Grove City College
Chemistry
eNewsLetter
Summer 2015

Departmental News

From Dr. Tim Homan, Chair

The spring semester brought a couple of significant events to the department. On a very sad note, Professor Edward Naegele died in March. Many of you received an email in the spring. Ed served the department from 1958 until his retirement in 1990. He was instrumental in building a strong chemistry department, and we are very mindful of his many contributions to the department and the college.

Secondly, the Provost informed the department at the end of the fall semester that we had been granted an additional faculty position. A search committee was established, including myself and Joe Augspurger from the department, Kevin Seybold (Psychology), the Provost and the Dean. We reviewed many applications, phone interviewed several candidates and brought two candidates to campus for interviews. I am pleased to announce that Dr. Venney Wong has joined the department. Venney is from Malaysia; she completed her B.S. and Ph.D. (analytical chemistry) degrees at Southern Illinois University. Venney went home after completing her Ph.D., then she returned to SIU this past year as a research associate and lecturer in the chemistry department. Venney will be taking over the analytical chemistry (CHEM 227) and instrumental analysis (CHEM 406) courses.

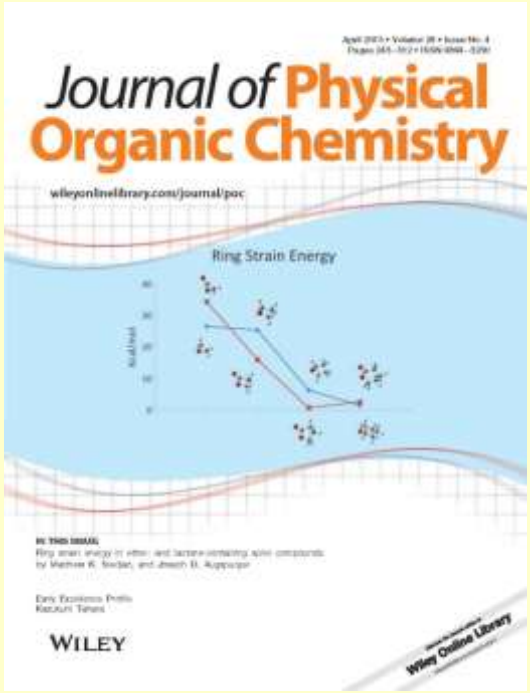
The Fall 2014 eNewsLetter announced the American Chemical Society Committee on Professional Training approval for our department to grant an ACS Certified degree. The completion of our first year resulted in senior Joseph Kriley receiving the first ACS certified degree from the department. We anticipate a number of our majors fulfilling the ACS requirements in this coming academic year. If you are interested in seeing the requirements for the ACS certified degree, you can see them in our current Chemistry_Status_Sheet.

Professors Tim Homan, Chuck Kriley and Mike Falcetta attended the National ACS meeting in Denver in March with four students. The students, Joe Winkelbauer, Rebecca McLaughlin, Lorna Williams and Emily Tharnish, presented their research projects at the poster session. It was a very good experience for them, and they were deeply appreciative of the financial support they received to attend. That financial support is partly provided by gifts from alumni and friends to the department and the college. Thank you for your commitment and support.

Yours,

Tim Homan

Research Highlights



Two of our department members had articles published recently. Dr. Falcetta published an article titled "Assessment of Various Electronic Structure Methods for Characterizing Temporary Anion States: Applications to the Ground State Anions of N_2, C_2H_2, C_2H_4, and C_6H_6" in the Journal of Physical Chemistry A (2014), **118**, 7489. He was assisted in the project by students Laura DiFalco (CHEM, '14), Daniel Ackerman (BIOC, '14) and John Barlow (CHEM, '15). Part of this work was the result of student research conducted in part during the summer of 2012. Dr. Falcetta was chosen to take part in a workshop entitled "Advances in Theory of Electronic Resonances" in July, in Telluride, Colorado, sponsored by the Telluride Science Research Center.

Dr. Augspurger published "Ring Strain Energy in Ether- and Lactone-Containing Spiro Compounds" in the April issue of the Journal of Physical Organic Chemistry (2015), **28**, 298. The work was completed in collaboration with Matthew Stedjan (CHEM, '11). The article was chosen to be featured on the cover of the issue.

