



CDMMS MEETING

UNION COLLEGE, Wold Center Atrium

Thursday, June 2nd, 2011

6-8PM



Cost: \$5 students, \$10 members, \$20 non-members (\$5 to attend talk only)

New membership and/or renewal membership dues will also be collected at this time:

\$25 for professionals and \$10 for students

PLEASE EMAIL IAN TO RSVP BY MAY 31st

spinelli@ge.com

Dinner Menu

Fresh Fruit Plate

California Mixed Greens Salad

Pasta Primavera with Grilled Chicken

Pasta Primavera (no meat option)

Cookies & Beverages

TWO SPEAKERS!

Pei-I Wang

SEM and FIB Investigations of Low Temperature Wafer Bonding by Copper Nanorod Array

Abstract. A vast array of Cu nanorods with 10-20 nm in diameter grown by an oblique angle deposition technique were utilized as an adhesive layer for bonding 200 mm Si wafers at low temperatures. The size of Cu nanorods was controlled by oxygen-mediated growth where the Cu nanorods exposed to the oxygen ambient periodically during growth resulted in a reduction in the diameter as well as an increase in the areal density of the nanorods. This oxygen-induced modification to the nanorod growth is attributed to the higher energy barrier for Cu atom migration on the oxide surface at room temperature, consequently reducing the rod diameter. The focused ion beam/scanning electron microscope images illustrate that the Cu nanorod array underwent coalescence readily upon a bonding temperature at 200°C. Upon 400°C, a dense Cu bonding layer with homogeneous structure was achieved. A fully dense

bonding structure was also obtained upon a lower bonding temperature at 300°C followed by a post-annealing at 400°C in a reducing ambient.

Bio. Dr. Wang received his Ph.D degree in Mechanical Engineering from Rensselaer Polytechnic Institute in 2001 for the work on self-forming barrier for Cu interconnect applications in integrated circuits. He then joined the Center of Integrated Electronics in Rensselaer Polytechnic Institute and has been working as a research scientist till present. His research interests include advanced Cu interconnect technology, interface stability of metal barrier and low-k dielectrics, Cu wafer bonding, micro- and nano-fabrication, nano-structured materials growth and their novel applications. He is the author/co-author of more than 40 refereed publications and holds 5 granted/pending patents in associated areas.

Dee Breger

Visualizing Information: Graphics Principles for Microscopy

Bio. Dee Breger received a degree in Art from the University of Wisconsin and began her career as a scientific illustrator at Lamont-Doherty Earth Observatory, Columbia University's Earth science research institute. She has specialized in imaging through the scanning electron microscope since Lamont acquired one of the first available models. In 1982 she founded Lamont/Columbia's first professional SEM and X-ray microanalysis facility, which she directed for the next 22 years. In 1995 she published her coffee-table book, *Journeys in Microspace*, which was featured in the New York Times magazine. In 1998 her work was featured in the BBC documentary *Hidden Visions*. In 2004 Breger moved to Philadelphia's Drexel University as Director of Microscopy, and in 2009 retired from academic lab duties to launch Micrographic Arts. Her microworld slideshows and oceanographic videos encourage a delight in the many worlds of science in K-12 schools, nature clubs, professional societies, cruise ships and other venues. Besides specializing in the SEM, Breger has also led or participated in several Earth science programs on over 30 field expeditions, with a specialization in Antarctic oceanography. Some of her imagery is derived from these expeditions.



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