| | |
|---|---|
| **Title of the thesis** | Development of an instrumented microfluidic culture system to study tumour-stroma interaction and drug sensitivity of pancreatic adenocarcinoma |
| **Acronym** | MATisSE |
| **Reference number** | 007 |

| **Hosting institution** | **Employer** |
|---|---|
| Université de Lille<br>Website: https://www.univ-lille.fr/home/ | CNRS<br>Website: http://www.cnrs.fr/en |
| **Hosting research unit 1** | **Hosting research unit 2** |
| Name: laboratory for Integrated Micro-Mechatronics System<br>Acronym: LIMMS<br>Identification number: UMI 2820<br>Address: Institut pour la Recherche sur le Cancer de Lille (IRCL)<br>1 Place de Verdun, 59 045 Lille Cedex - France<br>Website: https://limmshp.iis.u-tokyo.ac.jp/ | Name: CANcer heterogeneity, plasticity and resistance to THERapies<br>Acronym: CANTHER<br>Identification number: UMR 9020 CNRS - UMR1277 Inserm<br>Address: Bâtiment Cancer<br>1, place de Verdun<br>59045 LILLE cedex, France<br>Website: http://crjpa.fr/ |
| **Principal supervisor** | **Co-supervisor** |
| Name: Vincent<br>Surname: SENEZ<br>Email: Vincent.senez@isen.fr<br>Phone: +33 6 0747 8047 | Name: Isabelle<br>Surname: VAN SEUNINGEN<br>Email: isabelle.vanseuningen@inserm.fr<br>Phone: +33631529030 |
| **Foreign co-supervisor** | **Foreign co-supervisor** |
| Name: Orjan Grottem<br>Surname: MARTINSEN<br>Email: o.g.martinsen@fys.uio.no<br>University: University of Oslo<br>Research unit: Oslo Bioimpedance and Medical Technology Group<br>Website: https://www.mn.uio.no/fysikk/ | Name: Håvard<br>Surname: KALVØY<br>Email: havard.kalvoy@ous-hf.no<br>University: Oslo University Hospital<br>Research unit: Department of Clinical and Biomedial Engineering<br>Website: https://www.med.uio.no/hth/ |

## Thesis information

| | |
|---|---|
| **Keywords** | organs-on-chip, electrical sensors, pancreatic cancer, chemoresistance, microfluidics |
| **Abstract** | Research at the laboratory for Integrated Micro-Mechatronics System (LIMMS), a joint International Unit between University of Tokyo and CNRS experimentally addresses the development of new miniaturized analytical tools in molecular cell biology, integrative biology and infection. State-of-the art and advanced micro- and nanotechnologies are applied in a professional research environment characterized by its well-established international profile. The laboratory has 5 research groups with a research staff of 40, of which about 10 are PhD students and 10 are Postdoctoral researchers. Read more about LIMMS at http://limmshp.iis.u-tokyo.ac.jp<br>This doctoral student position is available in the group headed by Dr. Vincent Senez, Research Director at CNRS, located in Lille, France. The project addresses the field of cancer research and more specifically the development of in vitro model of pancreatic cancer, usable in clinical routine to propose an adapted treatment to each patient. Pancreatic cancer is a deadly cancer for which no diagnostic or prevention plan |

| | |
|---|---|
| | currently exists. Palliative chemotherapeutic treatment has low efficacy and high toxicity due to multifactorial resistance those mechanisms are still poorly understood. We are studying resistance mechanisms involving MUC4 membrane bound mucin using conventional established models (*in vitro* 2D chemoresistant cell lines and *in vivo* chemoresistant xenografts models). Since pancreatic cancer is highly heterogeneous, we are also investigating the role of the extra cellular matrix as well as of the interaction between tumour cells and stromal cells in this MUC4-mediated chemoresistance. Our aim in this MATisSE project is to combine our efforts to better understand these mechanisms. We are implementing a new three-dimensional microfluidic model allowing continuous monitoring of the cell culture thanks to integrated electrical sensors to identify new markers and/or new targets to propose new adapted therapeutic regimens for each tumour/patient by mimicking at the closest a heterogenous *in vivo* environment.<br>The successful candidate will work in a multi-cultural and multidisciplinary environment and in particular will collaborate with the groups of (i) Dr Isabelle Van Seuningen, Research Director at CNRS and head of the 'mucins, differentiation and epithelial carcinogenesis' group of CANTHER "CANcer Heterogeneity, Plasticity and Resistance to THERapies" laboratory, (ii) Prof. Orjan G. Martinsen, head of the 'Bioimpedance' group at University of Oslo (Norway), (iii) Prof. Håvard Kalvoy, department of Clinical and Biomedial Engineering at the Oslo University hospital and with the company SCIOSPEC in Germany. He/she will undertake his/her research within a joint PhD program (Cotutelle) between the University of Lille and the University of Oslo. The total period of employment is three years of full-time study, starting on 1st September 2020.<br>The PEARL international PhD Program is co-funded by the European Union's Horizon 2020 research and innovation program under the Marie Skłodowska-Curie grant agreement No 847568 and the foundation I-SITE Université Lille Nord-Europe (I-SITE ULNE).<br>For more information, please contact the Principal Investigator, Dr. Vincent Senez, telephone: +33 6 0747 8047, vincent.senez@isen.fr. |
| **Expected profile of the candidate** | The applicant must hold, or to be about to receive before starting the contract, a MSc degree in physics, electrical engineering, bio-engineering, materials science, microtechnology or related areas. The applicant should be strongly motivated to carry out research within the area of organs-on-a-chip. Background in electrical impedance spectroscopy will be appreciated. The candidate should have a cleanroom experience (e.g. photolithography, film deposition & etching). Proficiency in English is required for communication within the consortium and to publish results and present them at international conferences. |
| **Application procedure** | The application procedure is detailed on the European programme PEARL website www.pearl-phd-lille.eu. The funding is managed by the I-SITE ULNE foundation which is a partnership foundation between the University of Lille, Engineering schools, research organisms, the Institut Pasteur de Lille and the University hospital.<br>The application file will have to be submitted before April 15, 2020 (10h Paris Time) and emailed to the following address : international@isite-ulne.fr. |
| **Net salary and Lump Sum** | A net salary of about €1,600 + €530 per month to cover mobility, travel and family costs. |