

# ConnMS

The Connecticut Microscopy Society Newsletter

[HTTP://www.ConnMS.org](http://www.ConnMS.org)

October 2007

## From the President



It has been an honor and a pleasure to serve as the Vice President last year and now as President of the Connecticut Microscopy Society. In this capacity, I have met many microscopy enthusiasts with diverse interests in applications and techniques.

Despite this range of interests, one thing we all love is the process of discerning structures that are otherwise seemingly “invisible” and perhaps even “unknowable”. Our fall meeting is a case in point as one speaker will talk about the tracking of single intracellular molecules over time and the other on defining nanodevice structures by EM.

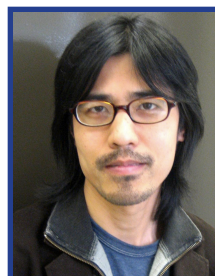
I have had the help of two new officers this year. Notably, and perhaps for the first time ever, all of the current society officers are light microscopists! David Knecht, our new Vice President, is a Professor in the Department of Molecular and Cell Biology on the Storrs UConn campus whose research employs time resolved light microscopy. Our new secretary, Gary Lavensky, of Andor Technologies, also has considerable expertise in laser scanning microscopy, in particular spinning disk confocals and CCD cameras.

### Warm Welcome to New Microscopists in Town

We would like to welcome a couple of academic researchers who have moved to CT within the last year. We are fortunate that one of these researchers will be speaking at our next meeting (see below)! Barry Carter has recently moved from the University of Minnesota and taken the position of Head of the Department of Chemical, Materials and Biomolecular Engineering at the Storrs UConn campus. Pu-Xian Gao has moved from the Georgia Institute of Technology and has also joined the

*Continued on page 3*

## Ji Yu



Dr. Yu obtained his B.S. in Chemistry from Tsinghua University and his PhD in Physical Chemistry from University of Texas at Austin. He worked as a postdoctoral fellowship at the Harvard University, before he joined the

faculty at the University of Connecticut in 2000. He is currently an Assistant Professor in the Center for Cell Analysis and Modeling of University of Connecticut Health Center.

## Pu-Xian Gao



Dr. Pu-Xian Gao received his Ph.D. in Materials Science & Engineering from the Georgia Institute of Technology. After completing a postdoctoral fellowship in the Center for Nanostructure Characterization and Fabrication at the Georgia

Institute of Technology, he joined the department of Chemical, Materials and Biomolecular Engineering (CMBE) at the University of Connecticut as an assistant professor on January 2007. Dr. Gao's research interests lie in synthesis, characterization and growth theory studies of low-dimensional nanomaterials; biomedical applications such as biosensors, bioactuators and biogenerators; and energy and environment related applications.

### Inside this issue

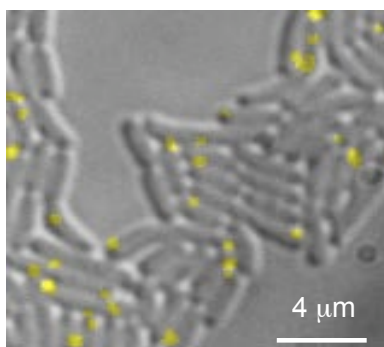
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# Fall Meeting Abstracts

Ji Yu, PhD

## “Designing Experiments *in Singuli*: Imaging Intracellular Single Protein Molecules”

The past decade has seen the gradual maturation of various single-molecule techniques that have been shown to be extremely useful for studying biomolecules *in vitro*. But in order to truly understand the activity of biomolecules, it is also important to observe single biomolecules in their native environment of biological cells – a field that is much younger and less proven. In this talk I will focus on three single-molecule techniques based on detection of individual fluorescent protein molecules in cells. The first is an assay of protein expression: although expression is normally measured in terms of concentration, unique dynamic information can be obtained from recording the “birth-time” of individual protein molecules in a cell in real time. The second technique, which we call photo-activation molecule tracking, is an improved single-molecule tracking method for analyzing molecular transport kinetics. Lastly, I will discuss the enhancement and application of PALM, a super-resolution optical imaging method, for studying prokaryotic cytoskeleton subcellular structures..



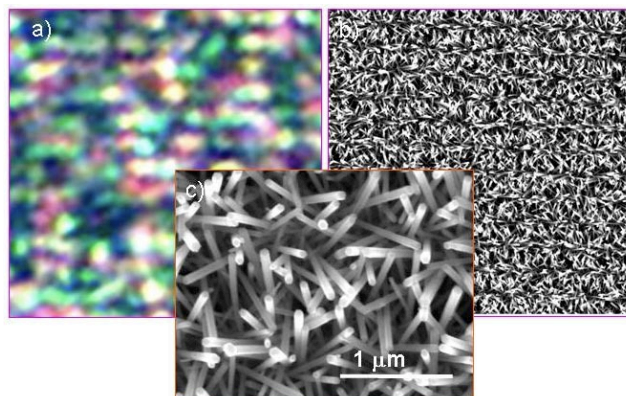
An *E. coli* micro-colony expressing a tiny amount of yellow fluorescent protein. Single fluorescent proteins are detected and shown as individual spots overlaid on the DIC image of the cells.

Pu-Xian Gao, PhD

## Substrate Tailored Assembly of Nanowires/ Nanobelts Architectures

Nanoscale materials such as nanowires (NWs), nanobelts (NBs) and nanotubes (NTs) have been demonstrated as building blocks for nanoelectronics and nanophotonics. Based on these individual nanoelements, nanoscale devices such as field effect transistors, resonators, light emission diodes and nanolasers have been fabricated. Widespread applications of nanomaterials require the ability to practically define their shape, size, composition, orientation and assembly as desired so as to get desired functionality in specifically fabricated nanodevices. Therefore, nanostructure synthesis in an architectural way is necessary in order to increase the flexibility and functionality of nanomaterials.

