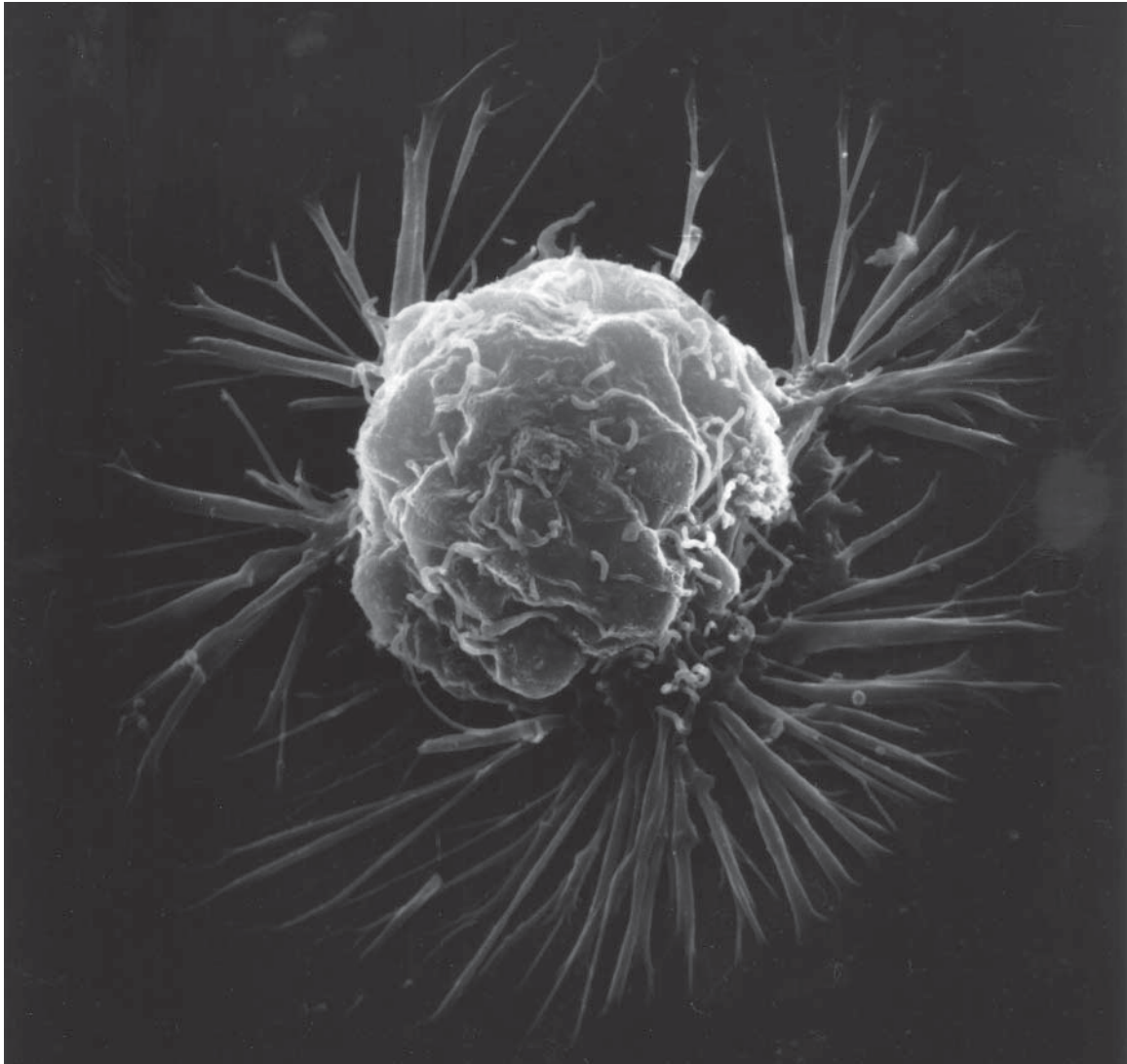


CELLULAR IMAGING AT THE NANOSCALE



June 27-28, 2013

OHSU Auditorium and Old Library

To download a schedule, workshop descriptions or poster abstracts, visit
<http://tinyurl.com/nano2013-ohsu>

