



Biointerfaces Unit

Overview

The Biointerfaces Unit focuses on mechanisms by which information sent from our brain moves our body, and develops technology that enables brainwaves to control machines and devices. The unit also develops technology capable of assessing the condition of organs such as the liver, kidneys, and brain to promote health and enable the early detection of disease. Utilizing sensors that noninvasively assess the condition of the brain and other organs, the unit develops biointerfaces that control devices using collected biological signals. The goal of the unit is to utilize biointerfaces not only for the benefit of the elderly and disabled, but also for a wide range of purposes including the development of equipment designed to maintain health in daily life.

Research goals

The Biointerfaces Unit aims to clarify the mechanisms of hand and foot movements via signals from the brain utilizing brain waves and electromyograms, develop prosthetic arms and hands that can be moved by brain activity alone, and apply this technology to rehabilitation of individuals suffering from limb paralysis due to strokes and other diseases. The unit also plans to develop mobile devices that can noninvasively detect internal conditions from outside of the body. These include the condition of the liver and bladder, and other biological information such as blood and breathing to be used in the prevention of disease. By bringing together such technologies, the unit conducts research and development for wearable devices capable of monitoring health.



Research Unit Leader **Yasuharu Koike**

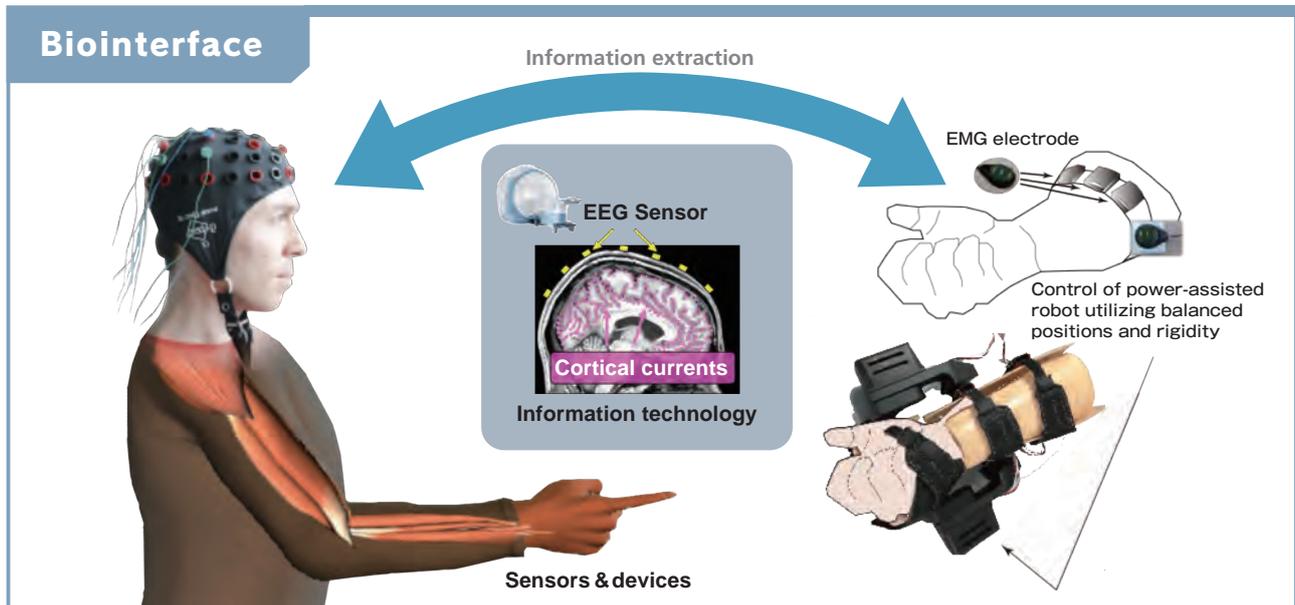
Profile

- 2016 Professor, Institute of Innovative Research, Tokyo Institute of Technology
- 2009 Professor, Precision and Intelligence Laboratory, Tokyo Institute of Technology
- 1998 Associate Professor, Tokyo Institute of Technology
- 1995 Toyota Motor Corporation
- 1992 Researcher, Advanced Telecommunications Research Institute International
- 1989 Toyota Motor Corporation
- 1989 Master of Engineering, Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology
- 1987 Bachelor of Engineering, School of Engineering, Tokyo Institute of Technology