In this presentation, the recent progress will be presented on hierarchical assembly of NWs and NBs. Specifically, large scale and flexible nanowire power sources, laterally bridged NWs devices and well-tailored three-dimensional (3D) NW architectures have been successfully demonstrated. It is envisioned that using low-cost bottom-up synthesis techniques, well-defined 2D and 3D substrates via lithography techniques can be directly engineered into large scale functional devices and 3D NW architectures that can be used as potential nanosensor arrays and photonic crystal-based devices.



*from the President continued . . . .*

faculty of that same department as an assistant professor on the Storrs UConn campus.

**Fall Meeting**

This year's spring meeting will be held Wednesday November 7th at Wesleyan University in the Woodhead lounge near the Science Library. We have yet again lined up two excellent speakers. **Ji Yu** will speak on the imaging of single molecules by employing photoactivation of GFP and its subsequent photobleaching in a technique known as PALM. **Pu-Xian Gao** will speak to us about his research that utilizes EM to elucidate the structure of components used for nanodevices such as electronics and biosensors. Both these talks promise to be exciting presentations on cutting edge applications of EM and light microscopy. *Please take a minute to post a copy of the enclosed meeting announcement near you so others can be made aware of this symposium.*

**Many Thanks to Those Who Contributed.** I'd like to express my gratitude to the many people who have contributed to the society this year. First and foremost, I'd like to acknowledge the strong work

of our Vice President, **David Knecht**, who went to considerable effort to arrange for this meeting's speakers. It has been both a joy and a privilege to work with him. Thanks also go out to **Gary Lavensky** who has been exceptionally helpful in his role as secretary.

We are indebted to **Jeff Gilarde** who is once again hosting the Fall meeting on the Wesleyan campus. Having the Fall meeting at Wesleyan has become a bit of a tradition of late, which is fortunate for this society as the Woodhead Lounge is a lovely location for meetings that combine dinner and talks. Many thanks are also due to our Past Presidents, **Marc Pypaert** and **Larry Altman**, who both continue to give advice and support.

Finally, I would like to invite you to consider serving as a society officer this upcoming year. Helping to run the ConnMS is not burdensome and it is a great service to our community. Plus, frankly, it is fun to choose speakers and topics for our meetings. Please consider taking a role in the upcoming year!

Best Regards,

Ann Haberman, President

**We would like to thank all our sponsors:**



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Lawrence Altman, Thomas Burrage, Linda Chicoine, Frank Dye, Margaret Grunnet  
Becky Hohman, Margaret Ianiello, Gayle Norbert, Marc Pypaert, and David Snow

# Connecticut Microscopy Society Fall Meeting

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**Ji Yu, Ph.D.**, University of Connecticut, Farmington CT

“Designing Experiments *in Singuli*: Imaging Intracellular Single Protein Molecules”

**Pu-Xian Gao, Ph.D.**, University of Connecticut, Storrs CT

“Substrate Tailored Assembly of Nanowires/Nanobelts Architectures”

Date: Wednesday November 7th, 2007

Woodhead Lounge at the Science Library, Wesleyan University

5:00-6:00 PM - Registration and Reception

6:00-6:45 PM - Ji Yu, Ph.D

6:45-7:30 PM - Dinner

7:30-8:15 PM - Puxian Gao, Ph.D

**Pre-registration is preferred by October 31th**

Meeting registration fee: \$25 for regular members

\$30 for non-members

\$15 for students

**To register:** please contact [G.Laevsky@andor.com](mailto:G.Laevsky@andor.com) or visit our webpage at: <http://www.connms.org>

## **Directions to Wesleyan University (Middletown):**

### **From Hartford and points north:**

Take I-91 south to Exit 22 for Route 9 southbound, and follow the signs to Wesleyan.

### **From New Haven, New York and points south:**

Take I-95 north to I-91 north to Exit 18 for Route 66 east, and follow the signs to Wesleyan.

### **From Waterbury and points west:**

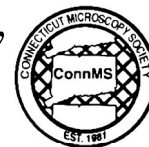
Take I-84 east to exit 27 to Routes 691/66 east. Follow the signs to Wesleyan.

- Once on route 66 (Washington Street) in Middletown, turn right into High Street. Turn right at the fourth traffic light, into Lawn Avenue.

- The Science Library, next to the Science Tower, will be on your right 400 meters up the road. You can park on the street or in parking lot L at the beginning of Lawn Avenue. Parking lot D is directly in front of the best entrance to the Science Library.

- The meeting is in Woodhead Lounge, in the Science Library, just next to the Exley Science Center.

*A map of the area can be found at the following website: <http://www.wesleyan.edu/about/campusmap.html>*



## Registration for the Fall Meeting

November 7<sup>th</sup>, 2007

Woodhead Lounge at the Science Library

Wesleyan University, Middletown, CT

Name: \_\_\_\_\_

Affiliation: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Email: \_\_\_\_\_

Tel: \_\_\_\_\_

Field of Interest: Life Science \_\_\_\_ Materials Science \_\_\_\_ Both: \_\_\_\_

Membership in related societies: MSA: \_\_\_\_ NESM: \_\_\_\_

### Registration fees (please check one)

\_\_\_\_\_ Regular Member \$25

\_\_\_\_\_ Guest / Non-Member \$30

\_\_\_\_\_ Student Member \$15

*Please send completed application and check payable to ConnMS to:*

Gary Laevsky  
Andor Technology  
425 Sullivan Ave. ST. 3  
S. Windsor, CT 06074

If you have any questions I can be contacted at:

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