Science, Instrumentation, and Interaction Go Hand-In-Hand at Pittcon 2009

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Pittcon 2009 will celebrate its 60th anniversary of showcasing the most advanced instrumentation and technologies and presenting the latest advances in scientific research. Pittcon is always a unique experience and provides diverse opportunities for education and interaction with leading scientific innovators and thought leaders from academia, industry, and government from around the world. Conferees can expect a week-long immersion into science in the form of technical presentations, workshops, short courses, and networking opportunities, along with a vibrant exposition of the latest instrumentation and laboratory equipment.

An atmosphere of excitement and expectation will prevail when Pittcon opens its doors to the scientific community for the 60th time in Chicago, Illinois, March 8–13 — excitement at the prospect of a week-long immersion into science, opportunities to learn from leaders in the field, and high expectations of seeing the most advanced laboratory instrumentation in use today.

The Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (Pittcon) is a Pennsylvania-based not-for-profit, educational corporation owned by the Spectroscopy Society of Pittsburgh (SSP) and the Society for Analytical Chemists of Pittsburgh (SACP). Proceeds from Pittcon are used to fund science education outreach programs in the greater Pittsburgh area, in the host city, and throughout the United States. Unlike most other conferences and exhibitions, Pittcon is
organized by an all-volunteer committee and small office staff (1).

Anticipating more than 20,000 attendees, organizers of Pittcon 2009 look forward to presenting a comprehensive multidisciplinary technical program to complement the premier product exposition in the industry. Here are just a few of the highlights of this year’s conference and exposition (Figure 1).

Is There a Nobel Laureate Waiting in the Wings?

It is not unlikely that one of the many scientists who are presenting their research during Pittcon will one day be recognized with the Nobel Prize in their discipline. In Pittcon’s 60-year history, there have been many Nobel Laureates who have participated in the technical program and shared inventions and research that have made a global impact on the advancement of science.

Most recently, Dr. Roger Tsien, University of California, San Diego, delivered the plenary lecture at Pittcon 2006. Two years later, he was awarded the 2008 Nobel Prize in Chemistry for his discovery and development of the green fluorescent protein (GFP). His discovery revolutionized the fields of cell biology and neurobiology by allowing scientists to peer inside living cells and observe the behavior of molecules in real time (2).

At Pittcon 2004, lectures by 2002 Nobel Laureates in Chemistry, Koichi Tanaka of Shimadzu and Kurt Wüthrich of the Swiss Federal Institute of Technology were a highlight of the technical program (3). Tanaka was recognized for developing a novel method for mass spectrometry (MS) analy-
ses of biological macromolecules. Wüthrich was recognized for his development of nuclear magnetic resonance spectroscopy for determining the three-dimensional structure of biological macromolecules in solution. The 2002 Nobel Prize in Chemistry was also shared by John B. Fenn of Virginia Commonwealth University, Richmond, for his work in the field of MS, specifically for the electrospray ionization technique often used to identify and analyze biological macromolecules.

Paul Lauterbur, the 1985 Maurice Hasler Award and 1987 Pittsburgh Spectroscopy Award Winner, shared the Nobel Prize in Physiology or Medicine in 2003 for his work, which made the development of magnetic resonance imaging (MRI) possible (4).

At Pittcon 2003, Fenn gave what he referred to as an “archaeological expedition” of the history of electrospray ionization (ESI), the technology for which he shared the Nobel Prize. Since Fenn’s group developed the technique in the early 1980s, ESI has become an essential tool for the MS analysis of extremely large biomolecules (5).

Among the other Nobel Laureates who have taken the podium at Pittcon over the years are:
- Ahmed H. Zewail, Nobel Prize in Chemistry 1999
- Kai M. Siegbahn, Nobel Prize in Physics 1981
- Rosalyn Yalow, Nobel Prize in Physiology or Medicine 1977
- Gerhard Herzberg, Nobel Prize in Chemistry 1971
- Charles H. Townes, Pittcon plenary speaker and Nobel Prize in Physics 1964
- Archer John Porter Martin, Nobel Prize in Chemistry 1952

Scientific Leaders to be Recognized for Their Recent Achievements

If there are Nobel Laureates to emerge some time in the future, conferees might find potential candidates in the Pittcon Awards Symposia, where the most significant scientific achievements are recognized annually. Many Nobel Laureates have received these very awards in recognition of their contributions. Here are some of the highlights in the Pittcon Awards program.

