Soft Matter World Newsletter

January | 2011 | Issue 25

Dear Soft Matter Colleagues,
Happy New Year! This issue celebrates the two year anniversary of the Soft Matter World Newsletter. We have redesigned the layout along with an expanded special edition newsletter.

Soft Matter Research at the University of California, Merced: Home of Soft Matter World

The institution we are featuring this month is the University of California, Merced. The University of California (also known as the UC) is a part of California's three-tier public higher education system. The UC Merced campus opened in September 2005 as the tenth campus of the UC system and the first American research university built in the 21st century. This vibrant campus is home to a small but dedicated group of soft matter researchers and is also the headquarters of the SoftMatterWorld.org website.

Three research groups at the university conduct a majority of the soft matter related research:

The Hirst Group

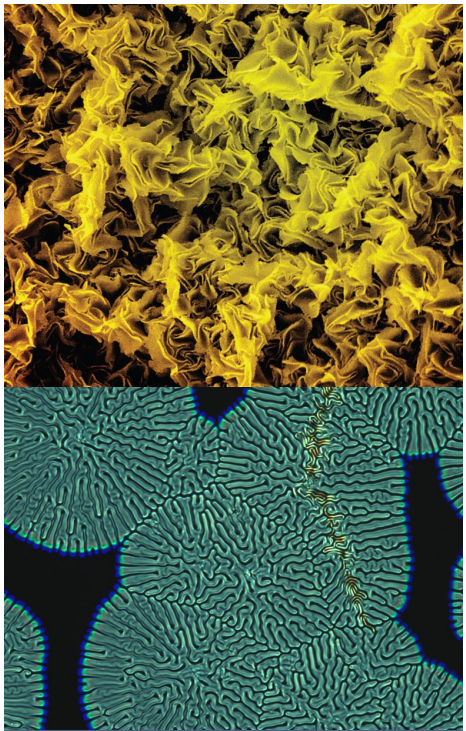
Led by Prof. Linda S. Hirst who joined the UC Merced faculty in 2008, the group's research interests focus largely on Biophysics and Liquid Crystal Materials. Some of the most current research interests include:

- The influence of cholesterol and polyunsaturated lipids on cell membrane structure
- Controlling Lipid phase behavior and raft formation for "soft microfluidics"
- Biopolymer Networks
- Bent-Core and novel ferroelectric liquid crystal materials

Prof. Linda Hirst is also the creator of Soft Matter World. The site was founded in January of 2008 in an effort to provide a focal point for the soft matter research community around the world, through education and networking. She maintains and edits the site with the help of two graduate students that are also conducting research in her group; Adam Ossowski and Ronald Pandolfi. Visit the group's website to read more about their research.

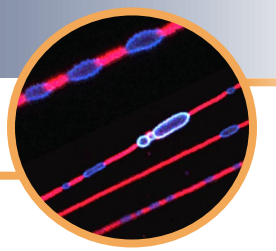
The Gopinathan Group

This group is led by Prof. Ajay Gopinathan who uses theoretical research to investigate a variety of topics in soft matter and biophysical research. The group's primary research area is Biological Transport, focusing on understanding how material, such as macromolecules and vesicles are transported within the cell and across membranes. They are involved in a number of other projects including:



(top): SEM image of large-scale biaxial bimetallic Au/Ag nanopetals on shrunk polystyrene (PS) sheets. Image was featured on the November 15, 2010 issue of Applied Physics Letters.
(bottom): Polarized microscopy image of the cholesteric (chiral nematic) liquid crystalline phase (100x magnification). Jennifer Kirchhoff.

- Cytoskeletal network dynamics



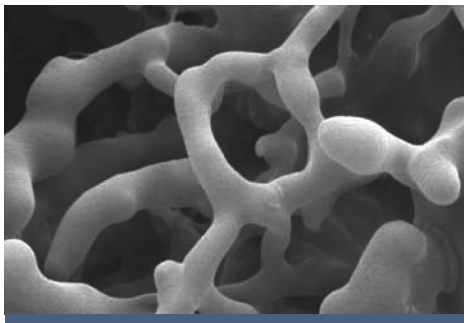
- Biopolymer aggregates
- Chemotaxis
- Drug design
- Wrinkling/crumpling of elastic sheets
- Transport in disordered and or confined geometries

Visit the group's website to read more about their research.

