

# Workshop: Light-Driven Processes for Bio-Inspired Materials and Systems

December 14-16, 2014

BioScience Research Collaborative

## **Sunday, December 14, 2014**

|  |   |  |                                       |
|--|---|--|---------------------------------------|
| 5:30 pm  | Welcome Reception   |  | BRC Event Space                       |
| Talk Session 1 -- Introduction to Interdisciplinary Vision of the Workshop |   |  | BRC Auditorium                        |
| Session Chair: Christy Landes, Rice University                             |   |  |                                       |
| 7:00 pm  | <i>Welcome</i>  |  | Christy Landes, Rice University       |
| 7:15 pm  | <i>Capturing color: cephalopod-inspired plasmonic active materials</i>  |  | Naomi Halas, Rice University          |
| 7:45 pm  | <i>Exciton transport in carbon nanotube photovoltaics using 2D White-Light Spectroscopy: Design principles from light harvesting proteins</i> |  | Martin Zanni, University of Wisconsin |
| 8:15 pm  | <i>Linker Rectifiers for Covalent Attachment of Catalysts to Semiconductor Surfaces</i>   |  | Victor Batista, Yale University       |
| 8:45 pm  | <i>Improving the Photocurrent Generation of Thylakoid Bio-solar Cells</i>   |  | Shelley Minteer, University of Utah   |
| 9:15 pm  | Adjourn   |  |                                       |

## **Monday, December 15, 2014**

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|---|--|--|--|
| 8:00 am   | Breakfast  |  | BRC Lobby  |
| Talk Session 2  |  |  | BRC Auditorium   |
| Session Chair: Anatoly Kolomeisky, Rice University                        |  |  |  |
| 9:00 am   | <i>Novel Plasmonic Nanomaterials and Instruments for Biomedical Applications</i>                               |  | Wei Shih, University of Houston                            |
| 9:15 am   | <i>Monitoring Charge Interactions through Changes in the Plasmon Linewidth</i>                                 |  | Stephan Link, Rice University                              |
| 9:30 am   | <i>Super-resolution imaging of hybrid organic-plasmonic nanostructures</i>                                     |  | Katherine Willets, University of Texas at Austin           |
| 10:00 am  | <i>Plasmonic nanoparticles for sensing applications</i>  |  | Emilie Ringe, Rice University                              |
| 10:15 am  | <i>In Situ Three-dimensional Super-resolution Imaging of Molecular Transport and Single Particle Catalysis</i> |  | Ning Fang, Iowa State University                           |
| 10:45 am  | Coffee Break   |  |  |
| 11:00 am  | <i>Light Management in Extremely Thin Photoelectrode Architectures for Solar-Fuel Generation</i>               |  | Isabell Thomann, Rice University                           |
| 11:15 am  | <i>Tuning of Charge Separation at the Nanoscale for Energy Applications</i>                                    |  | Clemens Burda, Case Western Reserve University             |
| 11:45 pm  | Lunch  |  | BRC Event Space  |
| Talk Session 3a   |  |  | BRC Auditorium   |
| Session Chair: Neal Waxham, University of Texas Medical School at Houston |  |  |  |
| 1:15 pm   | <i>Organic Solar Cells: Current Progress and Challenges</i>  |  | Thuc-Quyen Nguyen, University of California, Santa Barbara |
| 1:45 pm   | <i>Charge Separation and Photovoltaic Performance of All-Conjugated Block Copolymers</i>                       |  | Rafael Verduzco, Rice University                           |

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| 2:00 pm | <i>Metal Oxide Photocatalysts for Overall Solar Water Splitting: Recent Advances and Challenges</i>          | Jiming Bao, University of Houston                |
| 2:15 pm | <i>Single-molecule spectroscopic study of the counterion effect at the polyelectrolyte aqueous interface</i> | Y. Elaine Zhu, Notre Dame University             |
| 2:45 pm | <i>Computational Challenges in Broadband Mid-Infrared Imaging</i>  | David Mayerich, University of Houston            |
| 3:00 pm | <i>Mass Transport in Confined Environment Studied with Super Resolution Optical Microscopy</i>               | Gufeng Wang, North Carolina State University     |
| 3:30 pm | <i>Interfacial Molecular Foraging</i>  | Daniel Schwartz, University of Colorado, Boulder |
| 4:00 pm | Coffee Break   |  |

### Talk Session 3b

BRC Auditorium

Session Chair: Emilie Ringe, Rice University

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|---------|---|--|
| 4:15 pm | <i>Exploring Materials Structure and Mass Transport Dynamics on Chemical Gradients by Single Molecule Tracking and Spectroscopy</i>                   | Daniel Higgins, Kansas State University                    |
| 4:45 pm | <i>How To Understand Dynamics of Singlet Fission Process</i>  | Anatoly Kolomeisky, Rice University                        |
| 5:00 pm | <i>Seeing Single-Molecule Dynamics at Interfaces with Optical Microscopy</i>  | Jixin Chen, Ohio University                                |
| 5:15 pm | <i>Influence of molecular connectivity and nearest neighbor interaction on the charge transport properties of porphyrin assemblies on Au surfaces</i> | James D. Batteas, Texas A&M University                     |
| 5:45 pm | <i>Biological recognition, transport, light harvesting, or energy transfer</i>  | Neal Waxham, University of Texas Medical School at Houston |
| 6:00 pm | <i>Biomolecular synthesis of conducting polymers: Harnessing the structural diversity of proteins to tune polymer properties</i>                      | Christine Payne, Georgia Institute of Technology           |
| 6:30 pm | Poster Session and Reception  | BRC Event Space  |

## Tuesday, December 16

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| 8:00 am | Breakfast | BRC Classroom 280, lobby (2nd floor) |
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### Talk Session 4

BRC Classroom 280 (2nd floor)

Session Chair: Stephan Link, Rice University

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|----------|---|---|
| 9:00 am  | <i>Fabrication of Novel Titania Nanostructures for Energy Applications</i>  | Anna Samia, Case Western Reserve University               |
| 9:30 am  | <i>Surface Enhanced Raman Spectroscopy (SERS) Of Core-Shell Structures With Different Shell Morphology</i>              | Laura Sagle, University of Cincinnati                     |
| 10:00 am | <i>Electropolymerized Molecularly Imprinted Polymer (E-MIP) SPR based Sensors</i>                                       | Rigoberto Advincula, Case Western Reserve University      |
| 10:30 am | Coffee Break  |   |
| 10:45 am | <i>Single-Molecule Methods to Quantify Adsorptive Separations</i>   | Christy Landes, Rice University                           |
| 11:15 am | <i>Quantum Plasmonics: Applications in Light Harvesting</i>   | Peter Nordlander, Rice University                         |
| 11:45 pm | <i>Biochemical applications of Surface-Enhanced Raman spectroscopy</i>  | Martin Moskovits, University of California, Santa Barbara |
| 12:15 pm | Lunch; Working Meeting to discuss possible future collaborations and/or center/collaborative proposals; Closing Remarks |   |