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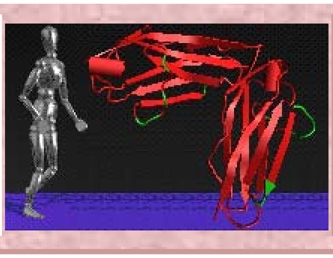

A cross-disciplinary ICAM WORKSHOP

NOV 12-15’2005, The Penn Stater Conference Hotel

The scope of the workshop includes theory, simulation, and experiments involving nanoscale materials inspired by biological systems. Specifically, the workshop will address the following questions:

1. What has been learned about the molecular interactions between biomolecules and nanomaterials in natural, synthetic and semi-synthetic systems?
2. What theoretical and experimental tools are needed to better understand the interface between natural and synthetic nanomaterials?
3. How can we better mimic nature's solutions in designing the electronic, optical, and architectural components of nanomaterials?
4. How does confinement affect the dynamics of biomolecules in nano-environments?
5. Can changes in the structure and function of biomolecules upon binding to nanomaterials be understood? predicted?
6. Can we design biologically compatible nanomaterials using inspiration from the natural systems that routinely survive extreme environments?
7. How can evolutionary approaches be used in nanomaterial design? How can biologically-inspired adaptive processes be incorporated into nanomaterials design?

Old Main, Penn State: A picture by G. E. Hagen

ORGANIZERS

Melik Demirel, Penn State University
Scott Reed, Portland State University
Vincent Crespi, Penn State University
Atul Parikh, University of California, Davis

Contact Information

Melik Demirel, 814-863-2270
Scott Reed, 503-725-8512

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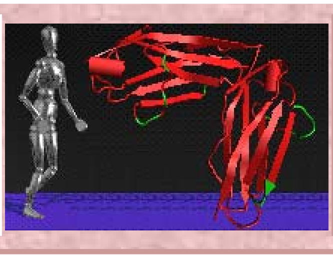

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If you have any questions please do not hesitate to contact Dr. Scott Reed 503-725-8512 or Dr. Melik Demirel 1-814-863-2270.

REGISTRATION

Registration fee for the workshop is $155.00. Please email Dr. Demirel if you are interested to register.

Click for the registration form

ACCOMODATION

Please contact the Penn Stater Hotel, 1-800-233-7505 or e-mail pshs@pshs.psu.edu and ask for group ICA1014.

Deadline: October 11'2005

POSTDOCS/STUDENTS

Limited number of funding is available for graduate students and postdocs. Please email Dr. Demirel if you are interested to apply. Please send a CV and brief description of your research (both in PDF format)

Deadline: September 15th 2005

OTHER

Getting to Penn State

By Plane: University Park Airport (SCE) offers daily flights to and from Philadelphia, Washington (Dulles), Detroit and Cincinnati. (taxi service are available for all flights).

By Car: Click for driving directions to Penn Stater Hotel

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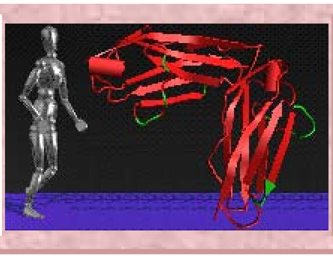

Calendar

NOVEMBER 2005

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
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27	28	29	30			

Biologically Inspired Nanomaterials

Workshop Program

November 12:

17:00-18:00 Opening Session (*Melik Demirel and Scott Reed*)

17:15-18:15 Keynote lectures

Self Assembly in Living and Synthetic Materials

David L. Allara, Pennsylvania State University *How we can use molecular self-assembly and molecular interface characterization to model biological systems?*

Uwe B. Sleytr, University of Nat. Resources and Applied Life Sciences, Vienna, Austria, *S-layers as basic buiding block for a molecular construction kit*

19:00- Reception Dinner

November 13:

08:00-9:30 Continental Breakfast

08:30-12:45 Morning Session (Coffee break 10:15-10:45)

Session Chair: Atul Parikh and Scott Reed

Bio-Nano-Interface

Itamar Willner, The Hebrew University of Jerusalem *Biomolecule-Nanoparticle Hybrids for Sensor and Circuitry Applications*

Vincent M. Rotello, University of Massachusetts, Amherst *Interfacing Nanoparticles with Biomacromolecules*

Mary Elizabeth Williams, Pennslyvania State University *Molecular Recognition Using Metal Binding Artificial Oligopeptides*

Giacinto Scoles, Princeton University *What can we learn from the mechanical response of oriented proteins deposited on a metal surface?*

Robert H. Austin, Princeton Univeristy *Nanoscale structures and biomolecule absorption: taming the beast*

12:30-13:30 Lunch

13:30-17:30 Afternoon Session (Coffee break 15:15-15:45)

Session Chair: Vincent Crespi and Melik Demirel

Probing Biological Systems using Nanomaterials

Joachim P. Spatz, Max Planck Institute fur Metallforschung *Biomimetic Studies of*

Joachim P. Spatz, Max Planck Institute fur Metallforschung *Biomimetic Studies of Cell Adhesion and Mechanics Applying Nano- and Microscopic Tools*

Weihong Tan, University of Florida Single *DNA nanomotor for providing energy at the nanometer scale*

Geoffrey F. Strouse, Florida State University *Optically Probing Biomolecular Structures via Nano Surface Energy Transfer*

Raymond E. Goldstein, University of Arizona *Motility, Mixing, and Evolutionary Transitions to Multicellularity*

