



PHILADELPHIA SECTION
MEETING ANNOUNCEMENT
October 21, 2010

Nano-Technology Innovations
in Lubrication and Wear

Speakers and Abstract Below

Thursday, October 21, 2010
1:30 – 4:00 PM

Brittingham's Irish Pub-Restaurant,
640 Germantown Pike, Lafayette Hill, PA

Dinner to Follow (entrée choices: Stuffed Flounder, Veal Parmigiana, Chicken Marsala)
Cost: \$30 (Students \$15)

Name _____ Company _____ No. of Persons _____

RSVP Mr. David Ammon, Houghton International Inc., 930 Madison Ave., Valley Forge, PA 19482 or (610)-666-4141 or dammon@houghtonintl.com. Please indicate your choice of entrée. Payment may be made in advance or at the door.

Nanomechanics at Interfaces: Friction, Lubrication and Wear at the Nanometer Scale

Jason Bares & Qunyang Li
University of Pennsylvania

Deformable solids interact with surroundings primarily through their surfaces. Despite this fact, little progress in mechanics has been made on revealing what is taking place at surfaces. In our lab, we are trying to address this by studying nanotribology: the fundamental science of contact, friction, adhesion, lubrication, and wear at the nanometer scale. In this work, we will give a brief overview of the research work carried out in our group and the advanced scanning probe microscopy, surface spectroscopy and material characterization tools that we use to investigate the tribological properties for novel materials. To be more specifically, we will also discuss two projects in more detail.

In one project, atomic force microscopy (AFM) was used to investigate the nanoscale properties of additive films formed under boundary lubrication conditions. Tribological properties of such films have traditionally been studied through macroscale testing. We will discuss how the frictional behavior of these materials can be measured on the nanoscale in an environment comparable to the end-use application.

In the other project, we will discuss an unusual friction phenomenon observed for solid lubricants (graphite and MoS_2) at the nanometer scale and illustrate how energy can be dissipated through unique surface interactions when samples are becoming atomically thin. The generality of the results indicates that this may be a universal characteristic of nano-scale friction for atomically-thin materials weakly bound to substrates.

Biography:

Jason Bares is a postdoctoral researcher at the University of Pennsylvania working with Professor Robert W. Carpick. His current research involves the use of atomic force microscopy to study the nanoscale properties of additive films formed under boundary lubrication conditions. He received his Ph.D. in materials science and engineering from the University of Florida in 2009 and his B.S. in materials science and engineering from the University of Wisconsin in 2005.

Qunyang Li is a postdoctoral researcher at University of Pennsylvania, working with Professor Robert W. Carpick on nano-scale tribology. His current work includes atomic-scale stick-slip friction, study of physical origin of rate and state friction and mechanical characterization of two-dimensional materials. He received his Ph.D from Brown University in 2008 under the supervision of Professor Kyung-Suk Kim. Prior to this, he obtained his B.S. and M.S. in Engineering Mechanics from Tsinghua University, China, in 2001 and 2003.

DIRECTIONS TO BRITTINGHAM'S (640 Germantown Pike, Lafayette Hill, PA):

FROM NORRISTOWN/CONSHOHOCKEN AREAS:

East on Germantown Pike 2.7 miles from the PA Turnpike interchange in Plymouth Meeting, PA. Brittingham's is on the right just before the curve.

FROM PHILADELPHIA:

West on I-76 to I-476 North.

I-476 North to Germantown Pike-East exit

Then follow "From Norristown/Conshohocken Areas" directions

FROM THE WEST:

I-76 East (PA Turnpike) becomes I-276 East.

I-276 East to Exit 333.

Exit at the "Germantown Pike-East" ramp after the tolls

Follow "From Norristown/Conshohocken Areas" directions

FROM THE EAST:

I-276 West to Exit 333

Exit at the "Germantown Pike-East" ramp after the tolls

Follow "From Norristown/Conshohocken Areas" directions

FROM NEW JERSEY

New Jersey Turnpike to Exit 6

Then follow "From the East" directions

FROM ALLENTOWN/POINTS NORTH:

I-476 (PA Turnpike Northeast Extension) south to the East-West Turnpike

Follow the I-276 West "Norristown/Harrisburg" ramp to Exit 333 (immediately at the end of this ramp)

Follow the "Germantown Pike-East" ramp after the tolls

Follow "From Norristown/Conshohocken Areas" directions

ALTERNATE ROUTE – ALLENTOWN/POINTS NORTH:

Due to frequent congestion on the Northeast Extension below Exit 31 (Lansdale), the following is an alternate route:

PA 309 south to I-276 West

Then follow "Directions from the East"

FROM DELAWARE/POINTS SOUTH

I-95 North (or south, depending on starting point) to I-476 North (Plymouth Meeting)

Follow I-476 North to Germantown Pike-East exit

Follow "From Norristown/Conshohocken Areas" directions