensing, mid-infrared		

REDI

The REDI (RMIT European Doctoral Innovators) program is a unique opportunity offering excellent PhD conditions including enviable international experience, top-class research discipline and transversal skills training as well as networking with academic and industry leaders across 60+ supporting partners and 12 countries.
As a REDI researcher you will be:

- enrolled by two entities, with the chance to be awarded dual doctorates and gain alumni status from multiple institutions, including the Marie Curie Alumni Association.
- seeing the world and spending a year at RMIT University in Melbourne, Australia (ranked in the top 20 of universities under 50 years old in the world).
- part of a rich multidisciplinary network of researchers and supervisors who come together in annual, week-long training events in Barcelona.
- working closely with industry and gaining experience with the 40+ leading companies supporting the program.
- earning a salary above national standards for doctoral positions with full social security benefits (with further support available for eligible researchers with additional needs).
- receiving support and guidance from two highest-calibre, experienced supervisors with high PhD completion rates.
- enhancing your career prospects through comprehensive technical and transversal skills training from leading institutions, intersectoral and international experience and mentoring.
- working on innovative and exciting projects of high commercial and societal value with up to four years to complete your research.

For more information visit: rediprogram.eu

Are you REDI? (Expected Profile)

Your background and skills: You are a talented and ambitious researcher with a good knowledge and a solid background in the field of solid-state physics, optics, and semiconductor devices. You should work towards your Masters/honours or Engineering degree in a field apposite to one of these areas. An experience in photonics, clean-room fabrication, programming or optical modelling and characterization will be strongly appreciated.

Your work experience: Professional experience is not required.

Your research experience: You should have a Master in a relevant field: electrical/electronic engineering/physics with a focus on integrated photonics.

Employment Benefits and Conditions

EC Lyon offers a 36-months full-time work contract (extendable up to 48 months in duly justified cases), indicatively starting on 03/10/2022. The position will be based in Ecully (France). International travel is foreseen, including to Australia (up to 12 months) and Spain (one week per year). At EC Lyon, there is a probation period of two (2) months and there are 35 working hours per week.

The remuneration, in line with the European Commission rules for Marie Skłodowska-Curie grant holders, will consist of a gross annual salary 26.340 EUR salary (gross amount for the employee before tax). Of this amount, the estimated net salary* to be perceived by the Researcher is ~ 1.764 EUR/month. However, the definite amount to be

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received by the Researcher is subject to national tax legislation. For more information on the estimated net monthly salary, please use the net salary calculator.

**Net salaries can fluctuate in accordance with an individual's personal circumstances (marital status, age, disability, family and dependents, etc. The above indicative net salaries offer an approximation of what a single person in their early 20s could expect to receive in their bank account after taxes.*

Benefits include:

- Sick leave
- Maternity leave
- Paternity leave
- Family events leave (marriage, death, etc.)
- A family bonus is granted from the birth of the first child.
- A transport bonus is granted if the Doctoral Student has a monthly public transport pass.
- 1,000€ yearly travel allowance to cover flights and accommodation to participate in the annual workshop at RMIT Europe in Barcelona (Spain)
- 10,000€ allowance to cover flights and living expenses for up to 12 months in Australia

For more details, please see: https://www.ec-lyon.fr/

REDI to apply? First a little more about us…

EC Lyon

Ecole Centrale de Lyon (ECL) is one of the top French "Grandes Ecoles". 450 "ingénieurs" (degree equivalent to Master of Science) graduate each year from ECL in various technical domains. About 300 researchers are working on the campus in 6 main laboratories associated with the French National Center for Research (CNRS), including the Lyon Institute of Nanotechnology (INL).

The goal of INL is to encourage world-leading multidisciplinary research in the areas of micro and nanotechnologies and their applications. The pioneering research undertaken at the Institute ranges from materials and technology to devices and systems, thus enabling the emergence of dedicated technologies. The Institute is supported in its work by the Nanolyon Technology Platform. INL has personnel of 200 people including 120 permanent staff and 80 PhD students/ postodoctoral fellows.

EC Lyon university offers to their Doctoral Students a wide range of training, mentoring and support activities, including:

- **Mentoring program:** The student will be closely supervised by at least 2 supervisors at the Ecole Centrale de Lyon site. The supervisors will be closely involved in the activities of the student and will suggest e.g., specific courses that the student can attend to strengthen his knowledge towards the PhD and collaborations that can provide additional support to achieve the thesis goals.
- **Courses and training opportunities:** The student will be able to access the full list of the EEA (Electronics, electrotechnics and automation) doctoral school courses of Univ. Lyon.
- **Language courses:** French courses can be attended free of charge -- frequency: 2x per week.
- **Relocation support:** Espace Ulys is the welcome center for international scientists arriving at the Lyon-Saint Etienne campus. The service provides assistance regarding relocation to PhD students studying or conducting research at Université de Lyon institutions and laboratories.
- **Cultural and social activities:** Cultural and social activities are organised by Espace ULYS: https://espace-ulys.universite-lyon.fr/ulys/site-anglais/
- **Engagement with industry:** The student will interact with the reference contact at THALES Research & Technology France who will be involved in defining the research project with a view to applying research results, providing guidance and mentoring throughout the project. Such interaction will be beneficial to also acquire a more application-driven perspective of the challenges that need to be solved and the different trade-offs involving also aspects such as costs, volume manufacturing etc.
- **Further benefits:** Tuition fees for PhD program enrolment are free of charge.

