

Master Ingénierie de la santé – Parcours : Neurotechnologie / Neurotechnology (NeuroTech)

SCIENCES, TECHNOLOGIES, SANTÉ

Présentation

The Health Engineering Master's program (BME Paris) is designed to provide a two-year education in the field of bioengineering, at the intersection of biomedical sciences and engineering sciences. It results from a partnership between [Université Paris Cité](#) and [Arts et Métiers](#).

The Master's program is based on a distinctive partnership that fosters an interdisciplinary approach, encourages student initiatives and promotes a global perspective. This policy is supported by the top-level and complementary expertise and know-how of the two partners: engineering science in the engineering school within Arts et Métiers, on the one hand, and biomedical and health science at Université Paris Cité, on the other.

The teaching staff are primarily drawn from the partner institutions. Guest lecturers include hospital clinicians from APHP and researchers from other schools and academic institutions as well as from private companies (e.g. GE Healthcare, Philips Healthcare, Renault, Sanofi, Thalès, Materialise Medical, etc.).

Learning outcomes

The BME Paris Master offers an exemplary program of excellence designed for students from diverse backgrounds, including biology, chemistry, physics, mathematics, engineering, medicine, pharmacy, health sciences and computer sciences. The primary objectives of the Master's program are:

- * to provide students with the knowledge and tools required in a wide range of the biomedical engineering fields

- * to foster a fruitful collaborative spirit between engineering and medical students, with the ultimate goal of bridging the existing « culture gap » between the corresponding professions.

While the second year (M2) offers five specialization tracks, the first year (M1) is devoted to strengthening and broadening students' skills in specific engineering and biomedical subjects. Students receive guidance on their selection of teaching units, ensuring they are current with essential science subjects that might not have been covered in their prior studies. For example, engineering students may focus on physiology and anatomy, whereas biology or medical students may focus into signal processing and mechanics.

In M1 (semesters 1 and 2), there is one single track, with individualized choices of courses according to students' backgrounds and their choice of specialization for M2.

* **Master 1**

The M2 (semesters 3 and 4) offers five tracks:

- * **NeuroTechnologies (NeuroTech)**
- * **BioImaging (BIM)**
- * **Innovation in Digital Health (eHealth)**
- * **BioMechanics (BioMECH)**
- * **Molecular and cellular biotherapies (MCB)**

NeuroTechnologies is one of the 5 M2 proposed tracks.

OBJECTIFS

Key Objectives

- * Bridge the gap for students with backgrounds in engineering, mathematics, and physics, enabling them to

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apply their knowledge to neurosciences and technological advancements.

* Offer specialized training for biomedical sciences students focused on neuronal technologies and their applications.

* Provide medical students and interns with the technological expertise necessary for advancements in neurological and mental health care.

The NeuroTech track is an integral part of the broader biomedical engineering master's program, interconnected with other tracks, and focused on specialized technologies and applications within the neural domain.

Motivation

With the increasing availability and power of neuronal technologies, the NeuroTech track addresses the growing need to understand the brain, monitor and diagnose health conditions, prevent or treat neural and mental disorders, restore neurological functions, and facilitate communication and interaction with the nervous system. These technologies have diverse applications, primarily in healthcare, but also extend to key industrial sectors such as transportation, machinery, and robotics, as well as the emerging leisure industry. There is a significant demand for engineers, scientists, and health practitioners trained in neural technologies, with a strong emphasis on health-related applications, while also encompassing other fields of interest.

Overview of the Program's Structure

The program is designed for biomedical and engineering students, while a dedicated sub-track with an adapted curriculum is proposed for medical and other health science students.

Neurotechnologies for health applications involve three fundamental domains of training for any neural engineering graduate:

1. Knowledge about the brain, nervous systems, and the functions they ensure.
2. Understanding of neurological and mental disorders and diseases through the lens of neuroscience.
3. Expertise in technologies used to investigate the nervous system and interact with it.

This core program includes mandatory courses on neurosciences, health, and neural engineering, providing the foundations for a neuro-engineering seminar that explores state-of-the-art applications. The mandatory curriculum also includes transdisciplinary projects in biomedical engineering innovation and an ethics workshop, which is transversal with the other tracks of the master's program. Students can further specialize through optional courses.

Further details of the programme can be found on the BME Paris master's website: <https://www.bme-paris.com/program/master-2/neurotechnologies/>

This curriculum is part of Université Paris Cité's Graduate School of BioMedical Engineering.

COMPÉTENCES VISÉES

Scientific skills

- Respect scientific ethics
- Design and develop scientific projects
- Implement a project, define the objectives and context, carry out and evaluate the action
- Conduct and develop scientific and technical projects
- Analyze, diagnose and interpret the results of scientific experiments
- Know how to assess professional risks, implement specific evaluation methods
- Master specific methods and tools

Cross-curricular skills

- Work independently, manage time, self-evaluate.
- Use information and communication technologies.

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- Conduct information research, identify access modes, analyze relevance, explain and transmit.
- Write clearly, prepare appropriate communication materials.
- Scientific communication in English.
- Working as a team: integrating, positioning, collaborating.
- Integrate into a professional environment: identify your skills and communicate them.

Programme

ORGANISATION

La formation se déroule en anglais, à temps plein.

Un stage de 2 à 4 mois obligatoires en Master 1 et un stage de 5 mois obligatoire en Master 2 dans un laboratoire de recherche académique, hospitalier ou industriel.

STAGE

Stage : Obligatoire

Durée du stage : 2 à 4 mois en M1, 5 à 6 mois en M2

Stages et projets tutorés :
OUI

Admission

- * Students with backgrounds in biomedical sciences.
- * Students from engineering schools.
- * Students and interns in health sciences (medicine, pharmacy, physiotherapy, etc.).

PRÉ-REQUIS

C1 level in English (TOEIC, TOEFL, ...).

Droits de scolarité :

Les droits d'inscription nationaux sont annuels et fixés par le ministère de l'Enseignement supérieur de la Recherche. S'y ajoutent les contributions obligatoires et facultatives selon la situation individuelle de l'étudiant.

Des frais de formation supplémentaires peuvent s'appliquer au public de formation professionnelle. Plus d'informations [ici](#).

Date de début de candidature : 15 janv. 2025

Date de fin de candidature : 31 mai 2025

Date de début de la formation : 1 sept. 2025

Et après ?

PASSERELLE

Passerelle vers médecine, pharmacie ou odontologie

DÉBOUCHÉS PROFESSIONNELS

Targeted Professional Domains for Graduates

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Academic research : PhD

* Neurology and mental health practice and research (medical students)

* Translational research

* Industry:

* Research and development

* Clinical research

* Innovation and technological transfer

* Business development

* Start-ups

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Contacts

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En bref

Composante(s)

UFR des Sciences fondamentales et biomédicales

Etablissements co-accrédités

- Ecole Nationale Supérieure d'Arts et Métiers (ENSAM)
- Université PSL

Niveau d'études visé

BAC +5 (niveau 7)

ECTS

120

Modalité(s) de formation

- Formation initiale

- Formation continue

Validation des Acquis de l'Expérience

Oui

Langue(s) des enseignements

- Anglais

Capacité d'accueil

56 en M124 en M2 NeuroTech

Lieu de formation

Campus Saint Germain des Prés

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