Hiroto Tanaka, PhD.
Associate Professor
Department of Mechanical Engineering
School of Engineering
Tokyo Institute of Technology
E-mail: tanaka.h.cb@m.titech.ac.jp
Lab URL:
http://www.tanakah.mech.e.titech.ac.jp/index_e.html

Biomimetic Studies on Flying and Swimming Animals

Abstract

Flying birds have served as inspiration for the invention of human flight with airplanes. The structures and movements of flying and swimming animals are diverse and complex, continuing to inspire the development of new fluid devices and robots. Particularly, advancements in measurement and manufacturing technologies in recent years have made it possible to mimic the diversity and complexity of biological organisms, increasing the utility of biomimetics.

In this presentation, biomimetic research focusing on the flexible flapping wing structures, diverse wing movements, and micro-convex structures on the body surface will be introduced using flying hummingbirds and swimming penguins as examples. The differences in design strategies and manufacturing methods due to the physical properties of water and air will be discussed.

CV

Hiroto Tanaka received the BSc degree in mechanical engineering at The University of Tokyo, Tokyo, Japan, in 2003, MSc degree in information science and technology at The University of Tokyo, Tokyo, Japan in 2005, and the PhD degree in information science and technology at The University of Tokyo, Tokyo, Japan in 2008. He was a JSPS (Japan Society for the Promotion of Science) research fellow in Isao Shimoyama lab at The University of Tokyo from 2006, to 2009, a postdoctoral fellow in Robert Wood lab at Harvard University from 2009 to 2011, and an Assistant Professor in Hao Liu lab at Chiba University from 2011 to 2015. Currently, he served as an Associate Professor of Department of Mechanical Engineering at Tokyo Institute of Technology, Tokyo, Japan.

From 2018 to 2023, he led one of the teams of JSPS KAKEHI Grant-in-Aid for Scientific Research on Innovative Areas “Science of Soft Robots”. His research interests encompass biomechanics, fluid dynamics, biomimetics, and soft robotics of flying and swimming animals.