THURSDAY, JUNE 27

- 7:30 AM Registration and Poster Set-up
- 8:00 AM Kimberly Beatty (Physiology and Pharmacology, Oregon Health & Science University)
Welcome and Overview of Symposium
- 8:15 AM Stefanie Kaech-Petrie (ALMC, Oregon Health & Science University)
“Overview of Light Microscopy at OHSU”
- 8:40 AM *Q&A and Group Discussion*
- 8:45 AM Alice Ting (Department of Chemistry, MIT)
Keynote: “Mapping proteomes and imaging proteins with enzyme-based reporters in living cells”
- 9:35 AM *Q&A and Group Discussion*
- 9:45 AM Break
- 10:30 AM Peter Barr-Gillespie (OHRC & Vollum Institute, Oregon Health & Science University)
“Neighborhood Implies Function: Localization of Proteins of the Hair Bundle”
- 10:55 AM *Q&A and Group Discussion*
- 11:00 AM Danielle Jorgens (UC Berkeley and LBNL)
Poster Talk: “Ultrastructure revelations from the third dimension: Discovering the overlap of cancer progression and mammary gland branching morphogenesis with high-resolution imaging”
- 11:10 AM *Q&A and Group Discussion*
- 11:15 AM Jay Mellies (Department of Biology, Reed College)
“Oligomerization of the *Escherichia coli* DNA binding protein Ler”
- 11:40 AM *Q&A and Group Discussion*
- 11:45 AM Lunch - *Provided for Registered Attendees only*
- 1:00 PM James Chen (MIT)
“Single-Particle Electron Microscopy: The Road Ahead”
- 1:15 PM *Q&A and Group Discussion*
- 1:20 PM Wim Voorhout (FEI)
“New Tools for Correlative Light and Electron Microscopy”
- 1:35 PM *Q&A and Group Discussion*
- 1:40 PM Roger Wepf (Electron Microscopy ETH Zurich)
Keynote: “3D Correlative Light and Scanning Electron Microscopy”
- 2:30 PM *Q&A and Group Discussion*
- 3:00 PM Microscopy Workshops: Group A
- 4:30 PM Microscopy Workshops: Group B

FRIDAY, JUNE 28

- 8:15 AM Xiaolin Nan (Biomedical Engineering, Oregon Health & Science University)
Session Overview
- 8:30 AM Eric Betzig (Janelia Farm)
Keynote: “Imaging Life at High Spatiotemporal Resolution”
- 9:20 AM *Q&A and Group Discussion*
- 9:30 AM Erik Sánchez (Department of Physics, Portland State University)
“Better Imaging Resolution through Field Enhancement”
- 9:55 AM *Q&A and Group Discussion*
- 10:00 AM Break
- 10:30 AM Dan Gallahan (National Cancer Institute)
“Cancer Across Scales: An NCI Perspective”
- 10:40 AM *Q&A and Group Discussion*
- 10:45 AM Alan Gara (Intel)
Special Topic: “Exascale Computing and Biomedical Research”
- 11:20 AM *Q&A and Group Discussion*
- 11:30 AM Poster Session and Pizza sponsored by Life Technologies
- 1:00 PM Summer Gibbs (Biomedical Engineering, Oregon Health & Science University)
Session Overview
- 1:15 PM Alan Waggoner (Biological Sciences, Carnegie Mellon University)
Keynote: “Fluorescent biosensors for cell regulation pathways”
- 2:05 PM *Q&A and Group Discussion*
- 2:15 PM Tania Vu (Biomedical Engineering, Oregon Health & Science University)
“Molecular Imaging of Cellular Signaling in Space and Time Using Quantum Dots”
- 2:40 PM *Q&A and Group Discussion*
- 2:45 PM Break
- 3:15 PM Robert Strongin (Department of Chemistry, Portland State University)
“Teaching old fluorophores new tricks”
- 3:40 PM *Q&A and Group Discussion*
- 3:45 PM Monique Rennie (Biomedical Engineering, Oregon Health & Science University)
Poster Talk: “3D imaging of the early embryonic chicken heart with focused ion beam scanning electron microscopy”
- 4:00 PM Nicholas Dolman (Life Technologies)
“Probing the life and death of cells using fluorescent reporters”
- 4:25 PM *Q&A and Group Discussion*
- 4:30 PM Poster Prizes Awarded
- 4:40 PM Joe Gray (Biomedical Engineering, Oregon Health & Science University)
Closing Remarks

MICROSCOPY WORKSHOPS

*Workshops will provide demonstrations on some of the latest imaging technologies.
Registration for each workshop is now closed.*

Workshop 1 A/B: Super-resolution Structured Illumination Microscopy for Imaging the Actin Cytoskeleton in Cultured Cells

Aurelie Snyder

Workshop 2 A/B: Live Cell Imaging to Capture Microtubule-Based Vesicular Transport in Cultured Neurons

