

## **Laboratory for Bio-Iontronics (BION)**

**Head of Laboratory: Prof. Yujia Zhang**

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### **Biography:**

Yujia Zhang is an Assistant Professor of Electrical and Microengineering at the Institute of Electrical and Microengineering at EPFL, starting in January 2025. His research thrusts include iontronic hybrid tissues and wearable/implantable bioelectronics for applications in biomedicine. Recently, he has pioneered the area of dropletronics, in which networks of microscale soft droplets function as versatile bioelectronic/bioiontronic devices.

Prior to his appointment, he obtained his B.Sc. in Electronics and Information Science and Technology from the University of Science and Technology of China in 2016. Later, he completed his Ph.D. in biomedical engineering and MEMS/NEMS technology at the Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, followed by one year as a visiting scholar at Stony Brook University and New York University, USA. In 2021, Yujia joined the Bayley group at the University of Oxford, UK, and started his postdoctoral research focusing on developing multifunctional iontronic synthetic tissues for biotic interfaces and soft implants. In 2023, he became an early-career research fellow hosted in the Department of Chemistry at the University of Oxford.

### **Research Mission:**

At the **Laboratory for Bio-Iontronics (BION)**, the mission is to make bioiontronic synthetic tissues for applications in medicine. To that end, we are interested in developing synthetic tissues with key functions of embodied energy, logic control, stimuli-responsiveness, and therapeutics delivery, enabling interactive communication with biology. The synthetic tissues will be formed from three-dimensionally (3D) printed picoliter droplet networks, which use lipid bilayer, functional nanopores, and charge-selective solutes to feature sophisticated ion control. Ultimately, the bioiontronic synthetic tissues will provide an alternative strategy, in parallel to bioelectronic medicine, to be used as bioiontronic medicine for a wide range of medical conditions.

### **Open Positions:**

There are funded PhD and Postdoc positions available in the group. Master students interested in doing their semester project and/or thesis are also welcome. Researchers who are interested in joining the group can reach out to Prof. Zhang directly.

The research group is highly interdisciplinary. There are three main research directions:

1. Advanced manufacturing of iontronic synthetic tissues—3D printing system to construct microscale, multimaterial hydrogel droplet networks.
2. Multifunctional iontronic synthetic tissues from patterned droplet networks, including functions of embodied energy, logic control, stimuli-responsiveness, therapeutics delivery, etc.
3. Modulation of living cells in culture. Examples include human iPSC-derived neurons, cardiomyocytes, and organoids.