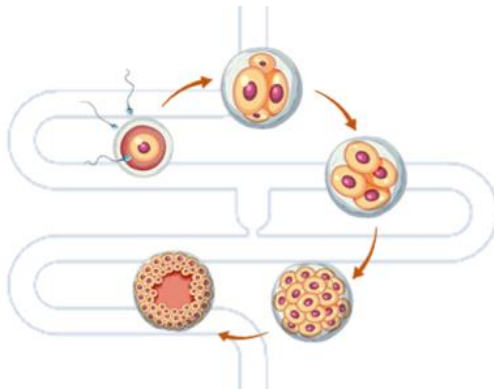


MICROFLUIDICS / BIOLOGY

Non-invasive microfluidic platform for hosting and characterization of embryos resulting from *in vitro* fertilization



Infertility affects 17.5% of couples of childbearing age. Assisted Reproductive Technologies (ART), such as *in vitro* fertilization (IVF), are costly and complex procedures that require state-of-the-art equipment and highly skilled labor. The successive manipulations of embryos are sources of stress that can affect the quality and viability of embryos. However, developmental abnormalities and miscarriages are primarily caused by chromosomal abnormalities so-called aneuploidies. These can be detected through preimplantation genetic testing for aneuploidies (PGT-A) followed by next-generation sequencing (NGS). However, PGT-A, which requires embryo biopsy, remains complex and invasive.

In this context, the Department of Technologies for Healthcare Innovation (DTIS) at CEA-LETI in Grenoble, in collaboration with the Multidisciplinary Preimplantation Diagnosis Center (CP-DPI) at the Grenoble University Hospital (CHU), proposes a PhD thesis that will explore the following questions:

- **How to improve embryo survival and viability over time using microfluidics?**
- **How could temporal monitoring allow better tracking of the evolution of specific biomarkers related to embryonic quality?**

The project will focus on automating embryo manipulations while minimizing mechanical stress, as well as extracting extra-embryonic fluid for biomarker analysis. The doctoral research will lead to the development of a non-invasive microfluidic platform for hosting and characterization of embryos resulting from *in vitro* fertilization.

Microfluidic
Organ-On-Chip
Embryo
IVF
Diagnostis

Required profile

- ▶ Proven proficiency in physics, engineering and fluid mechanics
- ▶ Prior experience in microfluidics and genuine interest in biology are highly appreciated
- ▶ Strong aptitude for experimental methods
- ▶ Team work, proactive attitude and ability to engage in interdisciplinary projects



Contract Period: 3 years
Start date: autumn 2024
Workplace: Grenoble

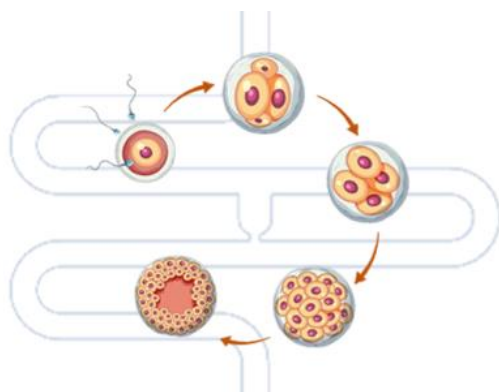


To apply, please contact:

Camille LAPORTE

MICROFLUIDIQUE / BIOLOGIE

Plateforme microfluidique d'accueil et de caractérisation non invasive d'embryons de la fécondation *in vitro*



L'infertilité touche 17,5% des couples en âge de procréer. Les techniques de Procréation Médicalement Assistée (PMA), telles que la fécondation *in vitro* (FIV), sont des procédures couteuses et complexes qui nécessitent du matériel de pointe et une main d'œuvre hautement qualifiée. Les manipulations successives des embryons sont sources de stress pouvant impacter la qualité et la viabilité des embryons. Mais les anomalies de développement et les fausses couches sont principalement causées par les anomalies chromosomiques de nombre ou aneuploïdies. Celles-ci peuvent être détectées par le diagnostic préimplantatoire des aneuploïdies (DPI-A) suivi du séquençage haut-débit (NGS). Cependant, le DPI-A qui nécessite la biopsie embryonnaire reste complexe et invasif.