For more information, visit: https://www.ec-lyon.fr/en/research/doctorate/admission-enrolment-doctorate

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RMIT

RMIT is a global university of technology, design and enterprise, ranked in the top 20 of universities under 50 years old in the world. World-class people, leading edge resources, collaboration with industry partners and multi-disciplinary approaches are just a few of the trademarks of research at RMIT, which boasts almost 90,000 students and campuses in Australia, Vietnam, a centre in Barcelona, Spain and research and industry partners on every continent.

As Doctoral Student at RMIT you will be able to benefit from a wide range of training and mentoring opportunities including:

- **The PhD Up** program offering a huge range of workshops, seminars and short courses to build research knowledge and skills, including research writing, publishing, research methods, ethics, project management and careers (see more at: https://www.rmit.edu.au/students/student-essentials/information-for/research-candidates/enriching-your-candidature/phd-up-program)
- **RMIT PhD Online Modules**, designed specifically for PhD students, including *Researching your literature review, Writing a research proposal, Choosing where to publish, Writing for Publication, Research Integrity*, etc.
- **RMIT Creds**, RMIT's Digital Credentials Platform, which includes over 80 credentials covering a wide range of topics such as *Understanding Responsible Research and Innovation, Academic Integrity Awareness, Emotional Intelligence, Diversity Matters, Agile Ways of Working, Why Gender Matters, Cross Cultural Communications*, etc. (see more at: https://www.rmit.edu.au/study-with-us/levels-of-study/short-courses);
- **The e-Grad School**, the online learning modules of the Australian Technology Network (ATN) of Universities' covering a multitude of transferrable skills such as *Critical and Creative Thinking, Leadership and Communication, Entrepreneurship, Research Commercialisation, Public Policy*, etc.
- **The RMIT Mentoring platform also** gives you access to mentoring from trained professionals and experts, including:
    - *Career Mentoring* - career guidance from industry professionals from all disciplines and global locations.
    - *Women@RMIT Mentoring* - career guidance from industry professionals who are committed to gender diversity and equality in the workplace (especially for female students in male dominated industries)
    - *Pride Mentoring* - a chance for students who identify as LGBTIQ+ to receive professional and social guidance from industry professionals who also identify as LGBTIQ+ or are familiar with the additional challenges these groups face in the workforce.

Find out more: rmit.edu.au

A little more about you…

Eligibility

You need to fulfil criteria of the REDI program and both universities to be recruited.

To apply for REDI, you must comply with the MSCA-COFUND eligibility criteria by the application deadline:

- **Be in the first four years Full-Time Equivalent (FTE) research experience** of your research career and not yet have been awarded a doctoral degree. FTE Research Experience is measured from the date when a researcher obtained the degree entitling him/her to embark on a doctorate, **AND**

- **Not have resided or carried out your main activity (work, studies, etc.)** in the country of your research host for more than 12 months in the 3 years immediately before this call's deadline. Time spent as part of a procedure for obtaining refugee status under the Geneva Convention (1951 Refugee Convention and 1967 Protocol), compulsory national service and/or short stays such as holidays is not taken into account.

AND the following criteria:

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- **Hold a bachelor's degree requiring at least 4 years of full-time study** in a relevant discipline awarded with honours and including a research component; **OR**

- **Hold a master's degree that includes a research component** or a master's degree without a research component with at least a high distinction average; **OR**

- **Have evidence of appropriate academic qualifications and/or professional experience** demonstrating that the applicant has developed knowledge of the field of study or cognate field and the potential for research sufficient to undertake the chosen project.

AND

- Have **English level C1 language proficiency**.

In addition to the above, if your application is successful, you will be required to:

- Apply for a working visa in France. All researchers will have to obtain an agreement from the Defence Security Officer to work at Centrale Lyon (the maximum duration of this procedure is 2 months). In addition, non-European researchers will have to apply for a "Talent" passport, a multi-annual residence permit allowing a researcher to work in France.
- Apply for a student visa in Australia (More information: https://www.rmit.edu.au/study-with-us/international-students/apply-to-rmit-international-students/student-visas/apply-for-a-visa)

In addition to meeting the eligibility criteria for the REDI Program, you will also need to meet the admission criteria of both institutions:

Admission at EC Lyon

You will be enrolled as Doctoral Student at EC Lyon for the entire duration of the assignment. At admission, you will need to supply:

- Degree certificate and transcript of records of an applicable higher university degree. Official translations in English are required in addition to the documents in the original language.
- Proof of English according to the European Framework of Reference for Languages (CEFR)

More information: https://www.ec-lyon.fr/en/research/doctorate/admission-enrolment-doctorate

Admission at RMIT

You will also be enrolled as Doctoral Student at RMIT for the entire duration of the assignment. At admission, you will need to supply:

- CV
- Complete transcripts for all academic qualifications
- Research proposal or statement of interest in an available research project
- Language certificates

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- List of referees

More information: https://www.rmit.edu.au/research/research-degrees/how-to-apply

Apply now (https://www.rediprogram.eu/)

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