iMIND
International Master In Neurodegenerative Diseases

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iMIND
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Specialized and selective track of the Master BIP - Neuroscience (year 2)
The first masters programme to focus specifically on neurodegenerative disorders
Developed with the Paris Brain Institute (previously known as the Brain and Spine institute, ICM)
Recruits students who wish to understand the functioning of the brain in normal and pathological conditions

Coursework (5 x 6 ECTS), Msc second year, first semester

Brain to Market summer school

Novel Technologies applied to Human Neuropathologies

Gliai Pathologies and Neurodegenerative Diseases

Hot Topics: Transdisciplinary Approaches in Neurodegenerative and Psychiatric Diseases

Developing a Research Project

- Programme entirely taught in English
- Research-oriented (medical, scientific, R&D…)
- Flexibility allowed regarding course choices
- (access to Neurosciences master BIP modules)

- Guaranteed access to modules with limited spots
- Lectures delivered by researchers expert in their field, from the Paris Brain Institute, and other research institutes in Paris

Master's thesis (30 ECTS), Msc second year, second semester

- Partnership with the University of Vienna, Trinity College Dublin, the Catholic University of Leuven and the Technical University of Munich.
- Funding provided for transportation and living expenses abroad.
- Referent researcher assigned to each student going abroad.

Prerequisites: first year of Msc (M1) level in neurosciences, biology or equivalent
BRAIN TO MARKET SUMMER SCHOOL
PARIS BRAIN INSTITUTE (ICM) COURSEWORK

Brings together a diverse group of students from backgrounds in science, engineering, design and medicine to develop original solutions for people living with brain disorders.

Basis of entrepreneurship and business plan development including project management.

Themes have included depression, Parkinson’s, MS, epilepsy and rehabilitation.

Continuity with Paris Brain Institute tech transfer team’s annual hackathon and prototyping sessions.

No prerequisite in marketing or business required.

| Day 1 | Introduction of the scientific topic by all the care workflow (researchers, clinicians, paramedical staff). |
| Days 2-3 | Basis of marketing, business, health economy, ethic and regulatory aspects by actors of the Health and Wellbeing Business Community examples (companies, patients, regulators professionals). |
| Days 3-5 | Within multidisciplinary teams, design of a valuable proposal to develop concepts and products transferable from research to business and vice versa. |
| Day 5 | Presentation of the projects to a panel of experts. |

- Identify challenges raised by a neurological/psychiatric disease in the context of ageing
  - Learn and exchange within a multidisciplinary group
  - How to prepare a marketable project
    - Create a network of alumni
  - How to pitch a project in front of potential investors

10 students maximum
HOT TOPICS: TRANSDISCIPLINARY APPROACHES TO NEURODEGENERATIVE AND PSYCHIATRIC DISEASES

Students will develop a research project under the supervision of an expert tutor in the field, a cross between research and library project.

Project topics will cover the latest advances in neurosciences, specifically regarding neurodegenerative or psychiatric pathologies as well as cutting-edge technologies.

Students will be exposed to notions of fundamental, translational and clinical research by attending conferences at the Paris Brain Institute, where they will participate to discussions with the international scientists presenting.

➡ Exposure to the multidisciplinary aspects of neurodegenerative and psychiatric diseases research
➡ Participation in discussions with international experts via the Paris Brain Institute conference series which is integrated into the programme
➡ Tutorship with scientists from the Paris Brain Institute and the Neuroscience Paris Seine Institute to develop a research project

✓ Critically analyse the scientific literature
✓ Master approaches and tools to study neurodegenerative and psychiatric diseases
  ✓ Evaluate the validity of these approaches and tools
✓ Suggest experimental approaches to answer scientific issues
✓ Elaborate and organise the interpretation of research data
✓ Present in a clear summarized manner
NOVEL TECHNOLOGIES APPLIED TO HUMAN NEUROPATHOLOGIES

Overview of the latest methodological approaches used to study in an integrative way the molecular and cellular mechanisms associated with neuronal function and dysfunction

Focus on four main domains: Omics, stem cell research, imaging and electrophysiology

Applications to advance research on diverse brain disorders including: Parkinson’s disease, ALS, Alzheimer’s disease, MS, cancer, neurodevelopmental and psychiatric disorders

- Theoretical bases underlying the main techniques addressed in this course.
- Technical demonstrations at the ICM’s cutting-edge facilities.
- Talks from expert scientists covering their latest research on neurodegenerative diseases (Parkinson’s Disease, Alzheimer’s Disease, ALS, MS), as well as other human pathologies (neurodevelopmental diseases, epilepsy, addiction, cancer).
- Talks from junior scientists discussing their research projects as well as their professional experience and training.
- Workshop on ethical considerations regarding these new methodological approaches.

✓ Understand the most recent approaches to study cellular and molecular mechanisms underlying human diseases
✓ Gain knowledge on the scientific advances in these fields
✓ Acquire the methodological understanding (advantages and drawbacks of different approaches) to answer a specific scientific issue
✓ Develop critical thinking regarding an experimental design, results and literature
✓ Develop analysis and synthesis skills

20 students maximum
GLIAL PATHOLOGIES AND NEURODEGENERATIVE DISEASES

Overview of major neurodegenerative diseases and their clinical manifestations

Provide an understanding of the mechanisms of neurodegenerative diseases such as Alzheimer’s, Parkinson’s, and Huntington’s as well as insight into neuronal cell death, genetics and existing treatments.

Focus on the various physiological roles that different glial cells play and the pathologies that are associated with them.

Talks from expert scientists and clinicians studying

- Physiopathology of neurodegenerative disorders
- Mechanisms of neuronal cell death
- Genetics of neurodegenerative diseases

✔ Understand some of the techniques for developing new treatments for neurodegenerative pathologies

✔ Gain information on different types of glial cells and their functioning

✔ Understand the physiopathology involved in diseases related to glial cells (for example multiple sclerosis, peripheral neuropathy, glial tumours)

✔ Understand some of the therapeutic strategies for treating glial cell-related disorders

✔ Learn how to critically analyse neuroscience literature
DEVELOPING A RESEARCH PROJECT

Acquire the tools to **describe and present a research project**

Students will introduce the scientific question that they will study during their **Master’s thesis**

With the help of their host laboratory, students will **develop their experimental approach** with detailed protocols and feasibility considerations.

Opportunity to acquire the pre-requisites skills necessary to complete the Master’s thesis, with literature analysis and discussion with the host team during the first semester.

- **Writing a letter of intention** (scientific background, question raised, experimental strategy)
- **Oral presentation** and discussion with a researcher

- Present in a synthetic manner
  - Conduct a literature review and critical analysis
  - Describe a research project and experimental protocols
- Acquire theoretical skills necessary to apprehend useful concepts for experimental practice in biology
- Assess feasibility and limits associated with planned experiments
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Contacts

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Applications: mid May 2020 to early July 2020
Should you have any questions, please contact: Hélène Cheval

https://sciences.sorbonne-universite.fr/masters/master-biologie-integrative-et-physiologie-bip/m2-parcours-neurosciences