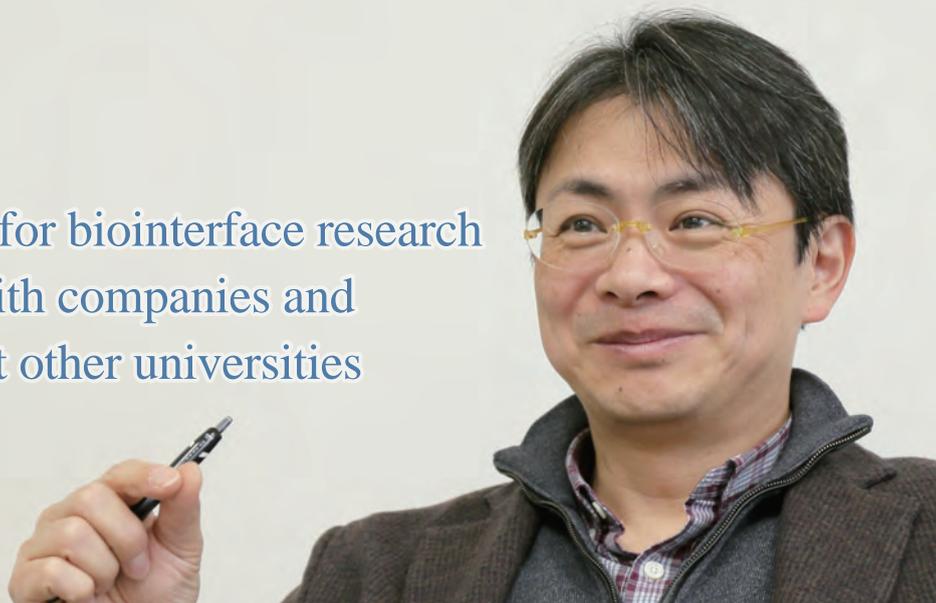
Unit members

- Associate Professor Hirohiko Kaneko
- Associate Professor Natsue Yoshimura
- Professor Kentaro Nakamura
- Associate Professor Marie Tahara
- Associate Professor Kotaro Tadano
- Professor Susumu Kajiwara
- Professor Yoshitaka Kitamoto
- Professor Scott Makeig, University of California San Diego
- Associate Professor Nicolas Schweighofer, University of Southern California

Biointerface



Creating a global base for biointerface research through cooperation with companies and faculties of medicine at other universities



Q Why was this research unit established?

The Biointerfaces Unit consists of a wide range of groups, including one that carries out research on brain-machine interfaces via brain signals and another that studies biological signals to the liver and other internal organs. The unit enables the gathering of component technology from the various groups, promotes information sharing, and conducts research and development for overall systems for the healthcare industry. Centering on Tokyo Tech, the unit also promotes cooperation with companies and faculties of medicine at other universities with the aim of creating a global base for biointerface research.

Q What are the strengths of this research unit?

Tokyo Tech has 150 faculty members engaged in research in the life sciences, medical care, and health. Their research is expanding to a wide range of fields, including chemical biology and regenerative medicine. Tokyo Tech researchers have achieved excellent results, particularly in the area of sensors and devices capable of monitoring the condition of the brain and internal organs noninvasively. The Institute also has information technology that allows us to analyze tremendous amounts of data collected from these sensors as big data. We are proud of our elemental technology and comprehensive capabilities.

Comprehensive development of health and medical care prototypes

- Brain-type information technology development
- Biointerface and device development



Development as international research base

Collaboration with

Faculties of medicine, universities, companies

Q What is the path to achieving the unit's goals?

The Biointerfaces Unit will promote its five-year plan for the development of elemental technology in the life sciences. We will advance research on algorithms used to move the human body utilizing brain sensors that are under development, and will swiftly move toward commercialization. The unit will also work on new diagnostic methods by effectively utilize the resources available at Tokyo Tech, which include functional magnetic resonance imaging to visualize brain activities. The Biointerfaces Unit also continues to promote research and development of wearable devices capable of understanding health conditions, aiming also for their rapid commercialization.

Contact us

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Biointerfaces Unit

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