Jennifer Lu Group

Led by Prof. Jennifer Lu, the group focuses its research on creating new transducer material systems by harnessing the unique properties of one-dimensional inorganic nanomaterials and polymeric materials.

By combining the highly deformable nature of polymers with transducer materials and using novel interface engineering strategies, thin film scaffolds can be directly fabricated on device platforms. These scaffolds can then be used in biophysical systems that will respond to external stimuli that can be remotely modulated. The highly controlled external stimulation can be imposed on cells for fundamental studies of cell differentiation and development mechanisms as well as for regenerative medicine and prosthetics.



Scanning Electron Microscopy (SEM) images of Poly(acrylic acid) grafted carbon nanotubes which have been shown to exhibit significant enhancement in neuron differentiation.
T. I. Chao, S. Xiang, C. S. Chen, W. C. Chin, A. J. Nelson, C. Wang, J. Lu. Biochem. & Biophys. Research Comm., 384(4), 426, (2009)

Visit the group's website to read more about their research.

Read more about these research groups by visiting their websites or affiliated graduate research program websites.

- Quantitative Systems Biology
- Biological Engineering and Small Scale Studies
- Physics and Chemistry Graduate Studies

If you are interested in the opportunities available at UC Merced, visit the Notice Board to read about an open postdoctoral faculty position for an Assistant Physics Professor position as well as an open positions in Prof. Jennifer Lu and Prof. Gopinathan's Groups.

Mechanical Properties of Squeezed DNA Molecules in Nanoslits

Yeng-Long Chen, Po-keng Lin, and Chia-Fu Chou. Macromolecules. Advance Article- December 7, 2010. DOI: 10.1021/ma102268b.

Dr. Yeng-Long Chen and colleagues from the Academia Sinica use computer simulations to explore the mechanical forces required to stretch a semi-flexible polymer such as DNA. The polymers are stretched in nanoslits where the slit height is comparable or smaller than the polymer persistence length. Under strong confinement, the correlation length between polymer segments is strongly influenced by the walls, and the entropic force required to extend the molecule decreases. By rescaling the extensional force with respect to the entropic force that accounts for wall effects, a generalized force-extension relation for worm-like chains is found.

This could be applied to determine an unknown external extensional force on a known DNA fragment by measuring the relative extension. To read more visit the Macromolecules Journal website at ACS publications or Prof. Chen's research group website.

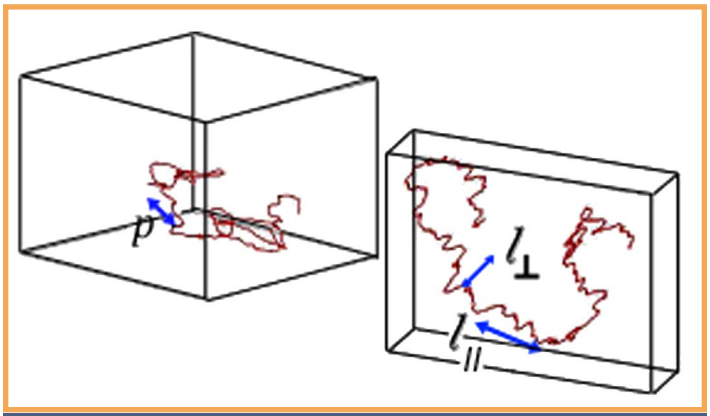


Figure 1. In smaller channels where height (H) is less than the chain persistence length (P) a qualitative change to DNA conformation and relaxation dynamics occurs due to confinement-induced change in the segmental correlation length lc, which separates into longitudinal ($l_{||}$) and transversal ($l_\perp$) components in the unconfined and confined dimensions.

Inter-Continental Advanced Materials for Photonics Summer School (I-CAMP) 2011

The Inter-Continental Advanced Materials for Photonics (I-CAMP) Summer School is taking place from May 18th through June 17th, 2011 in Montevideo, Uruguay and Buenos Aires-Corrientes, Argentina. The I-CAMP School will provide education for young scientists working in materials science, optics, photonics, biophysics, nanoscience, and related fields. The goal is to prepare the participants for research at the frontiers of science and technology by providing an interdisciplinary expert training not easily available within the traditional system of graduate education and postdoctoral apprenticeship.

