The Pittsburgh Section Website Has a New Address!

The Pittsburgh Section of the American Chemical Society website has a new address at www.chem.cmu.edu/acs-pgh/.

The Pittsburgh Section website provides members with a wealth of information including:

- Details regarding the latest Pittsburgh Section meetings and events
- Current and past issues of The Crucible
- A complete directory of contact information for Pittsburgh Section officers and committee chairs
- A link to the companies that advertise in The Crucible
- Councilor reports
- Links to the Chemistry Departments at colleges and universities within the Pittsburgh Section
- The bylaws of the Pittsburgh Section ACS
- Historical information regarding the Section including copies of the 50th and 100th Anniversary booklets and a list of Section Chairs beginning in 1903

We invite you to check out the website often to stay up to date on all the events and activities taking place within the Pittsburgh Section.

Corrections

In reference to the Pittsburgh Section Chair article on page 1 of the January issue, the Project SEED program takes place at both Duquesne University and Washington and Jefferson College. The program is going into its 7th year at Duquesne University in 2010.

Simion Coca is the current Treasurer of the Pittsburgh Section. Please see page 11 for correct contact information.

Contents...

The Pittsburgh Section Website Has a New Address!  1
Job Searching for Chemical Technicians  2
ACS Energy Technology Group  3
Call to Action - Working Together for a Sustainable Future  3
Job Searching for Chemical Professionals  4
Spectroscopy Society of Pittsburgh February Meeting  5
Society for Analytical Chemists of Pittsburgh March Meeting  6
ACS Pittsburgh Chemists Club Technology Forum - February Meeting  7
Spectroscopy Society of Pittsburgh  7
Society for Analytical Chemists of Pittsburgh  7
This Month in Chemical History I  8
Chemistry for a Sustainable World at the San Francisco National Meeting  8
This Month in Chemical History II  9
Save the Dates for Green Chemistry  9
June 21-24
Advertiser’s Index 11
Calendar 12
JOB SEARCHING FOR CHEMICAL TECHNICIANS

Presented by

The Society for Analytical Chemists of Pittsburgh
The American Institute of Chemical Engineers, Pittsburgh Section
The American Chemical Society, Pittsburgh Section
The Spectroscopy Society of Pittsburgh

Friday, February 5, 2010

Pre-Registration Required

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Bidwell Training Center, 1650 Metropolitan Street, Pittsburgh, PA 15233
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PROGRAM

8:30 A.M.  Registration

9:00 A.M.  MANAGING AN EFFECTIVE JOB SEARCH
Daniel J. Eustace, Ph. D.
Career Consultant, American Chemical Society

11:30 A.M. OVERVIEW OF THE LOCAL JOB MARKET
Joseph D. Jolson, Ph. D.
Career Consultant, American Chemical Society

12:00 Noon  CLOSE

Registration

Job Searching for Chemical Technicians Workshop

Send an email to Iesha Griffin (412-323-4000 Ext. 165) at:igriffin@mcg-btc.org

Your email must include your full name, complete contact information including address, phone number and email address.
It is likely that some form of climate change legislation or regulation will soon be enacted in the United States. This would have major implications for coal-fired power plants, which account for about a third of the nation’s total CO$_2$ emissions. Nevertheless, coal currently produces about half of the electricity in the U.S., and the country will likely continue to depend on this low-cost, domestic fuel as an important part of its generation mix. Moreover, climate change is a global issue, and developing countries such as China and India will continue to rely on coal to meet their rapidly growing energy needs. As a result, CO$_2$ capture and sequestration (CCS) from coal-fired power plants has emerged as an essential technology for achieving the levels of greenhouse gas emission reductions being contemplated in the U.S. and worldwide. This presentation provides a comprehensive overview of the status of CCS technologies. It is technically feasible to capture and sequester CO$_2$ from power plants using commercial or near-commercial technologies; however, significant progress is still needed to scale up these technologies and reduce their cost and energy requirements. Uncertainties regarding social acceptance and permitting of CCS projects and long-term liability for the sequestered CO$_2$ must also be resolved. The areas of greatest need, and the work being done to address them, will be highlighted.