Dr. Chad Mirkin will be presented with the Pittsburgh Analytical Chemistry Award.
Dr. Mirkin is the George B. Rathmann Professor of Chemistry at Northwestern University and Director of the International Institute for Nanotechnology. He is also the most-cited nanotechnologist in the world. Mirkin is best known for the development of nanoparticle-based biodetection schemes, the invention of dip-pen nanolithography, and contributions to supramolecular chemistry. A total of 15 companies have been founded to commercialize technologies developed at the Nanotechnology Institute. Dr. Mirkin personally has founded several companies that have developed products based upon technology developed in his laboratory (Figure 2).

Dr. R. Graham Cooks, Henry B. Hass Distinguished Professor – Analytical Chemistry, Purdue University, will receive the Ralph N. Adams Award. Dr. Cooks’ group focuses on MS, including fundamental phenomena, instrumentation, and analytical applications. At the awards presentation, Dr. Cooks will present his group’s most recent work in desorption electrospray ionization (DESI), which allows mass spectra to be obtained almost anywhere at ambient temperatures, from inert surfaces or directly from living tissues with no sample preparation. He envisions that this research will soon lead to the commercial development of a miniature mass spectrometer that would enable rapid tissue analyses in situ, during surgery (Figure 3).

Dr. Ira W. Levin, National Institutes of Health, will be presented with the Pittsburgh Spectroscopy Award. Dr. Levin’s work involves high-throughput spectroscopic imaging approaches to identify molecular biomarkers. His laboratory has participated directly at the patient level in collaborations with cardiologists and transplantation surgeons. In his award presentation, Dr. Levin will describe procedures in which visible reflectance imaging techniques are used to aid surgeons in performing laparoscopic procedures by allowing the assessment of tissue oxygenation and vessel differentiation despite significant visual limitations (Figure 4).

Other Pittcon awards to distinguished scientists include:

- Dr. Nelson Torto, Rhodes University;
  The Analytical Chemistry Award for Young Investigators in Separation Science. This award recognizes and encourages outstanding contributions to the

Figure 3: Dr. R. Graham Cooks, 2009 Ralph N. Adams Award.
field of separation science by a young chemist or chemical engineer within 10 years of their highest degree.

- Dr. Martin Quack, Swiss Federal Institute of Technology (ETH) Zürich; The Bomen-Michelson Award. This award recognizes contributions to molecular spectroscopy.

- Dr. Charles R. Martin, University of Florida; The Charles N. Reilley Award. This award recognizes contributions to the theory, instrumentation, or applications of electroanalysis.

- Dr. Frantisek Svec, E.O. Lawrence Berkeley National Laboratory; The Chromatography Forum of the Delaware Valley Dal Nogare Award. This award recognizes outstanding work in the field of chromatography.

- Dr. Gary M. Hieftje, Indiana University; The Maurice F. Hasler Award. This award recognizes notable achievements in spectroscopy that have significantly improved applications on a broad scale.

- Dr. Daniel T. Chiu, University of Washington; The 2009 Pittsburgh Conference Achievement Award. This award recognizes significant contributions to fields of analytical chemistry and applied spectroscopy in the 10 years following completion of the Ph.D. degree.

- Dr. Jerome J. Workman, Jr., Luminous Medical Inc.; The Williams Wright Award. The Coblentz Society presents this award to recognize the industrial spectroscopist who has made significant contributions to vibrational spectroscopy while working in industry.

### Plenary Lecture Focused on Science and Technology Issues in Developing Countries

Dr. George M. Whitesides, the Woodford L and Ann A. Flowers University Professor at Harvard University Department of Chemistry and Chemical Biology, will deliver this year’s Plenary Lecture during the Sunday afternoon technical program. Dr. Whitesides’ presentation, “Paper Diagnostics—Using First World Science in Developing Economies,” will discuss solutions for using science and technology to service problems in developing countries. The lecture will focus on two exciting new technologies: microfluidic systems based upon patterned
The exposition features developers and suppliers involved with:
- chromatography, MS, and spectroscopy
- laboratory equipment, chemicals, and disposables
- customized solutions

New Product Forums
Some of the latest developments in scientific instrumentation and equipment can be seen in the New Product Forums, which will be held from Monday through Wednesday. A few of the products to be presented include:
- Centrifugal supercritical fluid paper and microanalytical systems using magnetic levitation (Figures 5 and 6).

