

Minnesota Microscopy Society

Local affiliate of the *Microscopy Society of America*
and the *Microanalysis Society*



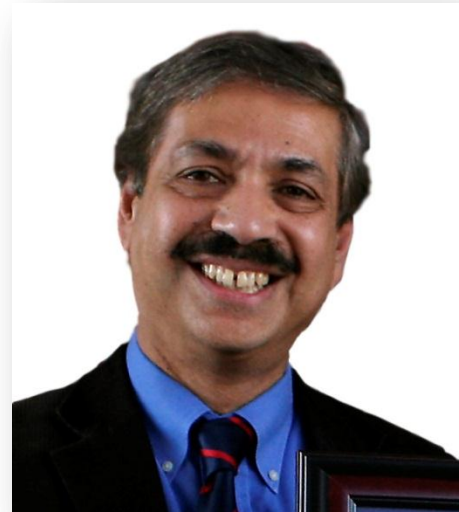
Newsletter

August 2013

Fantastic Voyage: Designing Self-powered Nanobots

Ayusman Sen

[Department of Chemistry](#),
The Pennsylvania State University
University Park, PA 16802
Email: asen@psu.edu



Date

Thursday, September 19, 2013

Schedule

6:00 – 6:30 p.m. Check-in
6:30 – 7:30 p.m. Dinner
7:30 – 8:30 p.m. Speaker

Location

[Earle Brown Heritage Center](#), north of
downtown Minneapolis in Brooklyn Center
Google map: <http://bit.ly/q3Qa5r>

NOTE: Leave extra time for possible
construction re-routes on I-694. Check the
[MnDOT North Central Project site](#) for updates.



Reservations

Cost for the fall program is \$10. Reservations are being taken through **11:59 p.m. on Wednesday, September 11**. Reservations may be made via Paypal by going to the MMS website's Calendar of Events page at <http://www.mnmicroscopy.org/calendar.html>.

MMS Fall Kickoff Event – Fantastic Voyage: Designing Self-powered Nanobots

continued

Speaker Bio

Ayusman Sen was born in Calcutta, India, and holds a Ph. D. from the University of Chicago where he was first introduced to catalysis. Following a year of postdoctoral work at the California Institute of Technology, he joined the Chemistry Department of the Pennsylvania State University where he is currently a Distinguished Professor. He is a Fellow of the American Association for the Advancement of Science. His research interests encompass catalysis, organometallic and polymer chemistry, and nanotechnology. He is the author of approximately 325 scientific publications and holds 24 patents. Sen's pastime centers on enological and gastronomical explorations.



Abstract

Self-powered nano and microscale moving systems are currently the subject of intense interest due in part to their potential applications in nanomachinery, nanoscale assembly, robotics, fluidics, and chemical/biochemical sensing. We will demonstrate that one can build autonomous nanomotors "from scratch" that mimic biological motors by using catalytic reactions to create forces based on chemical gradients. These motors are autonomous in that they do not require external electric, magnetic, or optical fields as energy sources. Instead, the input energy is supplied locally and chemically. These "bots" can be directed by information in the form of chemical and light gradients. Further, we have developed systems in which chemical secretions from the translating nano/micromotors initiate long-range, collective interactions among themselves. This behavior is reminiscent of quorum sensing organisms that swarm in response to a minimum threshold concentration of a signaling chemical. In addition, an object that moves by generating a continuous surface force in a fluid can, in principle, be used to pump the fluid by the same catalytic mechanism. Thus, by immobilizing the nano/micromotors, we have developed nano/microfluidic pumps that transduce energy catalytically. These non-mechanical pumps provide precise control over flow rate without the aid of an external power source and are capable of turning on in response to specific analytes in solution.



2013:

September 25 **What:** **JEOL USA / Thermo Fisher Users Meeting**

Location: Medtronic
Fridley, MN

October 17 **What:** **MMS / Sigma Zeta Joint Meeting**

Location: Bethel University, Community Life Center
3900 Bethel Drive, St. Paul, MN 55112

Speaker: Dr. Jennifer Wiseman, Senior Astrophysicist, NASA
Goddard Space Flight Center

Topic: "Glimpses of an Incredible Universe"

November 2 **What:** **Microscope Day**

Time: 1:00 – 4:00 pm

Location: Science Museum of Minnesota
St. Paul, MN



Volunteers needed! Please contact Ann Palmer:
palme003@umn.edu

2014:

March 20 **What:** **Minnesota Technical Symposium ([MinnTS](#))**

Time: 5:00 – 9:00 pm

Location: Medtronic World Headquarters
Fridley, MN

May 2 **What:** **Spring Symposium**

Location: Minnesota Science Museum
St. Paul, MN

New! MMS Now Has a LinkedIn Professional Group



Join MMS on LinkedIn. The group is dedicated to the local microscopy community. Post your upcoming events or pose a question for discussion.

Follow this link to join: <http://www.linkedin.com/groups?home=&gid=5099687&trk=anet ug hm>



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 **Minnesota Microscopy Society**

The purpose of The Society shall be to increase and diffuse, for scientific and educational purposes only, the knowledge, science and practice of microscopy, imaging and compositional analysis, and associated techniques, and to foster communications among people who have an interest in those areas.

Join Group Or sign up »

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(651) 733-2352; jjpayne@mmm.com

Corporate Liaison: Jason Heffelfinger, Medtronic Inc.,
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Bldg. 201-BE-16, St. Paul, MN 55144-1000;
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Minnesota Microscopy Society – Membership Form

All microscopists are urged to support their Society at one of the membership levels offered below. Often, supervisors will support MMS memberships out of their project budget because they recognize that it is a very inexpensive way to maintain and increase the skills of their microscopists. If you have been a member over the years and recognize the value of MMS to the community of microscopists it serves, consider upgrading your membership this year to the patron or sustaining level. Thank you.

Name _____ Dr Mr Ms Phone (_____) _____

Affiliation _____ Position _____

Address _____ ZIP _____

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(Newsletter notifications will be e-mailed to the address above.)

Check here if you do NOT want your name and address to appear in the Society directory.

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