**Bio:** Dan Connell is an engineer with CONSOL Energy Inc., which is the largest producer of high-Btu bituminous coal in the United States and a major producer of coalbed methane gas. CONSOL’s Research & Development department, located in South Park, PA, has provided energy and environmental research and technical services for over 60 years and is actively engaged in developing CCS technologies for coal-fired power plants. Since joining CONSOL in 2003, Dan’s work has focused on the environmental implications of fossil fuel utilization. He leads CONSOL’s research on CO$_2$ capture technologies, multi-pollutant control, and ambient air quality. Dan holds a B.S. in chemical engineering from the University of Notre Dame, and is the author of numerous papers on air pollution and emissions control.

For reservations, please call Al Mann by Tuesday, February 9, 2010 at 412-661-5947 or by email at alfred.mann@verizon.net

The cost of the dinner is $16 including tax and gratuity. Please specify your preference from the following menu choices:

- Spaghetti with meatballs
- 15-layer lasagna
- Four-cheese manicotti
- Fettuccini Alfredo
- Grilled chicken Caesar salad

Also indicate special needs such as vegetarian, gluten-free, etc.
JOB SEARCHING FOR CHEMICAL PROFESSIONALS

Presented by

The Society for Analytical Chemists of Pittsburgh
The American Institute of Chemical Engineers, Pittsburgh Section
The American Chemical Society, Pittsburgh Section
The Spectroscopy Society of Pittsburgh

Saturday, February 6, 2010

ROOM A221/A224, LANGLEY HALL, UNIVERSITY OF PITTSBURGH
4249 Fifth Avenue (between Ruskin Avenue and Tennyson Avenue)

Lunch Provided - Parking Available at Soldiers and Sailors Parking Garage

Pre-Registration Required

PROGRAM

8:30 A.M. Registration
9:00 A.M. Welcome and Introduction
9:30 A.M. MANAGING AN EFFECTIVE JOB SEARCH
Daniel J. Eustace, Ph.D.
Career Consultant, American Chemical Society
12:10 P.M. OVERVIEW OF THE LOCAL JOB MARKET
Joseph D. Jolson, Ph. D.
Career Consultant, American Chemical Society
12:30 P.M. Networking Lunch
1:00 P.M. Resume Review, Personal Consultation, and Job Fair
4:00 P.M. Close

Bring your parking ticket for validation and your resume to participate in the afternoon program
(Undergraduates without a resume may participate in the afternoon group resume review)

Pre-Registration

Job Searching for Chemical Professionals Workshop

Send an email to Professor Toby Chapman at: tchapman@pitt.edu

Your pre-registration must be received by Monday, February 1, 2010 and include your full name and complete contact information including address, phone number, email address and whether or not you expect to participate in the resume review. Academic registrants - please include university affiliation and university department. Let us know when you expect to complete your B.S., M.S., Ph.D., post-doc, or other assignment.
SPECTROSCOPY SOCIETY OF PITTSBURGH

February Meeting - February 10, 2010
Duquesne University, Mellon Hall of Science
(Laura Falk Hall)

“Dynamic Nuclear Polarization Nuclear Magnetic Resonance in Liquids and Solids at High Magnetic Fields Why Two Electrons Are Better Than One”

R. G. Griffin
Francis Bitter Magnet Laboratory and Department of Chemistry
Massachusetts Institute of Technology

6:00 PM - Social Hour; 6:30 PM - Dinner, City View Cafe; 8:15 PM - Technical Program

