



Society for Analytical Chemists OF PITTSBURGH



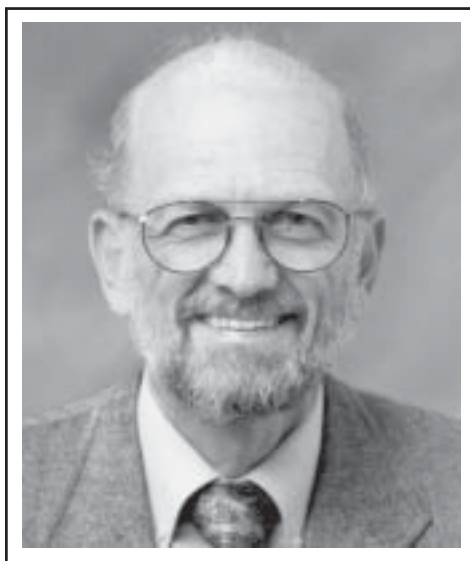
SEPTEMBER MEETING

Monday, September 10, 2007

8:00 p.m.

Duquesne University
Maurice Falk Hall

DINNER: Duquesne Ballroom (4th Floor)



R. GRAHAM COOKS, Ph.D.

PROFESSOR OF CHEMISTRY
PURDUE UNIVERSITY

*“Mass Spectrometry in the Ordinary Ambient Environment:
Forensics, Tissue Imaging, Environmental Analysis”*



5:30 PM	Social Hour	Duquesne Ballroom (4th Floor)
6:30 PM	Dinner	Duquesne Ballroom (4th Floor)
7:30 PM	Student Affiliate Meeting	Mellon Hall - Room 410
7:40 PM	Business Meeting	Mellon Science Building - Maurice Falk Hall
8:00 PM	Technical Meeting	Mellon Science Building - Maurice Falk Hall

ABSTRACT:

Ambient ionization using desorption electrospray ionization (DESI) allows materials on solid surfaces to be analyzed rapidly and without sample preparation by mass spectrometry. The experiment allows high throughput analysis of samples as diverse as biological fluids, explosives residues, tissue, fingerprints and many more. The experiment is presented with emphasis on the range of applications and the underlying mechanisms. Lipid analysis directly from untreated biological tissue is discussed, especially in the context of bacterial typing.

Laser doppler spectroscopy is used in characterizing the DESI mechanism. A phase transfer (droplet pickup) mechanism is presented and supported by phase doppler anemometry measurements and by fluid dynamics simulations.

Applications of DESI to chemical imaging are presented. Spatial resolution of 250 micron is readily achieved and is applied to tissue imaging for disease diagnosis and tumor margin determination.

Experiments in which DESI is used in conjunction with a miniature mass spectrometer are also discussed. A shoebox sized, 10 kg handheld miniature mass spectrometer, the Mini 10, based on a rectilinear ion trap mass analyzer is shown to allow immediate determination of biomolecules and drugs in the real environment. The use of this instrument for protein characterization is also shown..

DINNER RESERVATIONS:

Please email Larry Senor, Arrangements Co-Chair at senor@pittcon.org, by Thursday, September 6, 2007 to make dinner reservations. Should you not have email, please call Larry at 724-327-4428. If you want to be placed on the permanent dinner list, let Larry know when you RSVP. The entrée for September is Oriental Beef and broccoli, Vegetable lo mein. Dinner will cost \$8 (\$4 for students) and checks can be made out to the SACP. If you have any dietary restrictions, let Larry know when you leave message.

PARKING:

Duquesne University Parking Garage entrance is on Forbes Avenue. Upon entering the garage receive parking ticket and drive to upper floors. Pick up a parking sticker at the dinner or meeting. Contact Dr. Mitch Johnson at Duquesne University if any difficulties arise.

BIOGRAPHY:

Graham Cooks was educated at the University of Natal, South Africa, and at Cambridge University in the UK. Since 1990 he has been Henry Bohn Hass Distinguished Professor of Chemistry at Purdue University. Cooks has been a major contributor to advances in instrumentation and methodology for mass spectrometry. By combining soft ionization with two stages of mass analysis, he introduced direct analysis of mixtures by tandem mass spectrometry in the 1970's. He conceived a kinetic method of estimating thermochemical properties based on cluster ion dissociation kinetics. He made key contributions - including the first use of matrices - to the modern desorption ionization methods, including MALDI. In a sustained series of contributions to instrumentation, many novel instruments were built in his laboratory, including the first hybrid instrument and early miniature mass spectrometers. Dr. Cooks has demonstrated ultra-trace environmental analysis and reactor control with membrane introduction mass spectrometry and made significant uses of tandem mass spectrometry in mechanistic gas-phase ion chemistry. His studies of ionic collisions at surfaces included the introduction of ion soft landing, a method that uses the separation power of mass spectrometry to soft-land intact biologically active molecules onto surfaces to form protein microarrays. His group is also responsible for the recently introduced and already commercialized ambient ionization method of desorption electrospray ionization (DESI). Dr. Cooks has authored over 800 publications and served as PhD thesis advisor to more than 100 Ph. D. students. He is enthusiastically involved in economic development in the State of Indiana.