Stefanie Kaech-Petrie

Workshop 3 A/B: Sample prep for EM and a tour of the FEI Living Labs

Danielle Jorgens and Wim F Voorhout

Workshop 4 A/B: Advanced Microscopy Applications from ASI

John Zemek and Gary Rondeau

Workshop 5 A/B: Automated Cell Imaging with the EVOS from Life Technologies

Nicholas Dolman, Mary Wittig, and Jeff Huber

POSTERS 1 - 5

Poster #1: Wavelength and pH Dependent Detection of Homocysteine

Aabha Barve, Mark Lowry, Robert M. Strongin
Portland State University. E-mail: aabha@pdx.edu

Poster #2: Synthesis and Characterization of Photoswitchable Fluorophores for Multispectral Super Resolution Microscopy

Amy M. Bittel, Andrew Nickerson, Li-Jung Lin, Xiaolin Nan, Summer L. Gibbs
Department of Biomedical Engineering, Oregon Health and Science University. E-mail: bittel@ohsu.edu

Poster #3: Ligand Deployment and Sensing in a Large, 3-D Extracellular Space

Michael Danilchik¹ & Elizabeth Brown²

¹Integrative Biosciences and ²Cell and Developmental Biology, Oregon Health & Science University. E-mail: danilchi@ohsu.edu

Poster #4: Multi-photon Excitation and Characterization of Novel Fluorophores for Cellular Imaging

Fredrick M. DeArmond¹, Robert M. Strongin², Allan Kachelmeier³, Peter Steyger³, Erik J. Sánchez^{1,4}

¹Department of Physics, Portland State University, ²Department of Chemistry, Portland State University, ³Oregon Hearing Research Center, Oregon Health & Science University, ⁴Department of Electrical and Computer Engineering, Portland State University. E-mail: fmd@pdx.edu

Poster #5: New Fluorescent Probes for Visualizing Autophagy

Nick J Dolman, Kevin Chambers, WenJun Zhou, Rachel Smith, Kyle Gee, Michael Janes

Molecular Probes Labelling and Detection Technologies, Life Technologies Corporation. E-mail: Nicholas.Dolman@lifetech.com

POSTERS 6 - 15

Poster #6: Frequency Modulation for Non-Contact SPM Cellular Imaging

Rodolfo Fernandez, Elia Zegarra, Andres La Rosa

Department of Physics, Portland State University. E-mail: rfern@pdx.edu

Poster #7: Synthesis and Characterization of Nerve-Specific Fluorophores for Image-Guided Surgery

Kayla Hackman, Theresa M. Koppie, Dusan Pavcnik, Summer L. Gibbs

Department of Biomedical Engineering, Oregon Health & Science University. Email: hackman@ohsu.edu

Poster #8: Simple and Selective Detection of Homocysteine

Lovemore Hakuna, Jorge O. Escobedo and Robert M. Strongin*

Department of Chemistry, Portland State University, Portland, OR 97201. E-mail: lhakun@pdx.edu

Poster #9: Investigating Thyroid Hormone Action in Myelination Disorders

Meredith D. Hartley and Thomas S. Scanlan

Oregon Health & Science University. E-mail: hartleme@ohsu.edu

Poster #10: Life Without a Diamine Transporter: a *T. cruzi* Perspective

Marie-Pierre Hasne and Buddy Ullman

Department of Biochemistry and Molecular Biology, Oregon Health & Science University. E-mail: hasnem@ohsu.edu

Poster #11: Single Cell Supersensitive Phosphoprotein Profiling Quantum Dot Assay Platform for Heterogeneous Drug Response Analysis

Thomas Jacob¹, Anupriya Agarwal², Thomas O'Hare², Damien Ramunno-Johnson¹, Brian J. Druker², Tania Q. Vu¹

¹Department of Biomedical Engineering, ²Knight Cancer Institute, Oregon Health & Science University. E-mail: jacobt@ohsu.edu

Poster #12: Mammary Gland Biology and Breast Cancer: Integrated 3D imaging of cells and tissues

Danielle M. Jorgens, Wenting Tsai, Hildur Palsdottir, Jessie K. Lee, Melissa Perez, Kester Coutinho, Andrew Tauscher, Manfred Auer, *in collaboration with Andrew Ewald, Zena Werb, Jamie Inman & Mina Bissell*

UC Berkeley & Lawrence Berkeley National Laboratory. E-mail: nyxhadanielle@gmail.com

Poster #13: Spatial Distribution of Single-Molecule AKT Signaling Complexes in Breast Cancer Using Quantum Dot Imaging