Nuclear magnetic resonance (NMR) is probably the most versatile analytical technique available to chemistry and biochemistry because it is non-perturbing and offers site-specific atomic resolution available with few other approaches. It is very forgiving as to the physical state of the sample, being applicable to gases, solutions and to amorphous and crystalline and microcrystalline solids. In addition, for similar reasons NMR (or MRI) is widely used in many other areas of science ranging from basic nuclear physics to medical imaging. Despite its enormous versatility, the sensitivity of the NMR experiments is relatively low because it is based on observation of low energy spectroscopic transitions between nuclear Zeeman levels. As a consequence, there are continuing efforts to develop new NMR methods and instrumentation that improve the signal-to-noise of the experiments. Some of the most successful of these involve polarization transfer experiments that move polarization from a highly polarized spin reservoir to a weakly polarized one, leading to an enhancement in the NMR signal intensities proportional to the ratio of the magnetic moments of the two spin species. It is now appreciated that the largest gains in signal intensities in these sorts of experiments can be achieved by transferring polarization from an electron spin(s) to a nuclear spin system. This is generally accomplished via microwave irradiation of the electron paramagnetic resonance (EPR) spectrum, an experiment known as dynamic nuclear polarization (DNP) NMR. Since contemporary NMR experiments are performed at magnetic fields of ~5-23 T, the required microwave radiation falls into the frequency range 140-660 GHz, or the millimeter wave regime. This presentation discusses the implementation of DNP/NMR experiments in high magnetic fields.

Over the last few years we have developed cyclotron resonance maser (a.k.a. gyrotron) microwave sources that operate at frequencies of 140-460 GHz that permit DNP enhanced NMR (DNP/NMR) experiments in magnetic fields of 5-16.4 T (1H NMR frequencies of 211-700 MHz, respectively). We review the instrumentation used for these experiments, which include new NMR probe designs and tunable gyrotron sources. In addition, we discuss two mechanisms that are currently used for DNP experiments in solids at high fields - the solid effect and cross effect -- and the polarizing agents appropriate for each. These include biradicals that enable increased enhancements at reduced concentrations of the paramagnetic center. Figure 1 depicts recent results obtained from the rigid biradical bis-TEMPO-bis-ketal (bTbk) where we observe an enhancement of ~250, or a reduction in signal averaging time of 62,500. In addition, we discuss applications of DNP/NMR that illustrate its utility in enhancing signal-to-noise in MAS NMR spectra of a variety of biological systems including membrane and amyloid proteins whose structures are of considerable scientific interest. Presently, enhancements that are routinely available and range from 40-250 depending on experimental variables such as temperature, magnetic field, microwave B1, polarizing agent, etc. Finally, we describe extensions of these experiments that permit observation of 13C liquid state spectra where we have observed enhancements of 140-400 in small molecules and a protein.

Bio: Prof. Robert G. Griffin received his B.S. degree (with Honors) in 1964 majoring in Chemistry at the University of Arkansas. He attended graduate school at Washington University (St. Louis, MO) where he worked with Prof. Samuel I. Weissman on EPR experiments directed at understanding the spectra and electron transfer processes of radical ions in solution. In 1970 after completing his Ph.D., he moved to MIT to perform postdoctoral work with Prof. John S. Waugh. At that time the field of high resolution NMR in
Abstract: Scientists working with nanoparticles commonly characterize them by simply a dimension. This should be extremely unsatisfying to a chemist—chemists should prefer to know the chemical formula and ideally the structure of a chemical material. This is challenging analytical chemistry. This lecture will describe some progress and directions for the analytical chemistry of small gold and other nanoparticles. Recent success stories are the nanoparticles Au25L18 and Au144L60 where L is an organothiolate ligand, relying especially on mass spectrometry but also other tools to inform about composition and structure. Another part of the story is the variability of properties with size, as these nanoparticles cross the metal-to-molecule dimension. The lecture will include the beginnings of analogous ventures into other kinds of small nanoparticles, such as silica and metal oxides.

The research has been supported by NSF and ONR.

