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# SAS Chicago

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## *April Meeting*

Tuesday, April 27, 2004

The April 2004 meeting will be held at the La Mirage, located at 3223 Algonquin Rd., Rolling Meadows. See the map on the back for more details. Entree choices: *NY Strip Steak, Chicken Breast LaMirage, or Fettuccini.*

**Social Hour: 5:30 PM**

**Dinner: 6:30 PM**

**Speaker: 7:45 PM**

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### Real-Time Studies of Molecular Self-Assembly in Thin Films Using a Planar Array Infrared (PA-IR) Spectrograph

**John F. Rabolt**

Department of Materials Science and Engineering  
and  
Delaware Biotechnology Institute  
University of Delaware  
Newark, Delaware

The invention of Fourier Transform IR (FT-IR) spectroscopy has proven to be one of the most important advances in modern instrumentation development. Optical spectroscopy utilizing the interference of light waves has made fast, sensitive detection of molecular vibration/rotation possible due to the large throughput and multiplex advantages provided by FT instrumentation. Interestingly enough, the same technological innovations, which have made FT-IR the instrument of choice for over thirty years, have also made FT-IR instruments extremely sensitive to their operating environment. As a result, the need for thermal stability, mechanical vibration isolation and stringent optical alignment has put severe limitations on where and how an FT-IR instrument can be used, confining it, for the most part, to the laboratory environment.

We have recently developed a new kind of IR instrument, which uses a focal plane array (FPA) detector onto which a beam of light dispersed by a prism or grating is focused. In this planar array IR (PA-IR) spectrograph, the broad range of frequencies displayed on the pixel array simultaneously make this a multiplex technique without using the complex scanning mechanism or computational requirements (for Fourier transformation of the data) used in FT-IR instruments. Thus the *no-moving parts* configuration of the PA-IR instrument provide the ruggedness required to make the instrument the size of a “shoe-box” and hence *portable*. In addition the increased sensitivity (100-1000X over single element FT-IR detectors) of the FPA allows an IR spectrum to be accumulated in as little as 10 microseconds. This speed in acquisition allows irreversible processes (e.g., film fracture, spontaneous chemisorption, Langmuir film compression, etc.) to be studied “real-time” and several examples of ultrafast IR studies of molecular orientation and organization will be given.

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Please make your dinner reservations for the upcoming meeting by using the form on our web page [http://www.sas-chicago.org/Reg\\_Form.htm](http://www.sas-chicago.org/Reg_Form.htm), by email at [sas.chicago@bigfoot.com](mailto:sas.chicago@bigfoot.com) or by calling Mike Jankowski (847)970-5061. Leave your **name, company affiliation, a telephone number** where you can be reached in the event that the meeting is cancelled (remember 9/11/01 & Feb. 26, 2002), the **number of reservations** and **your choice of entree** on the tape. Please call by **noon Friday, Apr. 23rd**, so that proper arrangements can be made with the La Mirage Restaurant. If you can't attend, cancel by Mon. noon: SAS is charged for no-shows.

