

SYNERGIES AT THE INTERFACE BETWEEN BIOMEDICAL ENGINEERING AND MICROFLUIDICS: *A JOINT GDR MEETING*

APRIL 2, 9:15
IPGG, PARIS

2025

This joint meeting brings together the dynamic communities of two complementary *Groupements de Recherche*: *GDR Réparer l'Humain (RH)* and *GDR Micro et Nanofluidique (MNF)*.

By bridging expertise in the biomedical field with advances in micro- and nanofluidics, this event seeks to foster interdisciplinary collaborations and innovative solutions to pressing challenges in healthcare and technology.

Confirmed speakers

Stéphanie Descroix (IPGG-Institut Curie)

Bruno Paiva Dos Santos (Univ. Paris Cité)

Bertrand Cinquin (IPGG Technological Platform)

Registration and abstract submission

<https://tinyurl.com/3cw9hmmn>

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Registration is free, but mandatory.
Coffee breaks and lunch will be provided.



PROGRAM

9:15-9:30	Welcome
9:30-10:15	Plenary: Stéphanie Descroix , “Organ on chip development from basic research to clinical applications”, IPGG-Institut Curie
10:15-10:30	Coffee break + Poster installation
10:30-11:00	Keynote: Bertrand Cinquin , “Microfluidics and Microfabrication for the development of biotechnologies“ IPGG platform
11:00-11:20	Valentin Chalut , “Intestinal organoids on magnetically actuated membranes with hydrogel-based microstructures as an intestinal model”, Univ Lyon
11:20-11:40	Savitashva Shring , “Cell sheet-based vascularized dermis on-a-chip “, ENS Paris
11:40-12:00	Xiaochen Huang , “Engineering of functional and perfusable 3D outer blood-retinal barrier on a chip”, Université Paris Cité
12:00-13:30	Lunch break + Poster session
13:30-14:15	Plenary: Bruno Paiva Dos Santos , “ Bone innervation“ , Univ. Paris Cité
14:15-14:35	Raúl Flores Berdines , “Soft thermoplastic elastomer compartmentalized chip for neurofluidics: a study to assess axonal growth in extracellular vesicle-based assays”, HEALTHFEX, Paris
14:35-15:55	Elisa Migliorini , “Development of a Biomimetic Bone Niche on a Microfluidic Device to Study Cancer Metastasis”, Université Grenoble Alpes
15:55-16:15	Caroline Parent , “Label-free Machine Learning Prediction of Chemotherapy on Tumor Spheroids using a Microfluidics Droplet Platform”, Institut Curie
16:15 - 18:00	Platform visit + Poster session

ABSTRACTS



Stéphanie Descroix, IPGG-Institut Curie

Organ on chip development from basic research to clinical applications

The development of a new generation of in vitro models is of interest in different fields such as basic research in life science to decipher physiological and patho-physiological mechanisms or in pharma companies to drastically improve drug screening process. In the last decade, basic research showed how our understanding of the behavior of physiological and patho-physiological systems can be greatly increased thanks to a rational simplification of the human body in artificial microsystems. Among these different models, organ on chips are considered today as key technologies. In this talk, I will first present different models of organ on chip to decipher biological and biophysical mechanisms. As a critical problem in the development and deployment of effective anti-cancer treatments remains the lack of adequate in-vitro model systems, in a second part, I will focus on tumor on chip development recapitulating in vitro the complexity of the tumor-microenvironment. We will especially discuss how these new models can be used in a next future to decipher cancer mechanisms or to help clinicians.



Bertrand Cinquin, IPGG platform

Microfluidics & Microfabrication for the development of biotechnologies

Whenever microfluidics is seen as the viable solution to answer key biological questions, we mostly often have to depend on commercially available devices or local services of microfabrication to engineer this new or next version of the device. Often inspired from previous works or other publications, adaptation of the geometry of the system, alteration to add new features, or building a device in different material are key. I will showcase different projects codeveloped at the platform with different IPGG research teams addressing different scales from the molecular level with the study of protein diffusion in a suspended membrane, to the cellular level with the study of nucleus plasticity, to the multicellular level with the study of oxygen dependance for cell growth to the full organism with the study of how temperature gradient influence the synchrony during development of C-elegans.



Bruno Paiva Dos Santos, Univ. Paris Cité

Bone innervation

The peripheral nervous system is directly involved in bone functions. From a physiological point of view, bone is fully vascularized and innervated, with sensory fibers connected to the dorsal root ganglion and closely interacting with blood vessels. An increasing body of evidence supports the role of the sensory nervous system in bone development, turnover, and regeneration. However, the mechanisms by which nerve fibers regulate osteogenesis and angiogenesis in bone tissue remain poorly understood. Using microfluidic devices, key steps in decoding cell-cell communication between neurons, endothelial cells, and bone cells could be achieved in a controlled environment. Here, we will discuss the interaction of sensory neurons on mesenchymal stem cells and their osteoblastic differentiation, as well as the impact of sensory neurons on endothelial cells in a bony context.