The Summer School is primarily targeted at advanced undergraduates, graduate students, and postdoctoral fellows within the first three years after defending their PhD, although those in different circumstances are considered too. In particular, the organizers strongly encourage early-career professionals from Industry to participate in the I-CAMP school if the school topics match their interests/background.

At each I-CAMP Summer School, there will be 50-100 students from a diverse range of scientific backgrounds and from different countries (with at least 50% of them coming from the USA institutions).

The I-CAMP school will bring together both prominent & junior scientists and will allow them to combine advanced education with learning about different cultures worldwide. Participation of students, postdoctoral fellows, and other early-career professionals is strongly encouraged. Up to 20 fellowships will be awarded to support travel of early-career scientists each year. Visit the website to read more.

(top left and bottom right) Optically generated photonic structures in a cholesteric liquid crystal. (bottom left) A diffraction pattern obtained using a HeNe laser beam and a self-assembled periodic hexagonal structure. (top right) A nematic liquid crystal with topological defects and square-shaped colloidal inclusions.

APS March Meeting 2011

Although abstract submission is closed you can still register for the APS March Meeting to be held on March 21st through the 25th in Dallas, Texas.

The outstanding scientific program will include more than 100 invited sessions and 550 contributed sessions at which approximately 7,000 papers will be presented. Registration only deadline is on January 15th.

Visit the APS Physics website to read more.

www.aps.org/meetings/

Colloids and Materials 2011

The 1st International Symposium on Colloids and Materials

The 1st International Symposium on Colloids and Materials is being organized by Elsevier (publishers of the Journal of Colloid and Interface Science) and will be held on May 8th -11th, 2011 in Amsterdam, The Netherlands.

Conference themes include:

- Soft materials from surfactants, polymers and dendrimers;
- Biomaterials, biomimetics and nanomedicines
- Supersolvophobic surfaces, wetting and surface functionalization
- Green nano and colloid chemistry
- Responsive colloidal materials
- Nanocatalysis and reaction control

Early Registration ends on January 31st so visit the website to read more.

www.colloidsandmaterials.com

INTERMAG

Asia International Magnetics Conference

The Institute of Electrical and Electronics Engineers Magnetics Society (IEEE) is presenting INTERMAG 2011, which will be held from Monday April 25 until Friday April 29, 2011, at the Taipei International Convention Center (TICC) in Taipei.

Intermag is planned to provide a range of oral and poster presentations, invited talks and symposia, a tutorial session, and exhibitions reviewing the latest developments in applied magnetics.

A few of the technical subject categories directly involved with soft matter science include:

- Soft magnetic materials and applications
- Crystalline, nanocrystalline and amorphous materials
- Ferrites, Garnets and other materials
- Magneto-dielectric materials or meta-materials
- Applications

Advance registration opens on January 21st, 2011. To read more visit the website at;

intermag.onestep.com.tw/

Soft Matter World Website Updates

Interactive Map, Archives and Conference Listing Additions

Global Research Network Map

The new and improved Global Research Network is now posted on the site. The new map differs from the old map with two new features.

- Navigation Bar: On the top of the map lies a navigation bar which will recenter the map.
- Research Category Filter: On the lower left hand side there is now a filter composed of 9 primary research interests to help you filter displayed groups on the map.

If you are a registered member please make sure that all of your information is correct. If you wish to add your group visit the Global Network on the website and register using the form on the bottom of the page.

Archives and Conference Listings

To help accomodate increasing growth on the site two new sections have been added to the site;

- Conference Listings: What was previously the "Latest News" section is now its own navigation bullet as Conference Listings.
- Archives: Previous Newsletters and article archives were previously listed at the bottom of the "Latest Research" section now have their own dedicated Archives page.

Should you have any inquires about the recent site updates just email the editor at editor.softmatterworld@gmail.com.

We hope you enjoy browsing softmatterworld.org and come back soon

Linda S. Hirst and Adam Ossowski

SoftMatterWorld.org

**If you would not like to receive this e-mail newsletter please send a reply to editor.softmatterworld@gmail.com with UNSUBSCRIBE in the subject line.*