Lam, Wai Yan¹; Ramunno-Johnson, Damien¹; Chin, Koei²; Gray, Joe²; Vu, Tania¹

¹Department of Biomedical Engineering, Oregon Health and Science University, ²OHSU Center for Spatial Systems Bioscience, Oregon Health and Science University. E-mail: lamw@ohsu.edu

Poster #14: Engineering the Nanomaterials-Bio Interface

Lester Lampert, Andrew Barnum, Haiyan Li, and Jun Jiao

Mechanical and Materials Engineering Department & Department of Physics, Portland State University. E-mail: lester.lampert@pdx.edu

Poster #15: Visualizing Internalized Cargo Acidification in Live Cells with Novel pH-Sensing Fluorescent Dyes

C. Langsdorf, D. Beacham, T. Huang, W. Zhou, C. Archer, D. O'Connell, S. Jaron, M. Janes;

Molecular Probes, part of Life Technologies. E-mail: Chris.Langsdorf@lifetech.com

POSTERS 16 - 24

Poster #16: RAS Dimerization-Mediated Cell Signaling Studied with Super Resolution Microscopy

Li-Jung Lin, Eric Collisson, Tanja Meyer, Andrew Nickerson, Tao Huang, Frank McCormick, Joe Gray, Steven Chu, and Xiaolin Nan

Biomedical Engineering, OHSU Center for Spatial Systems Biomedicine, Oregon Health & Science University. E-mail: linlij@ohsu.edu

Poster #17: Investigating Protein Kinase A Dynamics in Neurons Using Single Molecule Tracking PhotoActivation Localization Microscopy

Brian R. Long and Haining Zhong

Vollum Institute, Oregon Health & Science University. E-mail: longbr@ohsu.edu

Poster #18: Using the Helios NanoLab 650 DualBeam™ for Life Science Applications at OHSU

Claudia S. López¹, Jessica L. Riesterer² and Eric Barklis¹

¹Department of Molecular Microbiology and Immunology, Oregon Health & Science University, ²FEI Company. E-mail: lopezcl@ohsu.edu

Poster #19: Cell-based Analysis of Oxidative Stress, Lipid Peroxidation and Lipid Peroxidation-Derived Protein Modifications Using Fluorescence Microscopy

Bhaskar S Mandavilli, Robert J Aggeler, Upinder Singh, Hee Chol Kang, Kyle Gee, Brian Agnew and Michael S Janes
Life Technologies. E-mail: Bhaskar.Mandavilli@lifetech.com

Poster #20: A Role for Adenine Nucleotides in the Sensing Mechanism to Purine Starvation in *Leishmania donovani*

Jessica L. Martin¹, Phillip A. Yates¹, Maria Belen Cassera², Jan M. Boitz¹, Audrey L. Fulwiler¹, Buddy Ullman¹, Nicola S. Carter¹

¹Dept. Biochemistry & Molecular Biology, Oregon Health & Science University, ²Dept. of Biochemistry, Virginia Polytechnic Institute and State University. E-mail: majessic@ohsu.edu

Poster #21: Improved N-glycan Labeling of TRPV5 with Cyclooctynes in the SPAAC Reaction

Mandy H.L. Meuleners, Liz Leunissen, Jorge M.M. Verkade, Prof. Dr. J.G.J. Hoenderop, Prof. Dr. R.J.M. Bindels, Prof. Dr. F.P.J.T. Rutjes; Associate professor Dr. F.L. van Delft

Institute for Molecules and Materials, Department of Organic Chemistry, Radboud University Nijmegen in collaboration with UMC St. Radboud, NCMLS, Department of Physiology. E-mail: mandy.meuleners@gmail.com

Poster #22: Photoactivated Localization Microscopy with Bimolecular Fluorescence Complementation (BiFC-PALM): Imaging Protein-Protein Interactions in a Cell with Nanometer Resolution

Andrew Nickerson, Li-Jung Lin, Tao Huang, and Xiaolin Nan

Department of Biomedical Engineering, Knight Cancer Institute, and Oregon Center for Spatial Systems Biology, Oregon Health and Science University.

Poster #23: Quantification of *S. Mutans* Biofilm: Insights in Biofilm Morphology Using Confocal Microscopy and Image Analysis Software

Nicole Paterson¹, Samya Chaudhry¹, Curt Machida¹, Kirsten Lampi¹, Michael Danilchik¹ and Jack Ferracane².

