AGENDA

Sunday, 8 December 2013

18:30   Welcome Dinner
        Ezme,  2016 P Street, NW

Monday, 9 December 2013

8:00   Breakfast
        OSA Headquarters, 2010 Massachusetts, Ave., NW

8:30   Welcome & Opening Remarks
        Elizabeth Rogan, Chief Executive Officer, OSA, United States
        Hillel Adesnik, University of California, Berkeley, United States
        Laura Waller, University of California, Berkeley, United States
        Shy Shoham, Technion – Israel Institute of Technology, Israel

Session 1: Large Scale/High Speed Imaging and Photo-Stimulation in the Brain

8:50   Large-Scale High-Throughput Optical Imaging and Stimulation
        Peter Saggau, Baylor College of Medicine, United States

9:20   Towards a Dynamic Map of Neuronal Circuits
        Alipasha Vaziri, University of Vienna, Austria

9:40   Rapid 3D Optical Microscopic Imaging
        Guoqiang Li, Ohio State University, United States

10:00  Depth and Speed: What are the Limits?
        Elizabeth Hillman, Columbia University, United States

10:20  Coffee Break
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<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>10:40</td>
<td>Rapid Distributed Photo-stimulation and Imaging Using Holography and Temporal Focusing</td>
<td>Shy Shoham, Technion – Israel Institute of Technology, Israel</td>
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<td>11:10</td>
<td>Multi-photon 3D Imaging and Control of Neurons</td>
<td>Darcy Peterka, Columbia University, United States</td>
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<td>11:30</td>
<td>Optical Probing of Brain Circuits with Naturalistic Patterns of Neuronal Activation</td>
<td>Serena Bovetti, Italian Institute of Technology, Italy</td>
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<td>11:50</td>
<td>Using Digital Holography for Stimulation of Multiple Neurons Distributed in 3D with Cellular Resolution and Physiological Timescales</td>
<td>Karl Kilborn, Intelligent Imaging Innovations, Inc. United States</td>
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<td>12:10</td>
<td>Generalized Phase Contrast and Matched Filtering for Speckle-free Patterned Illumination</td>
<td>Darwin Palima, DTU Fotonik, Denmark</td>
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<td>12:30</td>
<td>Lunch</td>
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**Session 2: Imaging and Photo-stimulating Deep in Scattering Tissue**

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<tr>
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<tr>
<td>13:20</td>
<td>Deep, Fast Multiphoton Imaging</td>
<td>Chris Xu, Cornell University, United States</td>
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<td>13:50</td>
<td>Patterning Light in 3D and through Scattering Media: Then and Now</td>
<td>Rafael Piestun, University of Colorado, Boulder, United States</td>
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<td>14:10</td>
<td>Deep Tissue Molecular Imaging in Complex Biological Systems</td>
<td>Meng Cui, Howard Hughes Medical Institute, Janelia Farm, United States</td>
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<td>14:30</td>
<td>Two-photon Microscopy with SLM-based Coherent Control for Deep Imaging in Scattering Tissue</td>
<td>Thomas Bifano, Boston University, United States</td>
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<td>14:50</td>
<td>Ultrafast Time and Space Shaped Laser Pulses for Adaptive Functional Depth-resolved Imaging</td>
<td>Marcos Dantus, Michigan State University, United States</td>
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</table>
15:10 Coffee Break

15:30 Group Discussion
   The need for speed:
   Rapid scanning vs. planar imaging vs. parallel sparse illumination
   How deep can we see and stimulate with light?
   Are multi-modality methods the future?
   Combining depth, speed and wide areas.

Session 3: New Imaging Tools / New Imaging Modalities

16:20 Neuron-based Screening for Improved Red Fluorescent Genetically-encoded Calcium Indicators
   Hod Dana, Howard Hughes Medical Institute, Janelia Farm, United States

16:40 3D Optical Waveguide Arrays for In-vivo Optogenetics: Development and Application
   Anthony Zorzos, Massachusetts Institute of Technology, United States

17:00 Micron-scale LED Probes for In-vivo Spatiotemporal Optogenetic Activation of Neural Circuits
   Keith Matheison, University of Strathclyde, United Kingdom

17:20 Flexible, Cellular-Scale Optoelectronics for Wireless Optogenetics
   Jordan McCall, Washington University School of Medicine, United States

17:40 Waveguide Spatial Light Modulators
   Daniel Smalley, Brigham Young University, United States

18:00 Break-out Group Discussion
   Benchmarking imaging and stimulation systems; how to choose among a diversity of illumination geometries & devices.
   What is more appropriate for the field: brain observatories or a distributed observation model?

19:10 Dinner
   Bistro Bistro, 1727 Connecticut Ave, NW
Tuesday, 10 December 2013

8:30    Breakfast
        OSA Headquarters, 2010 Massachusetts, Ave., NW

Session 4: Applications & Analysis of Big Imaging Data Sets

9:00    Initial Attempts at Imaging Network Learning in Frontal Cortex
        Joshua Trachtenberg, University of California, Los Angeles, United States

9:25    A Cellular-resolution, Functional Map of Mouse Barrel Cortex
        Simon Peron, Howard Hughes Medical Institute, Janelia Farm, United States

9:50    Measuring Network Activity with 3D Random Access Two-Photon Imaging
        James Cotton, Baylor College of Medicine, United States

10:15   Morpho-functionality of Intact Neural Networks: From Single Cell to Whole Organ
        Francesco Pavone, European Laboratory for Non-Linear Spectroscopy, Italy

10:40   Coffee Break

11:00   Break-out Group Discussions
        What are the major challenges for deep brain imaging/photo-stimulation and how can they be solved?
        Next steps in radically new applications associated computational tools.

12:20   Break-out Groups Reports
        Hillel Adesnik, University of California, Berkeley, United States
        Laura Waller, University of California, Berkeley, United States
        Shy Shoham, Technion – Israel Institute of Technology, Israel

12:50   Summary, Conclusion & Next Steps
        Hillel Adesnik, University of California, Berkeley, United States

13:00   Lunch/Adjourn