



## NATIONAL CAPITAL SECTION

### OPTICAL SOCIETY of AMERICA

<http://www.osa.org/LocalSections/ncsosa/>



## April 2009

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Seventh 2008-2009 meeting of the  
National Capital Section of the Optical Society of America

Tuesday, April 21<sup>st</sup>  
Dinner at Sala Thai Restaurant

Lecture at OSA Headquarters, 2010 Massachusetts Ave., NW  
Washington, DC

Dr. Rhonda Stroud

Naval Research Laboratory, Washington, DC

### NANOASTRONOMY: MICROSCOPY OF DUST FROM SPACE

Dust is a very important material in the cosmos. Large volumes of dust are shed from dying stars that eventually get recycled to form new solar systems. The conventional astronomy approach to studying these processes relies on remote, telescope-based observation. Direct observation of the dust from stars, comets and asteroids using laboratory-based nanoanalytical instrumentation provides complementary information. For example, the average composition and crystal structure of dust grains can be inferred from circumstellar infra-red spectra, but these determinations are heavily model dependent. Using transmission electron microscopy to study individual stardust grains, we can provide detailed composition and structure information to constrain the spectral fits and also models of stellar evolution.

#### Sala Thai Restaurant

2016 P Street NW  
Washington, DC  
(202)872-1144  
6:00 PM

#### Social Hour & Networking

6:30 PM

**Dinner**

7:45 PM

**Lecture**

#### OSA Headquarters

2010 Massachusetts Ave. NW  
(Across P Street)

*See inside for map & directions*



If you are attending dinner  
**Reservations are required**

*Please call by 4:00 PM,  
Monday 20 April*

Contact

**John Burris**

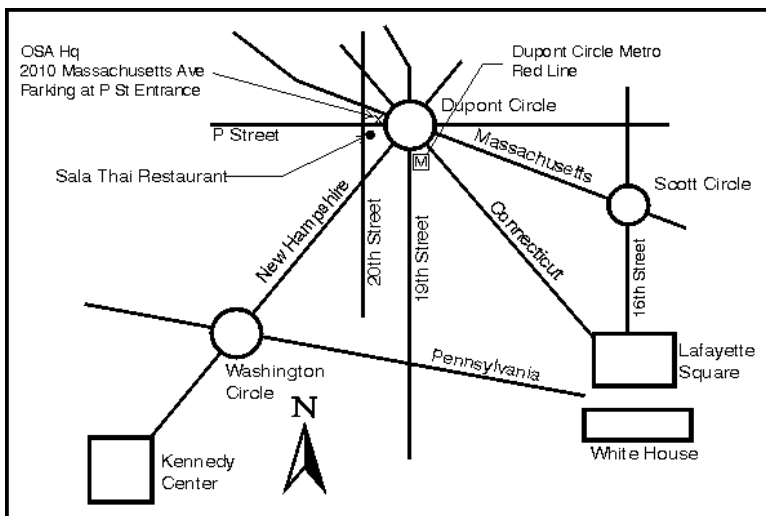
(301)614-6031

john.f.burris@nasa.gov

## Directions to the OSA Headquarters and Sala Thai Restaurant

The OSA Executive Offices are located at 2010 Massachusetts Ave., NW, Washington DC, just west of Dupont Circle. There will be parking in the OSA building garage that can be entered from P Street just across the street from the restaurant. Someone will be watching the remote monitors to let people in, either through the garage (if in your car), or the front door (Mass. Ave. side) if you are on foot. If the garage does not open reasonably promptly, press the buzzer. It is very important that you DO NOT pick up the telephone by the front and back entrances. This phone goes directly to security which in turn calls several OSA staff members at their homes! Park only in spaces marked

"Reserved for OSA". Please try to carpool as much as possible, or take the Metro, since parking is limited. The lecture will be in the First Floor Conference Room. The Sala Thai Restaurant is at 2016 P Street NW directly across the street from the entrance to the OSA garage. Note that the Dupont Circle Metro station (Red Line) is only a couple of blocks away.



## Meeting Schedule

6:00 PM Social Half Hour, Pay-As-You-Go Bar, Sala Thai Restaurant, Washington, DC

6:30 PM Dinner at Sala Thai Restaurant  
*If you are attending the dinner, advanced reservations are required..*

About 7:45 PM Lecture at first floor conference room, OSA Headquarters, 2010 Massachusetts Ave, Washington, DC: "Nanoastronomy: Microscopy of Dust from Space" by Dr. Rhonda Stroud

Dinner will be served family style & include several Appetizers & Entrees, Rice, Tea or Coffee.

The price will be about \$22, including taxes and tip. There is a \$2.00 surcharge for those who are not current members of NCS/OSA. Alcoholic beverages and desserts are extra.

