

News Release

November 24, 2009

Institute for Integrated Cell-Material Sciences
Kyoto University

Four Independent iCeMS Kyoto Fellows Named

As part of its ongoing effort to support and encourage young researchers to quickly attain independence, Kyoto University's Institute for Integrated Cell-Material Sciences (iCeMS) has established several independent Kyoto iCeMS Fellow positions. An international recruitment process, including advertisements in the journals *Nature* and *Science*, resulted in the selection of the first four fellows, listed below.

Asst. Prof. **Peter M. Carlton*** (Meiosis, Chromosome Biology, Optical Microscopy)
B.Sc.: University of Southern California
Ph.D.: University of California, Berkeley, Department of Molecular and Cell Biology
Present: University of California, San Francisco, Research Specialist



Asst. Prof. **Tatsuya Murakami** (Cell Engineering, Protein Engineering)
B.Sc.: School of Engineering, Osaka University
M.Sc., Ph.D.: Dept. of Molecular Engineering, Kyoto Univ. Grad. School of Engineering
Formerly: Assistant Professor, iCeMS Imahori Lab



Asst. Prof. **Takuya Yamamoto**** (Molecular Biology, Bioinformatics)
B.Sc.: Faculty of Science, Kyoto University
M.Sc., Ph.D.: Grad. School of Biostudies, Kyoto Univ. Division of Integrated Life Science
Present: Assistant Professor, Center for iPS Cell Research and Application (CiRA), iCeMS



Dr. **Ziya Kalay** (Statistical Physics)
B.Sc.: Middle East Technical University, Turkey
Ph.D.: University of New Mexico Department of Physics
Formerly: University of New Mexico, Research and Teaching Assistant



* iCeMS Visiting Asst. Prof. since September 2009. Becoming iCeMS Kyoto Fellow in March 2010.

** PI in the Basic Biology Department of the CiRA. Named iCeMS Kyoto Fellow in October 2009.

1. Description of the Position

iCeMS Kyoto Fellows receive an annual budget to support their own research groups, including salaries for the Fellow, research associates, lab technicians and supporting staff, as well as for covering research supplies and other costs. The iCeMS' superb research equipment and facilities are available to the Fellows, who are given 5-year appointments with full support from the institute's PIs. The Fellows are expected to undertake independent research programs, and at the same time, actively pursue collaboration with other researchers.

Fellows are chosen for **independent assistant professorships** or, for young scientists fresh out of graduate school or those with 1–2 year experiences as research associates, as **super-postdocs**.

2. Areas of Research of the Four Fellows

Asst. Prof. **Peter M. Carlton** (Meiosis, Chromosome Biology, Optical Microscopy)

Fluorescence microscopy is incredibly selective, imaging only a few specific kinds of biomolecules among thousands in the cell. However, its resolution has previously been poor, around 250 nanometers at best. Recently, many sub-diffraction microscopy methods have been developed, which provide unprecedented detail of subcellular complexes with light microscopy. Using these imaging methods in combination with genetics and molecular biology we are investigating the structure and dynamic behavior of chromosomes, with the ultimate goal of understanding the activity and transmission of the genome. We are particularly interested in understanding how meiotic chromosomes perform the essential events (pairing, recombination, segregation) of meiosis.

Asst. Prof. **Tatsuya Murakami** (Cell Engineering, Protein Engineering)

Recent progress in the field of nanotechnology has enabled the creation of external stimulus-sensitive nanomaterials that are attractive for biological applications. For example, carbon nanotubes have been shown to generate heat under laser irradiation and kill cancer cells. The aim of our research is to spatiotemporally regulate drug therapies and cell functions with such nanomaterials. This is achieved by refining the surfaces of these nanomaterials to not only make them biocompatible but also give them useful functions. We are now developing protein engineering-based technologies to enable this surface functionalization.

Asst. Prof. **Takuya Yamamoto** (Molecular Biology, Bioinformatics)

Elucidation of the molecular mechanisms of iPS cell induction and differentiation processes is an important step leading to applications of iPS cells for regenerative medicine. Analytical techniques (dry), such as bioinformatics, as well as molecular- and cell-biological experimental techniques (wet) are essential to extract biologically meaningful information from enormous amounts of data acquired by such analytical devices as microarrays and next-generation sequencers. Our primary objective is to perform exhaustive analysis of the entire genome through multilateral approaches, fuse the dry and wet techniques by feedback, and elucidate induction and differentiation processes of iPS cells in an integrative way.

Dr. **Ziya Kalay** (Statistical Physics)

We are interested in a wide range of problems concerned with the behavior of meso-scale (5–100 nm) systems. Currently, we focus on analyzing single-molecule diffusion data of membrane proteins and lipids in the cellular plasma membrane, to understand the hierarchical organization of the plasma membrane, spanning the nano-meso-micron scales. As an initial approach, we are addressing the following two questions: (1) how does the confinement of membrane molecules by the membrane skeleton modify their reaction rate?; and (2) are there better methods of dealing with noisy single-molecule imaging data? In addition, we are investigating the properties of coupled biological oscillators, which are fascinating from the viewpoints of both physics and biology.

3. Contact

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