



WPI-Bio2Q NEWSLETTER

# Bio2Q Connect

Title photo taken by Oltea Sampetean. Used with permission.

Keio University  
Human Biology-Microbiome-Quantum Research Center (Bio2Q)  
URL: <https://bio2q.keio.ac.jp>

35 Shinanomachi, Shinjuku-ku, Tokyo 160-8582, Japan  
E-mail: [sc-wpi-staff@adst.keio.ac.jp](mailto:sc-wpi-staff@adst.keio.ac.jp)

## BIO2Q AND THE SCHOOL OF MEDICINE COLLABORATE IN NURTURING THE NEXT GENERATION OF SCIENTISTS



All photos are Bio2Q original and used with permission.

Bio2Q continues to strengthen its commitment to scientific education through partnerships with the Keio University School of Medicine. This collaborative approach is fostering innovation while preparing tomorrow's medical researchers for the challenges ahead.

This year, Bio2Q started to participate in the Laboratory and Field Studies program for third-year medical students, contributing six distinct research themes to the curriculum. Four dedicated students have embarked on an intensive four-month journey, joining Bio2Q research projects that explore the fascinating connections within the gut-brain axis. This hands-on experience provides students with invaluable exposure to cutting-edge research methodologies while contributing to groundbreaking scientific discoveries.

Bio2Q's international presence was further highlighted when Q core PI Professor Takahiko Koyama, alongside STaMP doctoral student Fiona Quirion, participated in the prestigious [Joint Summer School 2025](#). This collaborative program, hosted by Peking University, King's College London, and Keio University in Beijing, focused on the transformative potential of artificial intelligence in medicine.

These initiatives demonstrate Bio2Q's dedication to bridging the gap between academic learning and real-world research applications. By providing students with direct access to pioneering research projects and international educational opportunities, Bio2Q is actively preparing the next generation of scientists to address complex cross-disciplinary and healthcare challenges.

Oltea Sampetean,  
Administrative Director, PI

## INTRODUCTION TO BIO2Q RESEARCH

Series #6:  
Dr. Vinodh  
Postdoctoral Fellow, Bio-1 Core

Our cells are constantly challenged by misfolded and toxic aggregated proteins, which can accumulate and contribute to cellular stress, aging, and disease. To reverse protein aggregates, cells rely on a set of molecular machines called protein disaggregases that could disassemble protein junk and target it for repair or degradation.

My research investigates how these systems have evolved in primates to better manage protein aggregation. We've identified new regulatory pathways that boost protein disaggregase activity in human cells.

We also explore how the gut microbiome contributes to host proteostasis. When the microbiome is imbalanced, a state called dysbiosis, it can trigger various cellular stresses linked to protein aggregation. We focus on delineating how microbial metabolites modulate protein disaggregase systems in the host.

To understand these interactions, we use a combination of primate cell lines, intestinal and brain organoids, and humanized mouse models. By integrating host protein quality control and the microbiome, we aim to reveal mechanisms that protect primates against aging and disease.



(Vinodh, Photo credits - Giordano Mattoni  
Used with permission)

## Q-AI WORKSHOP TOPICS



Bio2Q 2025. Original Photo used with permission.

In order to utilize Quantum Computing and AI in Bio2Q, we are holding educational workshops for STaMP students. The first five workshops are lecture-style, followed by a Round-Table workshop to delve deeper into various tools that can be used in research. I would like to introduce some of the topics discussed in the Round-table WS. In this workshop, the ambassadors cover a specialized topic each time, and the first topic was introduced by Ryan Browne on AlphaFold3. Many of you may already be using it in your own research, we covered topics related to protein management topics. In this roundtable discussion, we discussed recent advances in computational methods for modeling protein complexes, predicting protein-protein interactions and molecular docking based on 3D structures. We discussed the current state of the technology, how these technologies can be applied to your own research, major challenges and barriers in effective implementation and validation, and ideas for the development of this field. If you are interested, please contact us (sc-wpi-staff@adst.keio.ac.jp). We will introduce the following topics in the future.