William O. Hancock, Pennsylvania State University *Integrating kinesin molecular motors into hybrid biological systems*

November 14:

08:00-9:30 Continental Breakfast

08:30-12:30 Morning Session (Coffee break 10:15-10:45)

Session Chairs: Vincent Crespi and Scott Reed

Patterning with Biological Structures

Paul S. Weiss, Pennsylvania State University *Creating Nanostructures through Self- and Directed Assembly*

Jayanth R. Banavar, Pennsylvania State University *Origami of Life*

James E. Hutchison, University of Oregon *Organization of 1- and 2-D Nanoparticle Arrays via Assembly of Ligand-stabilized Nanoparticles on Functionalized Biopolymers*

Steven G. Boxer, Stanford University *Tethered vesicle gymnastics*

Mingdi Yan, Portland State Univeristy *Molecularly Imprinted Materials*

12:30-13:30 Lunch

13:00-17:30 Afternoon Session (Coffee break 15:15-15:45)

Session Chairs: Atul Parikh and Melik Demirel

Bio-inspired Functional Nanomaterials

Peixuan Guo, Purdue Univeristy *Fabrication of Patterned RNA Superstructures for Nanodevice, Gene Delivery and Therapy*

Rajesh Naik, Airforce Research Laboratory *Bio-inspired Materials Chemistry*

Cristian Micheletti, SISSA, Italy *Coarse grained models for the elasticity of Proteins*

Atul N. Parikh, UC Davis *Substrate Effects in Assembly, Structure, and Dynamics of Supported Phospholipid Membranes*

Melik C. Demirel, Pennsylvania State University *Molecular Forces in Proteins*

19:00 Dinner

November 15:

08:00-9:30 Continental Breakfast

08:30-10:50 Poster session (*contact Melik Demirel or Scott Reed for Information*)

12:00-12:00 Adjourn

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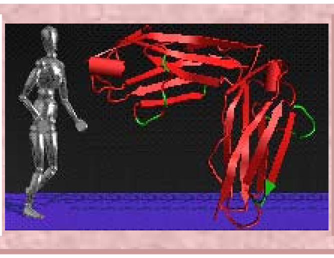

Participants (Confirmed)

1. David Allara, Chemistry and Materials Science, Pennsylvania State University, U
2. Giacinto Scoles, Chemistry, Princeton, USA
3. Itamar Willner, Chemistry, The Hebrew University of Jerusalem, Israel
4. Joachim P. Spatz, Biophysikalische Chemie , Universität Heidelberg, Germany
5. William Hancock, Bioengineering, Pennsylvania State University, USA
6. Mary Elizabeth Williams, Chemistry, Pennsylvania State University, USA
7. Cristian Micheletti, Biophysics, SISSA, Italy
8. Robert Austin, Physics, Princeton, USA
9. Paul Weiss, Chemistry, Pennsylvania State University, USA
10. Jorge Sofo, Physics, Pennsylvania State University, USA
11. Geoffrey F. Strouse, Chemistry, Florida State University, USA
12. Steven Boxer, Chemistry, Stanford University, USA
13. Uwe Sleytr, Center for Nanotechnology, Universität für Bodenkultur Wien, Aust
14. Jim Hutchison, Chemistry, University of Oregon, USA
15. Mingdi Yan, Portland State University, USA
16. Vincent M. Rotello, University of Massachusetts, USA
17. Gary Baker, Chemical Science Division, Oak Ridge National Laboratory, USA
18. Arthur Lesk, Biochemistry, Pennsylvania State University, USA
19. Akhlesh Lakhtakia, Engineering Science and Mechanics, Penn State, USA
20. Avishay Pelah, Max Planck Institute for Biophysical Chemistry, Germany
21. Kaan Kalkan, Center for Nanotechnology Education, Penn State University, USA
22. Keith Lidke, Max Planck Institute for Biophysical Chemistry, Germany
23. Alexander Gubin, BMBI/CSR, National Institutes of Health, MD, USA
24. Rajesh Naik, Airforce Research Lab, MLPJE, OH, USA
25. Pexiong Guo, Biomedical Engineering, Purdue University, USA
26. Mirna Macdonald, Engineering Science, Pennsylvania State University, USA
27. Jayanth Banavar, Physics, Pennsylvania State University, USA
28. Ray Goldstein, Physics, University of Arizona, USA
29. Ahmet Zeytun, Bioscience, Los Alamos National Laboratory
30. Samia Sulliman, ARL & ESM, Pennsylvania State University, USA
31. Gunalan Nadarajan, Associate Dean for Research, Penn State, USA
32. Esther Ofulue, Biology, University of Wisconsin, USA
33. Scott Reed, Chemistry, Portland State University, USA
34. Vincent Crespi, Phyiscs, Pennsylvania State University, USA
35. Atul Parikh, Bioengineering University of California, Davis, USA
36. Melik Demirel, Engineering Science, Pennsylvania State University, USA

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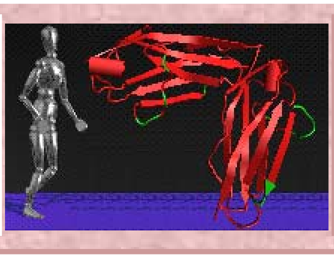

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Funding Agencies

Institute for Complex Adaptive Matter

Materials Research Institute, Penn State

Portland State University

Other Links

ICAM Penn State Web Site

Future ICAM meetings

ORGANIZERS

Melik Demirel, Penn State
Scott Reed, Portland State
Vincent Crespi, Penn State
Atul Parikh, U.C., Davis

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