

Title **Engineering Neo-Biomimetics: Paradigm Shift based on Biodiversity to Innovation for Sustainability**

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Place I²CNER Hall, Ito campus, Kyushu University

Abstract

Biological diversity is the result of a long evolutionary process for adaptation to various environments. This diversity has been acquired by "biological processes and techniques": including "production processes", "operation principles", and "operation systems", all of which differ from "human technology". "Sub-cellular structures" that are often observed on the surface of insects and plants possess characteristic functions. The study of the "biological processes and techniques" yielding these characteristic structures and functions will help to solve urgent issues involving the environment, resources, and energy, and will lead to a paradigm shift in human technology, known as biomimetic engineering.

A Japanese research project on "Innovative Materials Engineering Based on Biological Diversity" of the interdisciplinary area on "Grant - in - Aid for Scientific Research on Innovative Areas" has been started in 2012 under supporting of MEXT. This project, an interdisciplinary project based on the study of natural history, biology, agriculture, materials science, mechanical engineering, and environmental science, will open the door to a new system through the combination of lessons learnt from both "biological diversity" and "human wisdom", and from the viewpoints of environmental policy and comprehensive technical governance. Through the design and fabrication of materials and devices based on knowledge obtained from biological diversity and a biological process, we aim to make a platform for innovation and new industry to develop a "biomimetics database" as well as train a new generation of talented scientists with expertise in biology and engineering.

Our research area consists of three branches. In the group of "Biomimetics database", we aim to build a "biomimetics database" that will become the basis for an initial innovation platform based on the compilation of biological diversity. The other aim of this project is to train a new generation of scientists with expertise in biology and engineering. In the group of "Biomimetics design", we will disclose the functions and formation processes of biological "sub-cellular structures". Based on these biological systems, we will design and make innovative materials and devices. In the group of "Biomimetics sociology", we will systematize engineering based on biological diversity as a new field of science and technology from the viewpoint of the social implications of environmental policy, and with the aim of contributing to the realization of and further innovation toward a sustainability society.

About the Speaker

1978	Graduated from Department of Organic Synthesis, Faculty of Engineering, Kyushu University
1980	Master of Engineering, Graduate School of Engineering, Kyushu University
1980-1985	Assistant Professor, Department of Synthetic Chemistry, Faculty of Engineering, Kyushu University
1982	Visiting Research Fellow of Institute of Organic Chemistry, Mainz University, Germany
1985	Doctor of Engineering, Kyushu University
1985-1993	Associate Professor, Department of Industrial Chemistry, Tokyo University of Agriculture and Technology
1987-1988	Visiting MEXT Research Fellow of Physics Department, Technical University of Munich, Germany
1993-2007	Professor, Research Institute for Electronic Science, Hokkaido University
1999-2007	Team Leader, Frontier Research System, RIKEN Institute
2003-2006	Director, Nanotechnology Research Center, Hokkaido University
2007	Professor emeritus of Hokkaido University
2007-	Professor, Institute of Multidisciplinary Research for Advanced Materials, Tohoku University
2007-	Principal Investigator, Tohoku University WPI Advanced Institute for Materials Research

Host: Assoc. Professor Shigenori Fujikawa

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