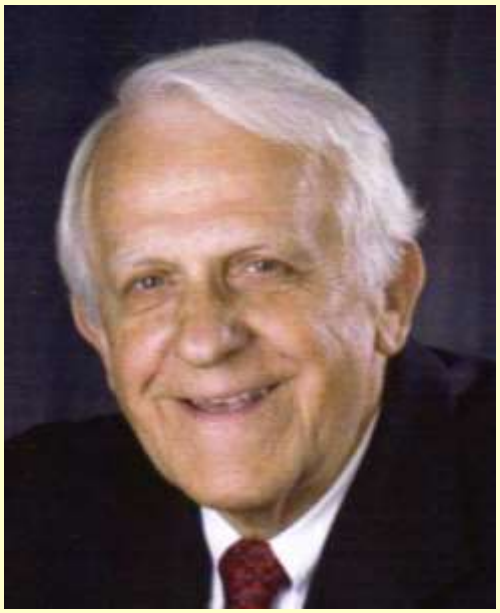
Dr. Kriley is supervising two students this summer, Ben Ivan and Andrew Claffey (both Biology, '17), who are working on the ongoing monitoring of well and ground water in areas where Marcellus Shale drilling is occurring. This project is supported by GCC's Sweezy Fund.

2015 Graduation

The class of 2015 included 16 graduates, including five earning degrees in chemistry and 11 earning degrees in biochemistry. They are going in a wide variety of directions, including joining the chemical industry, pursuing graduate degrees in chemistry and biology, entering the health professions as pharmacists or doctors, and one graduate has entered seminary.

Front row: Maddie Plessinger, Tarah Trebino, Frances Trenta, Anna Lehman, and Victoria Allen. Second row: Derek Shirey, Hannah Coad, and Micah Richardson. Third row: Joey Kriley, Nick Evancho, and Paul Brinkman. Fourth Row: Dr. Tim Homan, Erin Eperthener. Fifth Row: Dr. Susan Cramer and Dr. Chuck Kriley. Sixth Row: Dr. Kevin Shaw and Dr. Mike Falcetta

Alumni Spotlight (Part II)



In the previous edition of the GCC Chemistry eNewsLetter, we began the story of alumnus Jerry Carlson (CHEM, '54), his involvement in PittCon, and the central role Pittsburgh has played in the development of analytical chemistry and spectroscopy. If you didn't read it, you can find it here (link to Fall, '15 eNewsletter)

After Carnegie-Mellon University was formed by the merger of the Mellon Institute and Carnegie Institute of Technology in 1967, Jerry served as the Director of Analytical and Research Services. But after seven years, he decided it was time to return to a position as a researcher from that of an administrator. He left CMU in 1974 to take a position as a senior engineer in the Physical Chemistry Division of the Westinghouse Research Labs in Churchill, PA. In this position he was to provide physical and analytical chemistry services to the operating divisions of Westinghouse.

Jerry's contributions to Westinghouse can probably best be exemplified by his work for the Steam Turbine Division. At the time, Westinghouse was threatened with several lawsuits by utilities that had purchased Westinghouse steam turbines. The large blades in these turbines were breaking at an alarming rate and the utilities were claiming that the blade material developed by Westinghouse was deficient. Westinghouse, on the other hand, claimed that the utilities were not meeting the specification for steam purity that Westinghouse required and that impurities in the steam were depositing on the turbine blades causing corrosion and subsequent catastrophic failure. The cost to repair one of these turbines was on the order of $7 million plus another $7 million dollars in lost generation while the unit was shut down for repair. The utility companies agreed to withdraw their lawsuits if Westinghouse could definitively show that they were not meeting the steam purity requirement of less than 5 parts per billion of sodium, chloride, and sulfate. At that time, the detection limits for these contaminants by state–of–the art analytical methods was at least an order of magnitude above these levels, and tedious concentration of the sample was required. At this same time a new instrument company, Dionex, had introduced more sensitive instrumentation. Working with the development chemists at Dionex, Jerry and his Westinghouse colleagues helped develop methodology for lowering these detection limits to the one ppb level by collecting the sample onto ion exchange resins and then eluting these resins into the ion chromatograph. Jerry developed a steam purity analyzer that could be installed in a power plant to continuously monitor the suspected corrodents in the steam. With this system, upsets in the steam purity that clearly violated the steam purity requirements were detected and convinced the utility companies that it was their operating practices and not the Westinghouse blade material that was at fault. Westinghouse went on to market the Steam Purity Analyzer as a product line, and it was recognized by Industrial Research magazine as one of the 100 most significant new technical products of 1980.

