In the field of bioelectronics and biotechnology, extensive studies as well as its development related to artificial organs, biocompatible materials, energy conversion systems, and drug delivery systems, utilizing the inherent, unique, and original functionalities of biomolecules and organisms, have been performed. The desire of human being for a long and healthy life has motivated the development of robots for nursing and advanced medical systems. We predict that studies in this field will contribute to a sustainable society, a long and healthy life, personalized medicine, and so forth.

1) New materials: biomimetic and biocompatible materials, functional biomolecules
2) Precise interfacial control: surface modification, molecular interaction explication
3) Analysis: localized nano-structural and functional observation, kinetic interpretation
4) Fabrication: ubiquitous system, chip device
5) Novel devices: bio-computer, nerve circuit, smart sensor
6) Medicine: regenerative medicine, drug delivery system, nursing robot
7) Energy: photosynthesis, biomass, bio-fuel cell

**Fundamental Research and Development**

- Integrated Photonic sensor
- Photonic communication
- Surface modification
- New functional material
- Biomimetic material
- Diagnosis chip

- Micro biomachine
- Cell chip device
- Artificial organ

- Drug delivery system
- Regenerative medicine

- High functional sensing technology
- Single molecule detection
- Combining multiple methods
- Super high-sensitivity

- Human imitation robot
- Nursing robot
- Bio-fuel cell
- Bio-computer

**New Devices**

- Environmental recovery
- Waste treatment
- Harmful fungus check
- CO$_2$ fixation

- Smart healthcare
- Order-made diagnosis
- Physical enhancement
- Cognitive enhancement
- Implantable biomarker detection system
- Human-machine interface
- Real time cancer diagnosis
- Particular fusion with iPS cell technology

**Fusion between bio- and other technologies**

- Final Goal
  - Food self-support
  - New energy supply
  - Taylor-made medicine
  - Long and healthy life
  - Sustainable society

**Progress toward novel systems**

- 2010
- 2015
- 2020
- 2025
- 2030
- 2035
- 2040
- 2045