

# The John Mung Program

## Giving New Opportunities to Explore Global Frontiers

Kyoto University launched the John Mung Program in 2012, as a project to support mid- and long-term research by junior faculty members at leading academic institutions overseas. In 2013, the program was expanded to support study abroad for students and staff members.

**WEB** [www.kyoto-u.ac.jp/ja/research/young/support/john\\_man/](http://www.kyoto-u.ac.jp/ja/research/young/support/john_man/)

### **PHYS** How Do Things Change at the Nanoscale?

*Full quantum simulation of phase transition after dimensionality quench.*

At low temperatures, thermal fluctuations are reduced and many materials undergo phase transitions to more ordered states. Examples of such ordered phases include magnetism and superconductivity. However, in low dimensions, quantum fluctuations can destroy ordering even at absolute zero temperature. Recent experimental advances have allowed switching the effective dimension of some microscopic systems. Dr. Masaki Tezuka theoretically studies the gradual destruction of superconducting order after the dimension of the system is abruptly reduced. He aims to understand such dynamics by combining analytical and numerical methods of quantum mechanics.



The contributions of the Cavendish Laboratory to modern science are tremendous; among them are the discovery of electrons and neutrons, and the development of the double helix model of DNA molecules. Dr. Tezuka attended numerous lively seminars, visited other universities in United Kingdom, and started new collaborations. He was also impressed by the exhibitions of the actual experimental apparatus used for epoch-making discoveries at the Cavendish Laboratory.



#### **Dr. Masaki Tezuka**

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### **ECOL** Exploring the Effects of Leaf-Eating Primates on Forests

*Comparative Study of Community Structure and Resource Limits of Old World Monkeys.*

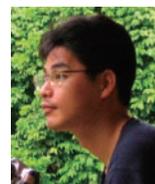
Dr. Goro Hanya had the opportunity to engage in research at McGill University, Montreal, Canada, for three months from December 2012 until March 2013. His host professor was Dr. Colin Chapman, a well-known primate ecologist undertaking a long-term study on the primate community in Kibale, Uganda.

Dr. Hanya's major achievement during his time in Montreal was a paper assessing the impact on forest ecosystems of fruit- and leaf-eating primates. His host Dr. Chapman recently published a paper based on long-term data of forest tree species composition that suggested primate leaf-eating in Kibale, Uganda could affect some tree species negatively. Dr. Hanya's research estimated the amount of food ingested by primates on Yakushima island in Japan, and compared it with the amount of leaves and fruits produced by the forest. In contrast to Dr. Chapman's findings, he found that primates on Yakushima have only a negligible impact on forest leaf production, which was explained by the difference in primate biomass between Kibale and Yakushima.



#### **Dr. Goro Hanya**

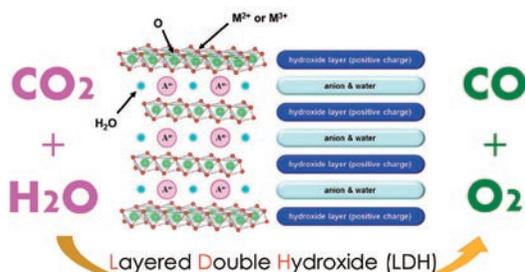
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## CHEM Sustainable Chemistry Study Using Solar Energy and Photocatalysts

*Development of novel layered double hydroxides for artificial photosynthesis.*



He learned the techniques of homogeneous and conventional coprecipitation, ion exchange in the interlayer, and synthesis of nanoplatelet LDHs. The synthesized samples were assigned using an X-ray diffractometer in the Chemical Research Laboratory. Prof. O'Hare will provide Dr. Teramura with a number of LDH samples synthesized in his laboratory as candidates for active catalysts and photocatalysts. Dr. Teramura hopes to continue his productive collaborative projects with Prof. O'Hare in the future.

### Dr. Kentaro Teramura

*Associate Professor, Graduate School of Engineering*  
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▲ With Prof. O'Hare

## AGRI Visiting the Birthplace of a Forest Pathogen

*Off-my-feet months at Louisiana State University.*

In Japan, mountains used to be covered with beautiful pine forests in the days when they were free from the pine wood nematode, a tiny 1mm-long forest pathogen that was introduced from North America in the early 19th century. Under the John Mung Program, Dr. Yuko Takeuchi visited Bogalusa, Louisiana, where the nematode was first discovered, to document its present status. On the university campus, in woodlands, and at Christmas tree farms, the nematodes still exist in Louisiana, but without causing a serious epidemic. Nematode cultures established by Dr. Takeuchi are now being comparatively studied with Japanese isolates of the same species to deepen our understanding of this disease. Dr. Takeuchi believes that the network developed during the surveys, experiments, and meetings will be a great asset to this important field of research.



### Dr. Yuko Takeuchi

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◀ Dr. Takeuchi with her supervisor, the nematologist Dr. E.C. McGawley



Christmas tree farm (left) a source of both the vector beetle (upper right) and the pathogenic nematode (bottom right).

## What's in a Name?

The program is named after the Japanese sailor, Nakahama Manjirō, also known in English as "John Mung." Rescued by an American whaler after a terrible shipwreck in 1841, Manjirō became the first Japanese to set foot on American soil. He enthusiastically learned about new technologies, laws, and customs. After he returned to Japan, he became a pioneering figure in developing the country's international relations. Inspired by his colorful life story, the program seeks to give junior faculty, staff members, and students opportunities to explore new academic and professional frontiers throughout the world.



PHOTO: Wikipedia