Biography: Dr. Murray was educated at Birmingham Southern College (B.S., ‘57) and Northwestern University (Ph.D., analytical chemistry, ‘60), joined the University of North Carolina faculty in 1960 and became Kenan Professor of Chemistry in 1980. He was Chemistry Department Chairman 1980-85. Murray has been colleague to nearly 160 graduate and post-graduate students, with whom he has published over 445 papers. Notable recognitions include the Olin Palladium Medal (The Electrochemical Society), the Charles N. Reilley Award (Society for Electroanalytical Chemistry), the Faraday Medal (Royal Society of Chemistry, UK), Breyer Medal (Royal Australian Chemical Institute), American Chemical Society Award in Analytical Chemistry, the North Carolina Award in Science, the Pittsburgh Analytical Chemistry Award, the Southern Chemist Award, and the Luigi Galvani Medal of the Italian Chemical Society. He is an elected member of the National Academy of Sciences and of the American Academy of Arts and Sciences. He has served since 1991 as Editor-in-Chief of the journal Analytical Chemistry.

Murray’s research interests include electroanalytical methods, the molecular design of electrode surfaces and nanoparticles, electrochemically reactive semi-solid media, mass transport and electron transfer dynamics, electrocatalysis, and voltammetry in extreme media. His role is to raise resources, keep order, and let good students do the rest.

Dinner Reservations: Please email Julie Theys, Arrangements Co-Chair at theysj@pittcon.org, by Thursday, January 28, 2010 to make dinner reservations. Should you not have email, please call Julie at 814-563-7236. Dinner will cost $8 ($4 for students) and checks can to be made out to the SACP. If you have any dietary restrictions, please let Julie know when you leave message.

Parking: Duquesne University Parking Garage entrance is on Forbes Avenue. Upon entering the garage, you will need to get a parking ticket and drive to upper floors. Bring your parking ticket to the dinner or meeting for a validation sticker. Contact Dr. Mitch Johnson at Duquesne University if any difficulties arise.
February Meeting
Tuesday, February 23, 2010

Carnegie Museum Small Group Guided Tour: Dinosaurs in Their Time

Carnegie Museum of Natural History
Forbes Avenue at Craig Street, Pittsburgh

Noon Meeting:
Note Early Reservation Deadline

Luncheon Meeting at Museum Cafe - on own through cafeteria line
Cost: $10.00 per person for the tour

For Reservations, please call Ed Martin by noon Thursday, February 18, 2010 at (724) 335-0904 or by e-mail at edwardmartin1046@verizon.net

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Thorpe was born in December 1845 in a small town near Manchester, England where his father was a cotton merchant. He attended Hulme Grammar School and then Owens College, which developed into Manchester University. (Personal note: I was on the faculty of the University of Manchester Institute of Science and Technology from 1958 to 1962, and we always referred to the central facility of the University, which was situated a couple of miles away, as “Owens”. At Owens Thorpe worked with the distinguished inorganic chemist Henry Roscoe on photochemistry and on the chemistry of vanadium. There followed the almost obligatory pilgrimage to Germany. At Heidelberg, under the tutelage of Bunsen, he worked on the remarkable liquid alloy of sodium and potassium, the subject of his Ph.D. thesis. He lodged in the same building as Victor Meyer, who was also working with Bunsen, and they became close friends.

From Heidelberg he moved to Bonn to work with Kekule and they jointly published two papers on photochemistry in 1870. As an up-and-coming young chemist it was not surprising that Thorpe was chosen for the Professorship in Chemistry at the Andersonian College of Glasgow, Scotland in 1870 and in that same eventful year he married Caroline Emma Watts. At Glasgow Thorpe published several papers: on a new oxychloride of chromium; on phosphorus chlorides; on the constitution of paraffin; and on the interaction between carbon tetrachloride and phosphorus pentasulfide. His work on chemical effects of light led to his going on an expedition to observe a total eclipse of the sun in Sicily to be observed on December 22, 1870. Sadly the ship was wrecked on the voyage from Naples to Sicily on December 15, but without loss of life.