Departments of ¹Integrative Biosciences and ²Biomaterials and Biomechanics, School of Dentistry, Oregon Health & Science University. E-mail: patersni@ohsu.edu

Poster #24: Using Super-Resolution Quantum Dot Detection and Automated Cell Segmentation to Study Subcellular Processes

Damien Ramunno-Johnson, Wai Yan Lam, Joe Gray, and Tania Vu

Department of Biomedical Engineering, Oregon Health & Science University. E-mail: ramunnoj@ohsu.edu

POSTERS 25 - 30

Poster #25: 3D imaging of the Early Embryonic Chicken Heart with Focused Ion Beam Scanning Electron Microscopy

Monique Y. Rennie¹, Claudia S. Lopez², Kent L. Thornburg^{1,3}, Sandra Rugonyi⁴

¹Knight Cardiovascular Institute, and Departments of ²Molecular Microbiology and Immunology, ³Medicine (Cardiology), and ⁴Biomedical Engineering, Oregon Health and Science University. E-mail: rennie@ohsu.edu

Poster #26: Correlating Photoactivated Localization Microscopy and Electron Microscopy

Danielle C. Robinson^{1,2}, Brian R. Long², and Haining Zhong²

¹Neuroscience Graduate Program, ²Vollum Institute, Oregon Health & Science University. E-mail: robidani@ohsu.edu

Poster #27: The Design and Synthesis of Enzyme-Activated Fluorophores for Biomarker Discovery

Katie R. Tallman, Nicholas A. Lopez, and Kimberly E. Beatty

Department of Physiology and Pharmacology, Oregon Health and Science University. E-mail: tallman@ohsu.edu

Poster #28: Cytoplasmic Trafficking and Recycling of BDNF-TrkB Receptor Complexes by Real-Time Single Quantum Dot Tracking in Sensory and CNS Neurons

Anke Vermehren-Schmaedick¹, Thomas Jacob¹, Wesley Krueger², Damien Rammuno-Johnson¹, Agnieszka Balkowiec³, Keith Lidke², Tania Q Vu¹

¹Department of Biomedical Engineering, Center for Spatial Systems Biology, Oregon Health and Science University,

²Department of Physics & Astronomy, University of New Mexico, ³Department of Integrative Biosciences, Oregon Health and Science University. E-mail: vermehre@ohsu.edu

Poster #29: Direct Observation *in vivo* Identifies Novel Wnt Signaling Mechanism

Misha Naiman^{1,2}, Daniel Lybrand^{1,2}, Gregory Scott¹, Tara Johnson^{1,3}, Naz Erdeniz¹, Elizabeth Swanson¹, Mark Peifer⁴, Marcel Wehrli¹

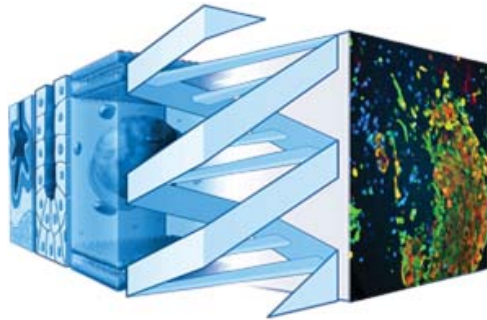
¹Cell & Developmental Biology, Oregon Health & Science University, ²Reed College, ³St. Mary Academy, ⁴Biology, University of North Carolina.

Poster #30: Neutral Atom Microscopy

Philip Witham, Erik Sánchez

Physics, Portland State University. E-mail: pjw@pdx.edu

*To download poster abstracts, visit
<http://tinyurl.com/nano2013-ohsu>*



Oregon Center for Spatial Systems Biomedicine



Cellular Imaging at the Nanoscale is made possible with generous support from the School of Medicine Research Roadmap, the OHSU Foundation Office, the Center for Spatial Systems Biomedicine, Life Technologies, Applied Scientific Instrumentation and FEI Company. This conference fulfills a key Research Roadmap goal: to enhance the ability of OHSU researchers to form collaborative focus groups or consortiums in pursuit of interdisciplinary research and innovative funding. Learn more at www.ohsu.edu/researchroadmap.

The cover image is a breast cancer cell taken with a scanning electron microscope, courtesy of the National Cancer Institute.

The organizers would like to extend special thanks to Jaret Herter, Norene Jelliffe, Katie Crossen, Bonnie Schade, Janet Itami and Jackie Wirz, PhD for their invaluable assistance in the planning and execution of this conference.

Kimberly Beatty, PhD
Summer Gibbs, PhD
Xiaolin Nan, PhD
Joe Gray, PhD