Following the successful outcome of the Steam Purity program, he was asked to take the position of Manager of the Analytical Chemistry Department at the Westinghouse R&D Center. After five years as manager, he requested to be returned to the Physical Chemistry Department where he could be more involved with technical problem solving. He returned to the Physical Chemistry Department in 1983 as an Advisory Scientist and was promoted to Consulting Scientist, the highest technical position within Westinghouse.

But in the early 1980s, Westinghouse purchased the Columbia Broadcasting System (CBS), and began divesting its traditional operating divisions. Since the funding for the Research Center came primarily from the operating divisions of the company, it soon became clear that as the number of operating companies dwindled, so did the funding for the Research Center. Although Westinghouse tried to replace this funding with government contracts and other external programs, the high overheads that had been established at the Research Center were not competitive and by about 1990, Westinghouse closed its R&D Center. In 1987, Jerry had the opportunity to join General Public Utilities, a consortium of electricity generating companies at its central laboratory in Reading, PA. There, he managed the Chemistry/Materials Laboratory whose task it was to provide analytical chemistry and materials characterization services in support of the electrical generating plants of the four operating companies. In many ways this assignment meshed well with the experience he had gained during his 12 years at the Westinghouse R&D Center. However, in the early 1990s, the state of Pennsylvania passed laws negating previous legislation that assured electric power companies operating in the state of no competition in their operating areas. When the State allowed the marketplace to determine who sold electricity in Pennsylvania, General Public Utilities was unable to compete and the decision was reached to sell or shut down their generating plants and become an electricity transmission company. With no plants to service there was no need for a Chemistry/Materials laboratory and after eight years he was again facing the loss of a job. Who would have guessed that three companies with the renown of Mellon Institute, Westinghouse, and General Public Utilities would disappear in his working lifetime! GPU offered lucrative severance packages to employees who were losing their jobs as a result of these changes and excellent retirement packages for employees old enough to retire. He was included in this latter group, but before his retirement went into effect, First Energy, a large Ohio based electric company, purchased GPU. So although he never worked a day for First Energy, he is considered a retiree of the company.

Jerry's career with Pittcon has encompassed 60 years with 50 of those years serving in some capacity on the Committee. His apex with the Conference Committee reached its peak in 1969 as President. The profit from the 1969 Conference was about $90,000 which was split between the SSP and the SACP, which by this time had developed a modest list of science projects that they supported in the Pittsburgh and surrounding area. As it became apparent that any number of disasters, such as large snow or ice storms, strikes, fire, etc., could prevent the meeting from being held at great financial loss to the organization, they took out insurance to cover these losses, but he also initiated a contingency fund to help with any losses due to unforeseen circumstances. This fund over the years has grown to almost $20 million, which means they no longer have to purchase show insurance, but also should the Pittsburgh Conference cease to meet for any reason, the programs established by the two sponsoring societies could continue for many years.

As the Conference grew, the money generated increased and it was recognized by the 1971 and 1972 Conference Presidents that the taxes paid on the profits were becoming significant. Steps were taken to achieve non-profit status for the Conference again increasing the profits and generating more money to fund the educational and scientific projects supported by SSP and the SACP. Now that most of the organizational and structural problems facing the Conference had been taken care of, the Committee faced the problems associated with escalating growth. In 1979 the Conference outgrew Cleveland and moved to Atlantic City for a five year stand when it became apparent that the exhibit hall could no longer accommodate their need for one million square feet of exhibit space. A Site Selection Committee was formed to evaluate all of the large convention centers in the country to identify those that had at least a million square feet of exhibit space to accommodate our growing program and other activities, with all of these functions within easy walking distance of each other. Another criterion was that the site be in an attractive city but near to areas where chemists and spectroscopists would be employed. The Committee identified five cities that met these requirements: New Orleans, Orlando, Atlanta, Chicago, and New York City. New York was selected for the 1990 Conference but was dropped after one meeting, largely because of the excessive costs for both exhibitors and conferees. So the conference has been rotating

between the other four cities since 1988, with Philadelphia added to the mix in 2013 when they enlarged their convention hall.

