Master Ingénierie de la santé - Parcours : Bioengineering and Innovation in Neurosciences (BIN)

SCIENCES, TECHNOLOGIES, SANTÉ

Présentation

The BME-Paris Master is designed to provide a 2-year education program in the field of bioengineering, at the cross-road of biomedical and engineering sciences. It results from a partnership between Université Paris Descartes, Arts-et-Métiers ParisTech and Université PSL.

Based on this unique partnership, this Master is founded on an educational policy that favors interdisciplinarity and students' initiative as well as international perspective. This policy is supported by the top-level and complementary expertise and know-how of the three partners: engineering sciences in the three engineering schools within PSL (ESPCI Paris, Mines ParisTech and Chimie ParisTech) and Arts-et-Métiers ParisTech, on the one hand, and biomedical and health sciences at Université Paris Descartes, on the other.

Teaching faculty is mostly from the partner institutions. Guest lecturers include hospital clinicians (AP-HP), and researchers from other schools and universities as well as from private companies (e.g. GE Healthcare, Philips Healthcare, Renault, Sanofi, Thalès, Materialise Medical, …).

Learning outcomes

The BME-Paris Master proposes a program of excellence intended for students with a wide variety of backgrounds (biology, chemistry, physics, mathematics, engineering as well as medicine, pharmacy and other health sciences…).

The overarching goals of the Master 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, that will eventually bridge 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 are advised in their individual choices of teaching units, to bring them up to date on the fundamental science subjects they may not have acquired through their previous studies (eg physiology and anatomy for engineering students, or signal processing and mechanics for biology or medical students).

This university program is part of Université Paris Cité's Graduate School of Neuroscience, linking master's and doctoral courses with advanced research labs. The Graduate School trains future neuroscientists with a broad approach, covering basic, clinical, and engineering research.

Read more >

OBJECTIFS

Our ambition is that through courses, seminars, social events, conferences and collaborative interactions, BIN students will contribute to bridge the gap between basic, clinical, and engineering neuroscience. We believe it is a key issue for both industry and medicine in the 21st century, because of:

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* aging of the world population, which will considerably increase the prevalence of neurodegenerative diseases, and more generally of sensory and motor handicaps.

* strong demands from a broadening range of industries, way beyond the biomedical ones, including aviation, automobile, sports, and videogames. There is an increasing need to understand how humans interact with their environments in general and with the new complex working environments of today in particular (human factor). Many industries will thus require engineers with both good engineering skills and basic knowledge of neurophysiology.

* the requirement of integrative methods and concepts, from the behavioral to the molecular level, to understand how the central nervous system functions, and can be repaired and enhanced. The neurosciences thus illustrate well the interdisciplinarity that lies at the heart of biomedical engineering, because they strongly require the collaboration of doctors and engineers, combining many different skills, in optics, electronics, informatics, robotics, physiology, ergonomy, chemistry...

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.

- 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.

Deux stages de 2 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 x 2 mois en M1, 5 mois en M2

Stages et projets tutorés :
OUI

Admission

Etudiants français et étrangers titulaires d'une licence ou d'un Master scientifique, étudiants en médecine ou en pharmacie, élève ingénieurs.

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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.

Et après ?

PASSERELLE

Passerelle vers médecine, pharmacie ou odontologie

Sur l'année de diplomation 2020-2021, le nombre d'admis était de 5 et le nombre d'inscrits administratifs était de 5 également.

DÉBOUCHÉS PROFESSIONNELS

Opportunities

* PhD in a field related to the M2 track followed by the student, in academia or jointly with a company (CIFRE PhDs).
* R&D positions in large companies or startups, in almost all activity biomedical and biotech sectors.
* Continuing medical or pharmacy school, or accessing it (« passerelle »), in either 2nd or 3rd year.

Business programs in biotech management (ESCP, EM Lyon / Centrale Supelec…)

Contacts

Responsable du diplôme
Sophie Bernard
sophie.bernard@parisdescartes.fr

Responsable du diplôme
André Klaresfeld
andre.klarsfeld@espci.psl.eu

Responsable du diplôme
Sébastien Laporte
sebastien.laporte@ensam.eu

Contact administratif
Barbara Dallez
+33 (0)1 76 53 46 90
barbara.dallez@u-paris.fr

Contact administratif
Isabelle Guenerie
+33 (0)1 76 53 46 64
isabelle.guenerie@u-paris.fr

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

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Université Paris Cité

Validation des Acquis de l'Expérience

Oui

Langue(s) des enseignements

- Anglais

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