

第 39 回生理学研究所コンファレンス・国際シンポジウム

「生物イメージングの最前線—最先端技術の連携」

今回の生理研国際シンポジウム「生物イメージングの最前線—最先端技術の連携」は、第 7 回岡崎統合バイオサイエンスセンターシンポジウムとリンクして開催され、11 月 10-12 日は、生理研シンポに、12 日ター13 日は、統合バイオシンポにあてられた。イメージング法は技術革新の著しい分野の一つであり、分子、細胞、組織、そして個体の各階層において独自に発展してきた。なかでもイメージング手法としての顕微鏡の活躍はめざましく、電子顕微鏡、光学顕微鏡、各種走査プローブ顕微鏡などが研究の先端を切り拓いている。従来こうした顕微鏡は独立の領域を形成し、相互連携は弱かったが、近年こうした手法間の横断的利用が試みられるようになって来ている。今回のシンポジウムでは、電子顕微鏡、光学顕微鏡、プローブ顕微鏡の協調の道を探り、イメージング手法の相互協力とさらにその先の統合化を基礎づけることを目標とした。

シンポジウムは自然科学研究機構共通施設 岡崎コンファレンスセンターで実施され、参加者は国内外より計 120 名（海外 40 名）、口頭発表 40 件、ポスター発表 28 件であった。総研大生をはじめ国内外の若手研究者が活発な発表と議論を行った。



39th NIPS International Symposium & 7th OIB Symposium
 “Frontiers of Biological Imaging : Synergy of the Advanced Techniques”
 November 10-13, 2008, Okazaki, Japan

MONDAY, NOVEMBER 10

Opening address

(Kuniaki Nagayama, Okazaki Institute for Integrative Bioscience/National Institute for Physiological Sciences)

1. Tomomi Nemoto (National Institute for Physiological Sciences, Japan)
Potential of two-photon microscopy for analysis of living organ
2. Kira Poskanzer (Columbia University, USA)
Development of two-photon stimulation methods to map cortical circuits
3. Makio Tokunaga (National Institute of Genetics, Japan)
Highly inclined thin illumination enables clear single-molecule imaging in living cells
4. Hiromi Okamoto (Institute for Molecular Science, Japan)
Potentiality of scanning near-field optical microscopy
5. Susy Kohout (University of California, USA)
Probing protein motions of Ci-VSP using voltage clamp fluorometry
6. Wolfgang Baumeister (Max-Planck-Institute, Germany)
Cryo-electron tomography: defining the functional modules of cells
7. Yasushi Hiraoka (Kobe Advanced ICT Research Center, Japan)
Correlative light and electron microscopy for observing molecular dynamics in living cells
8. John Sedat (University of California, USA)
New directions for live 4-dimensional imaging using OMX, a novel imaging platform
9. Masataka Murakami (National Institute for Physiological Sciences, Japan)
Salivary secretion: assessment of trans- and paracellular transport by physio-morphological techniques
10. Tomoko Nakanishi (The University of Tokyo, Japan)
Development of radioisotope imaging systems for plants
11. Haruo Sugi (Teikyo University, Japan)
Electron microscopic demonstration of the cross-bridge recovery stroke in living muscle thick filaments using the gas environmental chamber

TUESDAY, NOVEMBER 11

12. Yoshiyuki Kubota (National Institute for Physiological Sciences, Japan)
An excitatory and inhibitory synapse density on various GABAergic nonpyramidal cells in the rat cerebral cortex
13. Cedric Bouchet-Marquis (University of Colorado at Boulder, USA)
High resolution imaging using CEMOVIS and cryo-ET
14. Ohad Medalia (The Ben-Gurion University, Israel)
The molecular architecture of integrin-mediated focal adhesion by cryo-electron tomography
15. Wah Chiu (Baylor College of Medicine, USA)
Backbone tracing and model building in single particle cryo-EM
16. Holger Stark (Max-Planck-Institute, Germany)
Studying 3D dynamics of macromolecular machines by electron cryomicroscopy
17. Takashi Ishikawa (ETH Zurich, Switzerland)
Molecular arrangement of dynein in flagella revealed by cryo-electron tomography

18. Abraham Koster (Leiden University Medical Center, The Netherlands)
Tools for correlative cryo electron tomography
19. Grant Jensen (California Institute of Technology, USA)
How sample thickness and crowdedness affect interpretability in electron cryotomography
20. Radostin Danev (Okazaki Institute for Integrative Bioscience, Japan)
Zernike phase contrast for single particles and cryotomography
21. Gabriel Lander (The Scripps Research Institute, USA)
Appion: an integrated, database-driven pipeline for lucid EM image processing
22. Mark Ellisman (University of California San Diego, USA)
Multi-scale correlated light and electron microscopic imaging of the nervous system
23. Atsuo Miyazawa (RIKEN Harima Institute, Japan)
Development of a genetically encoded metalloprotein tag enabling protein detection by electron microscopy
24. Jiro Usukura (Nagoya University, Japan)
3D architecture of membrane cytoskeleton and spatial specificity of actin binding proteins revealed by immuno-freeze etching and cryo-microscopy
25. Winfried Denk (MPI-Heidelberg, Germany)
Reverse engineering the brain: tool to image activity and structure
26. Keiichi Namba (Osaka University, Japan)
Molecular mechanisms of self-assembly and protein export of the bacterial flagellum

WEDNESDAY, NOVEMBER 12

27. Kazuhiko Kinoshita, Jr. (Waseda University, Japan)
Protein machines under an optical microscope
28. Robert Glaeser (University of California Berkeley, USA)
Towards nearly full-proteomic coverage in imaging of multiprotein complexes
29. Kuniaki Nagayama (Okazaki Institute for Integrative Bioscience/National Institute for Physiological Sciences, Japan)
A submicron design for an Aharonov-Bohm effect Hilbert differential phase plate
30. Michael Marko (Wadsworth Center, USA)
Technological improvements for biological cryo-TEM tomography
31. Rasmus Schröder (University of Heidelberg, Germany)
In-focus phase contrast by electrostatic phase plates in anamorphic electron optics
32. Ueli Aebi (University of Basel, Switzerland)
The use of the atomic force microscope in the life sciences: opening new vistas for diagnosis, prevention and intervention
33. Jan Liphardt (University of California Berkeley, USA)
A superresolution view of the E. coli chemotaxis network
34. Takayuki Uchihashi (Kanazawa University, Japan)
High-speed AFM for visualizing biomolecular processes
35. Yuji Sasaki (Spring 8, Japan)
Dynamical single molecular observations on membrane proteins using X-rays and electrons
36. Hideo Higuchi (The University of Tokyo, Japan)
Imaging of stepwise motility of single motor molecules in living cells

37. Thomas Walz (Harvard Medical School, USA)

Electron microscopy of AQP0-mediated membrane junctions

38. Kaoru Mitsuoka (Japan Biological Information Research Center (AIST), Japan)

Structural analysis of membrane proteins and complexes by electron crystallography

39. Fred Sigworth (Yale University, USA)

Membrane proteins as single particles in cryo-EM

40. Chikara Sato (Neuroscience Research Institute (AIST), Japan)

Three-dimensional structures of ion channels, sensors and receptors revealed by single particle reconstruction

Closing address

(Kuniaki Nagayama, OIB/NIPS)