Note: you can just attend the lecture after the dinner.

## News Item – Short Light

The world's shortest single photon has been produced by physicists at Oxford University. Light can be thought of as a series of waves or, in the dualistic view of reality prescribed by quantum science, as a collection of quanta, particle-like parcels of light energy referred to as photons. At any place along a light beam there may be many photons present or in special cases just one. Creating single photons is not easy to do. It is possible to make photons in pairs by sending laser light through special crystals. Even a pure-color laser beam will consist of many photons; but occasionally one of these photons will be "down converted," that is, will turn into two photons each with half the energy of the original photon. When a pair has been created, the detection of one of these half-energy photons heralds the presence of its twin. Furthermore, these photons are entangled, meaning that the properties of one photon are inextricably linked to those of its partner and detecting one can ruin the quantum state of the other. By minimizing these quantum correlations, the researchers obtained

heralded photons with exceptionally high quality and short duration. In the Oxford experiment the pairs of photons made had a central wavelength of about 830 nm, at the border between visible and near-infrared light. Each of these photons was (in units of time) about 65 femtoseconds ( $65 \times 10^{-15}$  sec) long. In units of space, they were about 20 microns long. The shortest previously produced single photon was about 1picosecond ( $10^{-12}$  sec) long. Even shorter pulses of light-stretching only hundreds of attoseconds-have been made, but these pulses consist of many photons. One of the Oxford researchers, Peter Mosley, says that this new experiment represents the first time that textbook photons-identical, localized wavepackets containing a single quantum of energy-have been produced in a lab. (Mosley et al., Physical Review Letters, recent article)

From Physics News Update  
American Institute of Physics

### Next Meeting

Our next meeting will be our Annual Science Fair Awards Dinner on Thursday, May 28<sup>th</sup>, 2009 at the NASA/Goddard Recreation Center in Greenbelt, MD. Please save the date.

Please share this announcement with your colleagues, and tell them to look at our web site at:  
<http://www.osa.org/LocalSections/ncsosa>.

### Membership Dues for 2008-2009

Dues for the National Capital Section are \$10 per year. If you have not yet paid, please send \$10 (\$5 for students) to the NCS/OSA secretary at the address given below. If you are not sure if you have paid, please call (703)922-0433 or e-mail MJLahart@aol.com to check.

<b>NATIONAL CAPITAL SECTION</b>			
Optical Society of America			
<b>Membership Application</b>			
Name _____	Title _____ {Dr., Mr., Ms., etc.}		
Indicate Preferred Mailing Address		Home _____	Business _____
Home Address _____			
City _____	State _____	Zip _____	National Society Memberships OSA <input type="checkbox"/> SPIE <input type="checkbox"/> IEEE <input type="checkbox"/>
Home Phone ( ) _____			
Business Address _____			
City _____	State _____	Zip _____	
Business Phone ( ) _____		Fax ( ) _____	
E-Mail Address _____		Date _____	
Make Checks Payable to <b>NATIONAL CAPITAL SECTION</b> Please mail to: Martin Lahart, Secretary 6022 Sweet Pea Court Alexandria, VA 22310			<b>Dues \$10.00 per year (\$5.00 Student)</b>  July 2008 - June 2009 \$ _____

## About our Speaker – Dr. Rhonda Stroud

Dr. Rhonda Stroud grew up in Rochester, NY and was first introduced to physics research in her father's lab at the Institute of Optics. She went on to receive a bachelors degree in physics from Cornell University and a Ph.D. in physics from Washington University in St. Louis. She came to the Naval Research Laboratory in 1996 as an NRC Postdoctoral Fellow and was converted to staff in 1998. In 2007, she became the head of the Nanoscale Materials Section of the Materials Science and Technology Division. Her research specialty is the application of transmission electron microscopy to the nanoscale analysis of materials, ranging from cosmic dust to thin film electronic devices. Dr. Bhartia joined NASA in September, 1991. Prior to that he worked for various aerospace companies in both technical and managerial positions. He is the recipient of William Nordberg Medal and Exceptional Scientific Achievement award from NASA Goddard Space Flight Center and Outstanding Leadership Medal from NASA.

### 2008/2009 NCS/OSA Meetings

<b>Date</b>	<b>Title</b>	<b>Speaker / Affiliation / Location</b>
April 21, 2009	"Nanostastronomy: Microscopy of Stardust"	<b>Dr. Rhonda Stroud, NRL</b> <i>TBD</i>
May 28, 2009	TBD	TBD <i>NASA/Goddard Recreation Center</i>

National Capital Section Optical Society of America  
Martin J. Lahart, Secretary  
6022 Sweet Pea Ct.  
Alexandria, VA 22310