#### **Dinner Cost**

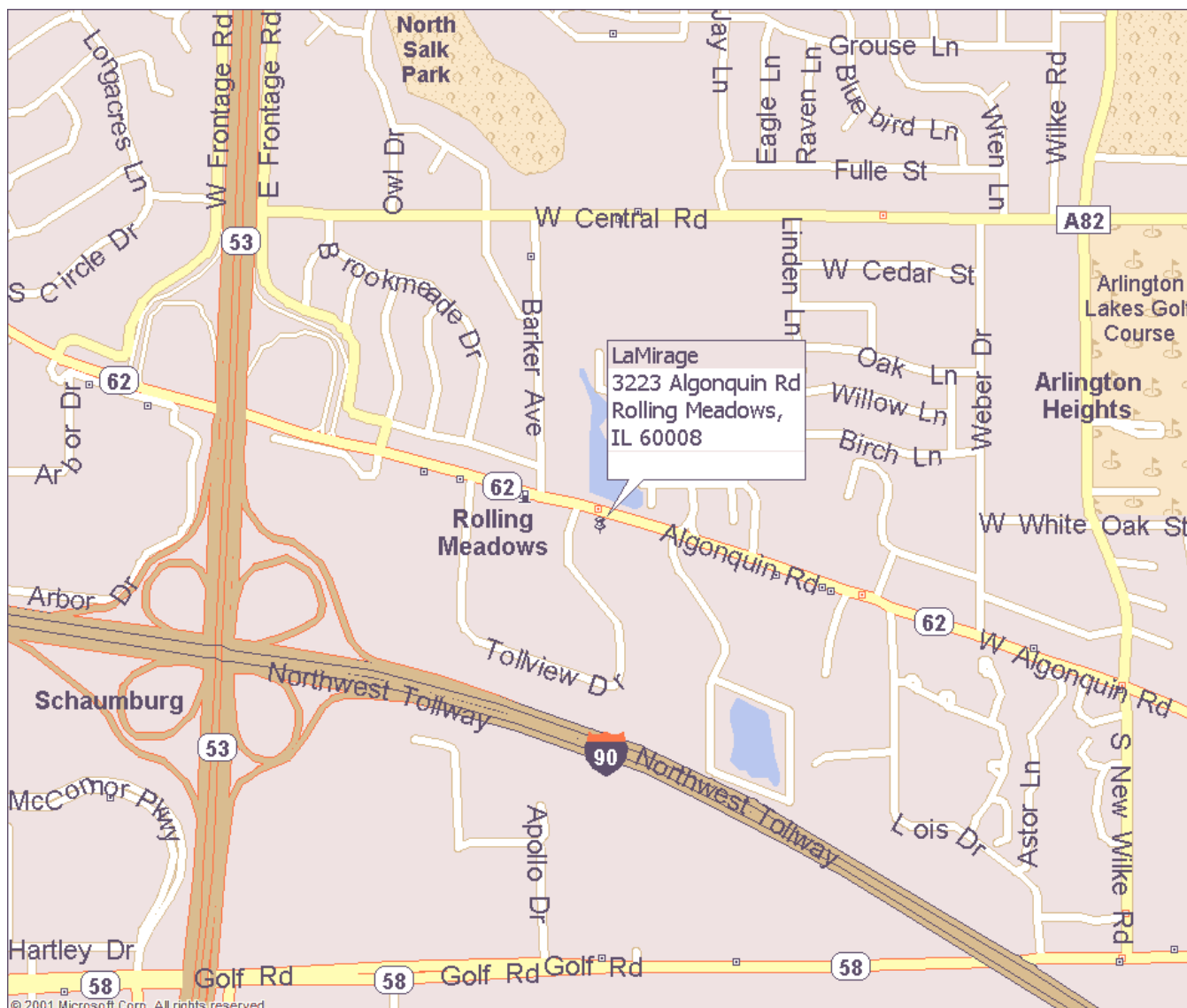
**Members: \$25**

**Students and Unemployed Members: \$10**

**Non-members: \$30**

## DIRECTIONS TO THE LA MIRAGE RESTAURANT

La Mirage is located at 3223 Algonquin Road in Rolling Meadows. It is located about 0.5 mile east of Route 53 on Algonquin Road. The La Mirage restaurant is on the south side of the road.



### Speaker Bio:

John F. Rabolt is currently the Karl W. and Renate Boer Professor of Materials Science and engineering at the University of Delaware where he also holds a position as an Associated Faculty in the Delaware Biotechnology Institute. Before joining the University of Delaware in 1996 as Chair of the Department of Materials Science and Engineering, Professor Rabolt was a Research Staff Member (1977-96) at the IBM Almaden Research Center where he served as a Co-Director of the NSF Center on Polymer Interfaces and Macromolecular Assemblies (CPIMA), a Stanford/IBM/UC-Davis Materials Research Science and Engineering Center. His research interests lie in the area of polymer deformation and orientation, electrospinning, organic thin films, IR/Raman spectroscopy and biomolecular materials. He received the Bomem-Michelson Award in Molecular Spectroscopy in 2000 and previously received the 1993 Ellis Lippincott Award in Vibrational Spectroscopy, the 1992 Louis A. Strait Award in Applied Spectroscopy, the 1990 Williams-Wright Award in Molecular Spectroscopy and the 1985 Coblenz Award. In addition to serving as Chair of 3 Gordon Conferences (Organic Thin Films-1996, Polymers (West)-1990 and Vibrational Spectroscopy-1990), J. Rabolt is an APS Fellow and also served as an Associate Editor of the ACS Journal, *MACROMOLECULES* from 1991-2001. He is currently a Member of the Gordon Research Conference's Scheduling and Selection Committee and NASA's Microgravity Materials Science Advisory Committee. Professor Rabolt has co-authored more than 175 peer-reviewed publications, 1 book and 6 patents.