(Shigeki Ishikawa, PI)

## WPI-BIO2Q OPEN SEMINAR

**Dr. Daniel Mucida & Dr. Carolina Lucas**

Dr. Daniel Mucida and Dr. Carolina Lucas visited Bio2Q and gave a seminar on June 25. Daniel Mucida is a Professor at The Rockefeller University in New York. He serves as the Principal Investigator (PI) of the Laboratory of Mucosal Immunology and is involved in research focusing on the immune

system, particularly how it interacts with the intestinal mucosa to maintain a balance between resistance to pathogens and tolerance to beneficial microbes. His research examines how the intestine generates protective responses against pathogens while also absorbing nutrients from food and microbes. This work is critical for understanding immune responses in the gut, and his contributions are significant in the field of immunology, particularly regarding mucosal immunity. In the seminar, using a sophisticated reporter mouse system, he introduced his latest research on how immune cells migrate to the site of infection and lymph nodes at different time points. His research fills a gap in current immunology by exploring how anatomically distant organs communicate within our body, aligning well with the center's mission.



Carolina Lucas, Used with permission.

Carolina Lucas is an Assistant Professor of Immunobiology at Yale University, specifically affiliated with the Center for Infection and Immunity. She completed her postdoctoral training at Yale in Dr. Akiko Iwasaki's lab, studying emerging virus pathogenesis, including Zika virus, CHIKV, and SARS-CoV-2. The Lucas Lab is dedicated to understanding the basic immune mechanisms necessary for controlling emerging viral infections and laying the groundwork for new therapeutic approaches and vaccination strategies. Focusing on the monkeypox virus (M-pox), she discussed how the host responds to the virus by monitoring the production of neutralizing antibodies. This topic also fits well with the center's mission.

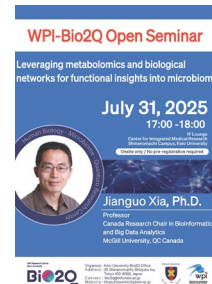


Bio2Q 2025. Original Photo used with permission.

(Kazuyoshi Ishigaki, PI)

## UPCOMING EVENTS

July 31 (Thu) 17:00-18:00 @Shinanomachi, WPI-Bio2Q Open Seminar by Dr. Jianguo Xia (McGill Univ., Canada)



August 4 (Mon) 14:00-15:00 WPI-Bio2Q Open Seminar by Dr. Shinichi Sunagawa (ETH Zurich, Switzerland) @Shinanomachi

August 7 (Thu) 17:00-18:00 WPI-Bio2Q Open Seminar by Dr. Kazuki Nagashima (Harvard Univ.) @Shinanomachi

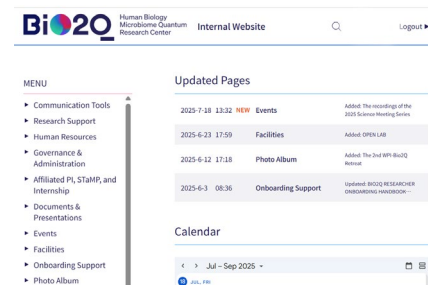
### Science Meeting Series

September 10 (Wed) 14:00-15:00 #30: Koji Atarashi, Jr. PI (Online)

September 24 (Wed) 14:00-15:00 #31: Keiko Matsuda, Jr. PI @Shinanomachi and Zoom (Hybrid)

October 22 (Wed) 14:00-15:00 #32: Leonie Brockmann, Jr. PI @Shinanomachi and Zoom (Hybrid)

## NOTES FROM EDITING STAFF



Bio2Q Internal Website Landing Page

As part of our public relations efforts, we maintain and curate the website at Bio2Q. In response to feedback from Bio2Q members, we launched the internal site this April—a comprehensive hub for information related to Bio2Q. The platform includes the Onboarding Manual for new researchers, internal regulations, an event calendar, equipment reservation instructions with links, and a powerful search function for quick access to needed information.

We are committed to keeping the content current and relevant. We welcome suggestions or ideas from both within Bio2Q and from external readers—please share them with us.

(Midori Yanase)

\*\*\*\*\*

The next "Bio2Q Connect" will be issued on Sep 29, 2025



Daniel Mucida, Used with permission.