Thorpe was “called” to the Professorship of Chemistry at the Yorkshire College of Science in Leeds (later Leeds University) in 1874 and worked there for 11 years. He turned to physico-chemical research on specific volumes of related liquid compounds and was elected a Fellow of the Royal Society in 1876. He made a successful trip to Colorado in July 1878 to observe the solar eclipse, and then began a series of magnetic observations, in collaboration with a physics colleague at Leeds, Professor Arthur Rucker. These included measurements along the 40th. parallel of the U.S. from the East Coast to the Great Salt Lake; in the Azores; and then a complete survey of terrestrial magnetism in the British Isles which was eventually published as a complete volume of Philosophical Transactions in 1896.

Thorpe was picked to succeed Sir Edward Frankland in 1885 as Professor of Chemistry at what was then the Normal School of Science and Royal School of Mines in South Kensington, London - later known as Imperial College of Science and Technology of the University of London. In the next column I will complete my discussion of the career of this distinguished chemist.

ACS Cut and Paste
November/December 2009

Chemistry for a Sustainable World at the San Francisco National Meeting

The Thematic Programming on Chemistry for a Sustainable World at the San Francisco ACS meeting in March will embrace the complete spectrum of ACS activities. The theme kick off features a Sunday afternoon plenary symposium of sustainability thought leaders from academics, industry, and government.

On Monday, March 22nd, we will celebrate the United Nations’ World Water Day through a symposium on Global Water Sustainability. Other major thematic symposium topics will include Sustainable Energy, Green Chemistry, and Chemistry in the Developing World. The keynote address will be late Monday afternoon.

Major sub-themes embraced by multiple Divisions reflect the breadth of our members’ interest in sustainability including Sustainable Energy, Sustainable Water, Sustainable Food, and Green Chemistry. The theme will extend to the Undergraduate Program with sessions on green jobs and solar fuel as well as to the High School Program for area teachers and to a Community event at the California Academy of Sciences on Saturday before the meeting starts.

The second offering in an Environmental Film Festival will feature the film, “One Water,” and the Sustainability in Action symposium will highlight some of the many efforts throughout the ACS to become a more sustainable organization.

The CALL to action event will additionally allow members to engage issues of sustainability directly. All members are invited to participate in this multidimensional and timely theme.

For more information and updates, please visit www.acs.org/sanfran2010sustainability

ACS Cut and Paste
November/December 2009
In my last column I described the beginning of the career of the chemist - and chemical historian - Edward Thorpe. In 1885 he was picked to succeed Sir Edward Frankland as Professor of Chemistry at what was then the Normal School of Science and Royal School of Mines in South Kensington, London - later known as Imperial College of Science and Technology of the University of London. He helped design the laboratory’s new buildings in 1912 where he helped develop plans for the Normal School of Science and Royal School of Mines. He returned to Imperial College from 1909 to 1912 where he helped develop plans for its new buildings which were completed under his successor, William Tilden.

Edward Thorpe’s great accomplishments led to many honors. After he retired from the Government Laboratory he received a knighthood and was an advisor to the Government during the first World War. He was Vice President of the Royal Society in 1894-95; President of the Society of Chemical Industry in 1895; President of the Chemical Society from 1899-1901; and President of the British Association for the Advancement of Science in 1921. His honorary degrees included doctorates from Dublin University, and the Universities of Manchester, Leeds, Glasgow, and Edinburgh. He had many European friends including Victor Meyer and Mendeleeoff who stayed with him when they came to England.

Thorpe was a prolific author of textbooks and reference works. His multi-volume “Dictionary of Applied Chemistry” was first published in 1890 and went through several subsequent editions. His texts on inorganic chemistry, quantitative analysis, and qualitative analysis were standard works in their time. (I have a number of Thorpe’s works in my personal library). And in the area of history of chemistry, in addition to the “Essays” referred to in my first column on Thorpe he published a history of chemistry (1909) and biographies of Humphry Davy, Priestley, and Roscoe. Thorpe was also a keen yachtsman; he maintained yachts at Salcombe estuary and wrote two guides for sailors - to the Dutch waterways and to the River Seine. Sir Edward Thorpe died at Salcombe in Devon, England, in February 1925.