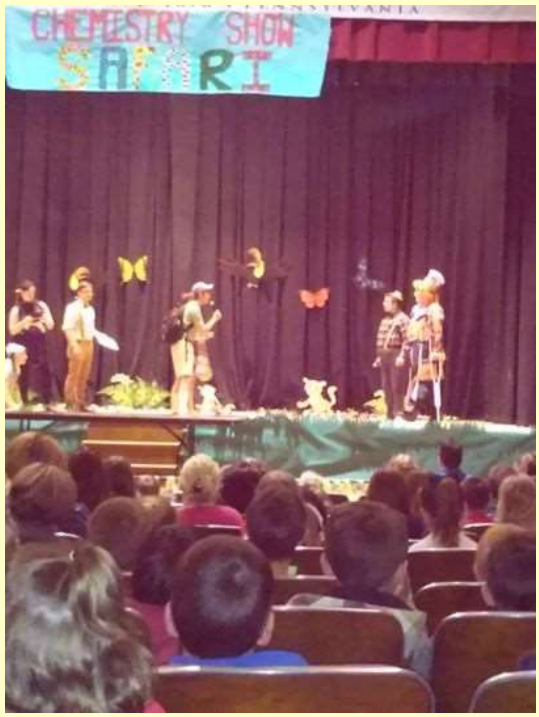
Since 2000 there has been a gradual decline in the number of attendees and also in the number of booths rented by exhibitors. (This trend has been seen in the convention industry in general). The latest conference in 2014 had an attendance of about 17,000, down appreciably from the lofty attendances of 35,000 seen in New York in 1990 and Chicago in 1996. The number of exhibiting companies and exhibit booths rented has dropped similarly from 3300 booths in New Orleans to under 1000 in 2014. The Conference has responded to the drop in income by reducing costs but without compromising the quality of the meeting. Nevertheless, the Conference has been losing money for the past five years or so, but has not decreased the allocation to the SSP and SACP so that commitments to colleges and schools receiving funding have not yet been affected. It is not clear how long this practice can be continued.

Although the funds generated by the Pittsburgh Conference support many science programs and projects, none of this funding comes directly from the Conference. Funding and monitoring of programs is the responsibility of the SSP and the SACP. Over the years the two societies have developed a portfolio of programs most of which continue to be funded year after year. (Disbursement of the funds is almost as much work as earning them, i.e. putting on the Conference.) The programs supported by the two societies are too extensive to be listed here.

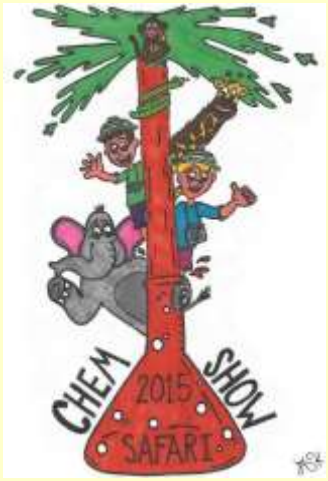
Jerry sums up his career: “I enjoyed it very much and am indebted to my employers for giving me the opportunity to perform interesting and important work while in their employ. It also points out that, contrary to earlier years, it is highly unlikely that younger generations will spend their careers working for only one employer. I have heard that the modern concept of employment is that once you find a job, you immediately start preparing yourself for your next job. I don’t believe it is quite that bad, but my advice would be to never become complacent and be prepared to change jobs on short notice.”

2015 Chem Show

The General Chemistry class presented the 17th annual "Chem Show" at Grove City College on May 1, providing an avenue for community outreach both locally and in the Pittsburgh and Butler areas. The show is geared towards preschool, kindergarten, 1st, 2nd, and 3rd grade students. Dr. Kriley directs the program which is run by two Senior, two Junior and two Sophomore chairs from the Chemistry Department. Over the past 17 years the students of General Chemistry 102 have provided chemistry shows for over 3,000 children. The show for this year was entitled "Chemistry Safari".



The students are given many different tasks to organize the show. Some serve as emcees (as shown on the left). Others design a T-shirt and programs. The back of this years T-shirt is shown here.



But the main event is using chemistry to attract interest to science and entertain. Most of the students are put into groups to perform demos. One of this year's highlights was adding liquid nitrogen to hot water to make "smoke" in the jungle.