Biological and Physical Sciences Converge in the Technical Program
The Technical Program offers an exciting view of the role science plays in addressing some of the most pressing global issues, such as food quality and safety, the environment, biological weapons detection, drug discovery and novel delivery mechanisms, and even space exploration. With well over 2000 technical sessions, including invited symposia, contributed oral sessions, workshops, and posters, the technical program offers a diverse educational experience. The technical program includes more than 100 invited speakers from academia, government, and industry, including many who have been recognized previously for their work with Pittcon achievement awards (Figure 7).

The program is broad in scope with emphasis in pharmaceutical and the life sciences. Major focus areas of the program will include:
- applied molecular spectroscopy
- bioanalytical chemistry
- biomedicine
- chemical imaging
- chemical separations
- environmental science and technology
- food analysis and regulatory affairs
- homeland security
- informatics
- mass spectrometry
- microfluidics
- nanotechnology
- pharmaceutical science
- proteomics, genomics, glycomics, and metabolomics
- separations science

Short Course Program and Workshops
In recent years, Pittcon's Short Course program has grown, as conferees take advantage of educational opportunities to make their week even more productive. Pittcon 2009 offers more than 100 courses and nearly 60 topics. Courses range in length from half-day, full-day, and two-day sessions. Also available are half-day and full-day intensive workshops.

Premier Product Exposition
A highlight of the Conference for many, the Pittcon Exposition will showcase the most recent developments in laboratory instrumentation and equipment and enable conferees to evaluate products and talk to the technical experts one-on-one. Exhibitors will offer hands-on demonstrations in their booths as well as in seminar rooms located on the exposition floor. All of the largest instrumentation companies will be there, as well as new start-up instrument companies and suppliers of supporting laboratory equipment, chemicals, and disposables.

The exposition features developers and suppliers involved with:
- chromatography, MS, and spectroscopy
- laboratory equipment, chemicals, and disposables
- customized solutions
- laboratory automation
- informatics and analytical software
- green chemistry solutions
- contract laboratory services
- OEM parts and dealers

The Pittcon Exposition floor includes special interest areas — Life Sciences, New Exhibitors, Informatics. and the Green Corner, a new area dedicated to exhibitors who will display environmentally-friendly chemistry solutions, resource conservation and pollution prevention techniques.
Networking a Key Element of the Pittcon Experience
With so much to learn in the technical program and see in the exposition, it seems difficult to imagine that conferees could pack much more into their Pittcon week. But most attendees also view Pittcon as a valuable, once-a-year opportunity to connect with their colleagues, network with their peers, or advance their global business interests. The ongoing interaction is a highly valued component of the overall Pittcon experience.

With the introduction of conferee networking sessions at Pittcon 2007, conferees have more opportunities for scientific interaction. These 2-hour networking sessions are designed to give conferees the opportunity to share ideas, solve common problems, and collaborate with their peers in informal discussions on specific topics. A few of the sessions organized for Pittcon 2009 include:

- Utilization of Newer LC and MS Technologies for Rapid Information Generation in Pharmaceutical Development
- HPLC of Soluble and Membrane Proteins
- State of Supercritical Fluid Chromatography
- Chemical Imaging
- ICP-MS and Chromatography for Metals Speciation
- LC–MS Users Forum
- Capillary Electrophoresis Involving Nanostructures
- Outsourcing in the Pharmaceutical Industry
- High Throughput Analysis in the Pharmaceutical Field
- Physical Characterization of Complex Biopharmaceutical Products Using Photon Correlation Spectroscopy (Dynamic Light Scattering) — Probes for Protein Aggregation and Lipid Vesicle Dynamics
- Lab-on-a-Chip Is a Beautiful Thing — But Where Are the Chips-in-the-Lab?

Online Program
The full 2009 Pittcon program can be found at www.pittcon.org as well as an online Agenda Builder, a handy tool to find programs and exhibitors of interest by presenter, topic, and technology.

References
(1) http://www.pittcon.org
(2) http://en.wikipedia.org/wiki/Roger_Y._Tsien
(3) http://findarticles.com/p/articles/mi_hb5255/is_200801/ai_n29073420
(4) http://en.wikipedia.org/wiki/Paul_Lauterbur
(5) http://pubs.acs.org/cen/coverstory/8113/8113pittcon.html

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