ACS Cut and Paste
November/December 2009

Save the Dates for Green Chemistry: June 21-24!

The 14th Annual Green Chemistry & Engineering Conference returns to downtown Washington, DC on June 21-24, 2010. With the theme “Innovation and Application” and with one of the renowned founders of green chemistry, Dr. John Warner (President and CTO, Warner Babcock Institute for Green Chemistry) as the chair, this conference is shaping up to be one you won’t want to miss! The tentative schedule for the week begins with a Student Workshop, Roundtable Meetings, and the Presidential Green Chemistry Challenge Awards Ceremony on Monday, June 21, followed by technical programming on June 22-24. Please visit the conference website, www.gcande.org, where more details will be posted as they become available.

ACS Cut and Paste
November/December 2009
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http://www.chem.cmu.edu/acs-pgh/

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Business Directory
The Crucible

The Crucible is published monthly, August through May. Circulation, 2,500 copies per month. Subscription price, six dollars per year. All statements and opinions expressed herein are those of the editors or contributors and do not necessarily reflect the position of the Pittsburgh Section.

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Volunteers Needed!
There are a number of volunteer opportunities in the Pittsburgh ACS section! If you are interested in volunteering, please contact Jim Manner at manner1@comcast.net!

Crucible Deadline
The deadline for items submitted to The Crucible is the 1st of the month prior to publication.

For example, all items for the March 2010 issue must be to the editor by February 1, 2010.

The Crucible readership is greater Pittsburgh’s largest source for chemical and biochemical buyers. The Crucible reaches more than 3,000 readers each month. It has been estimated that these buyers annually purchase more than $150,000,000 of:

- Equipment
- Supplies
- Consulting Services

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ADVERTISERS INDEX

INDSPEC Chemical Corporation 10
MASS VAC, Inc. 7
Micron inc. 10
NuMega Resonance Labs 10
Robertson Microlit Laboratories 10
Society for Analytical Chemists of Pittsburgh 10
Spectroscopy Society of Pittsburgh 10
Pittsburgh Area Calendar

Monday, February 1

Society for Analytical Chemists of Pittsburgh
“Analytical and Electron Transfer Chemistry of Nanoparticles”
Royce W. Murray, University of North Carolina
Duquesne University, Laura Falk Hall

Friday, February 5

Job Searching For Chemical Technicians
Harbor Gardens, Student Services Area Conference Rooms, Bidwell Training Center, Pittsburgh, PA

Saturday, February 6

Job Searching For Chemical Professionals
Room A221/A224, Langley Hall, University of Pittsburgh, Pittsburgh, PA

Wednesday, February 10

ACS Pittsburgh Energy Technology Group
“Carbon Capture and Sequestration: Progress, Challenges, and Opportunities”
Dan Connell, CONSOL Energy Inc., R&D
Duquesne University, Mellon Hall of Science (Laura Falk Hall)

Spectroscopy Society of Pittsburgh
“Dynamic Nuclear Polarization Nuclear Magnetic Resonance in Liquids and Solids at High Magnetic Fields Why Two Electrons are Better Than One”
R.G. Griffin, Francis Bitter Magnet Laboratory and Department of Chemistry Massachusetts Institute of Chemistry
Duquesne University, Mellon Hall of Science (Laura Falk Hall)

Spectroscopy Society of Pittsburgh Technology Forum
“Bug Therapy: Discovery How Insects Make Our World Better”
Dr. John E Rawlins, Carnegie Museum of Natural History

Tuesday, February 23

ACS Pittsburgh Chemists Club
Carnegie Museum Small Group Guided Tour: Dinosaurs in Their Time
Carnegie Museum of Natural History, Forbes Avenue at Craig St. Pittsburgh

Additional chemistry related seminars and events in the Pittsburgh area can be found on the Pittsburgh Section’s website at http://www.chem.cmu.edu/acs-pgh/