Dans ce contexte le Département des Technologie pour l'innovation en Santé (DTIS) du CEA-LETI, en collaboration avec le Centre Pluridisciplinaire de Diagnostic Pré-implantatoire (CP-DPI) du CHU de Grenoble propose un sujet de thèse qui explorera :

- **Comment améliorer la survie de l'embryon et sa viabilité au cours du temps grâce à la microfluidique?**
- **Comment le suivi temporel permettra de mieux suivre l'évolution des biomarqueurs spécifiques en relation avec la qualité embryonnaire?**

Le projet se focalisera sur l'automatisation des manipulations embryonnaires en minimisant le stress mécanique, ainsi que sur l'extraction du milieu extra-embryonnaire pour l'analyse des biomarqueurs. Le doctorat aboutira à la réalisation d'une plateforme microfluidique d'accueil et de caractérisation non invasive d'embryons issus de la fécondation *in vitro*.

Microfluidique
Organe-sur-puce
Embryon
FIV
Diagnostic

Profil recherché

- ▶ Formation en **physique**, ingénierie et **mécanique des fluides**
- ▶ Aptitude pour les **approches expérimentales**
- ▶ Intérêt pour la **biologie** et les **biotechnologies**
- ▶ Expérience dans les domaines de la **microfluidique** et de la **biologie**
- ▶ Aptitude au **travail en équipe** dans un **environnement multidisciplinaire**



Début : automne 2024

Durée : 3 ans

Lieu : Grenoble (38)



Pour candidater, contactez :

Camille LAPORTE



About CEA-Leti

Committed to innovation, CEA-Leti creates differentiating solutions for its industrial partners

CEA-Leti is a recognized global leader in miniaturization technologies. CEA-Leti's teams are focused on developing solutions that will enable future information and communication technologies, health and wellness approaches, clean and safe energy production and recovery, sustainable transport, space exploration and cybersecurity.

For more than 50 years, the institute has built long-term relationships with its industrial partners, tailoring innovative and differentiating solutions to their needs.

Its entrepreneurship programs have sparked the creation of 75 startups. CEA-Leti and its industrial partners work together through bilateral projects, joint laboratories and collaborative research programs.

CEA-Leti maintains an excellent scientific level by working with the best research teams worldwide, establishing partnerships with major research technology organizations and academic institutions. CEA-Leti is also a member of the Carnot Institutes network—a French network of 39 institutes serving innovation in industry.

Join CEA-Leti and benefit from:

- Resources to address major societal challenges
- Multidisciplinary networks to conduct your research
- World-class technological platforms
- An international scientific, high-skills environment
- The strength of a major public research organization



A global presence with offices in France, San Francisco, Brussels and Tokyo

€350

million annual operating budget

1,900

research engineers



3,200

patents in portfolio

600+

publications per years

11,000

square meters of cleanrooms



75+

startups created

ISO 9001

certified since 2000



A great place to study

The 2021 Shanghai Academic Ranking of World Universities named Grenoble-Alpes University **#1** in France for:

- Nanoscience & Nanotechnology
- Metallurgical Engineering
- Water Resources Engineering
- Geography
- Hospitality and tourism management

The university's student population of 59,000 stands out for its diversity and excellence:

- 42% pursuing degrees in a scientific field
- 3,000 PhD students
- 1 in 6 students is a foreigner
- 150 different nationalities

Source: *Invest in Grenoble Alpes, Grenoble-Alpes University*



Grenoble: 5th most inventive city in the world (*Forbes magazine*)

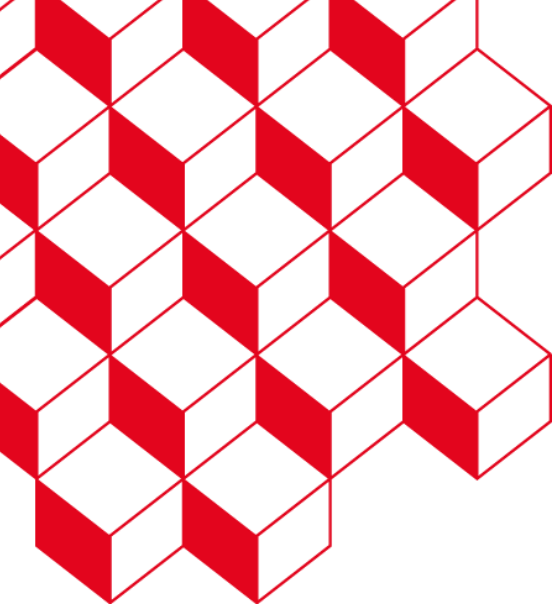
#1

Grenoble Alpes is ranked #1 in France for its concentration of R&D jobs



25

ski resorts close to the city



Contacts

Camille LAPORTE camille.laporte@cea.fr

Remco DEN DULK remco.dendulk@cea.fr

Interested in other areas of research?

Find a complete list of current
job opportunities

www.emploi.cea.fr

CEA-Leti, technology research institute

17 avenue des Martyrs, 38054 Grenoble Cedex 9, France
cea-leti.com

   @CEA-Leti

