FY2011 Annual Report

Molecular Cryo-Electron Microscopy Unit

Matthias Wolf, Assistant Professor

Abstract

We moved to Okinawa in March 2012. The unit is starting up. Wet lab and computer lab are essentially set up. A dedicated biosafety level 2 work area was established for cryo preparation of virus samples, cell culture and protein purification. A 16-GPU GPGPU server was set up for accelerated processing of single particle alignment and reconstruction. The unit relies on high throughput image collection of massive data sets

using a Falcon direct electron detector on the OIST Titan Krios electron microscope. The necessary automation will be in place soon. Immediate focus lies on structural virology at near-atomic resolution. Ongoing projects are papilomavirus, polyomavirus and poliovirus. While solving biological questions, we intend to improve the methodology, such that smaller molecules with lower symmetry than viruses and individual macromelecular complexes can ultimately be determined at comparable resolution. This goal will be facilitated by development of novel types of specimen support as well as by refining and expanding existing algorithms. Another branch has been started by the first researcher, Dr. Yang. He will enable large volume high resolution brain reconstruction of transgenic *Drosophila* with the focused ion beam / scanning electron microscope.

1. Staff

- Dr. Shun-Jen Yang, Researcher
- Rika Yoshizawa, Administrative Assistant

Past Members:

- Alina Aseeva, summer intern student
- Kikuko Matsuo, Administrative Assistant
- Yoko Fujitomi, Administrative Assistant

2. Collaborations

- **Theme: Structure of Poliovirus isoforms**
    - Type of collaboration: Joint research
    - Researchers:
        - Professor, James M. Hogle, Harvard Medical School
- **Theme: Common data validation for x-ray crystallography and EM**
    - Type of collaboration: Joint research
    - Researchers:
        - Assistant Professor, Kevin D. Corbett, UC San Diego Dept. of Cellular and Molecular Medicine, Ludwig Institute for Cancer Research, San Diego branch
- **OIST-internal collaborations:**
    - Prof. M.Sowwan: ultrastructure of inorganic nanoparticles
    - Prof. Y.Qi: structure-function relation of organic thin films for solar cells

- Prof. I.Maruyama, Prof.U.Skoglund: single particle analysis of calcium channel proteins
- Prof. K.Dani: novel TEM specimen support

3. Activities and Findings

Nothing to report.

4. Publications

Nothing to report.

5. Intellectual Property Rights and Other Specific Achievements

Nothing to report.

6. Meetings and Events

Nothing to report.