



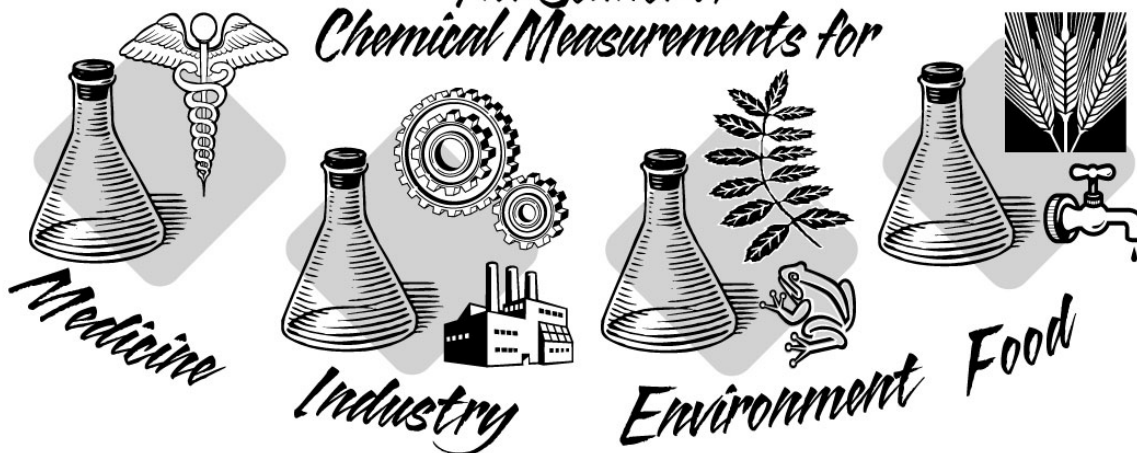
Spring  
Meeting  
New Orleans  
March 23-27, 2003

American Chemical Society

DIVISION OF ANALYTICAL CHEMISTRY  
**NEWSLETTER**

*Analytical Chemistry  
Serves Humanity*

*The Science of  
Chemical Measurements for*



SPRING 2003 EDITION  
SPECIAL ISSUE



In 2001, the Division was awarded a Chemluminary Award by the ACS for service to our members.

## The Division of Analytical Chemistry

- Funds and organizes analytical symposia at ACS meetings.
- Funds and administers grants for outstanding students in Chemistry.
- Recognizes professional excellence of analytical chemists.
- Offers analytical chemists networking opportunities.
- Advices the ACS on professional matters.

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## Newsletter Starting Paperless Edition in 2004

Publishing the newsletter consumes close to 6% of the annual Division of Analytical Chemistry's budget. Mirroring general societal trends, we are seeking more cost-effective solutions to our communication needs by using electronic publishing means.

As a pilot and starting next year, we will publish one of the two annual newsletters in electronic pdf paperless format. By moving to electronic editions of the newsletter, we can save in excess of \$8,000 per issue, which then we can apply to fund our scientific and grant programs.

An analysis of the membership roster showed that 80% of our membership has already shared their e-mail addresses with the ACS. These members will be alerted via e-mail of when the newsletter is available for downloading. If you do not supply your e-mail address, you can check the Division's website for publication details.

To receive future publication notification, please update your e-mail address at the ACS web site (<http://center.acs.org/applications/addrupdate/addrchange.cfm>).

[//center.acs.org/applications/addrupdate/addrchange.cfm](http://center.acs.org/applications/addrupdate/addrchange.cfm)).

If you are unable to receive the newsletter electronically and would like a hard copy, please contact the newsletter editor or any of your officers at the addresses included on this issue.

We welcome your comments on this and any other subject.

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## Special Issue of the Newsletter

This is a special issue of the newsletter. It includes reference information about the Division. The information used to be published every 3 years in the discontinued Division Directory, last published in 1997. The editor thanks the contributing authors.

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## Thanks to our corporate sponsors

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### 2002 Sponsors

Dekker Foundation•Waters Corporation•The Dow Chemical Foundation•Eli Lilly Corporation•E.I. Dupont de Nemours•Merck Corporation •Procter&Gamble•Eastman Chemical•Johnson and Johnson Pharmaceutical •Pfizer Inc Research and Development•Society of Analytical Chemists of Pittsburgh•Corporation Associates•Division Activities Committee.

### Spring 2003 Mtg Sponsors

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# New Orleans Analytical Division Sessions March 23-27, 2003

Division of Analytical Chemistry		ANYL				
J. D. Pinkston, Program Chair						
Convention Center	S	M	Tu	W	Th	
Advances in Techniques for Analytical Characterization in Fuel Chemistry* (FUEL)	A					
Function-Based and Other Novel Approaches to Sensors for Homeland Defense**	D					
MALDI and ESI Mass Spectrometry Techniques for Polymers* (PMSE)	D	D				
Synchrotron-Based Analytical Techniques for Nuclear and Environmental Sciences* (NUCL)	D	P				
That'll Never Work: Analytical Chemists Doing the Perceived Impossible	P					
Analytical Posters	E					
Undergraduate Research Poster Session: Analytical Chemistry* (CHED)		A				
Macromolecules to Bioparticles: Analyses with Field-Flow Fractionation**		A				
Present and Future Technologies in Chemical Instrumentation**		A				



## Invitation

All Division members are invited to attend the executive committee meeting in New Orleans on Saturday, March 22, 2003, from 1:00-5:00 pm. E. Morial Convention Center Room 274

Division of Analytical Chemistry		ANYL				
(continued)						
J. D. Pinkston, Program Chair						
Convention Center	S	M	Tu	W	Th	
Evaluation of Column Performance in Preparative Chromatography* (BIOT)		A				
Chemistry and Law of Driving While Intoxicated Prosecution* (CHAL)			D			
Chromatography Advances* (BIOT)		P				
Analytical Chemistry Workforce of the 21st Century**		P				
Novel Bioanalyses Using Lab-on-a-Chip Technologies* (BIOT)		P				
Encouraging Disadvantaged Students into Careers in the Chemical Sciences Honoring Isaiah M. Warner**		P				
Microscale Biosensors for Environmental Monitoring* (ENVR)		P				
Analytical Chemistry in Nuclear Technology* (NUCL)		P	D	D		
Sci-Mix		E				
Instrument Miniaturization for Homeland Defense: Progress and Challenges			A			
Fundamentals of Electrospray Ionization			D			
NMR Spectroscopy of Polymers* (POLY)			D	D	D	
Chromatography Award Symposium Honoring William S. Hancock			P			
NMR Spectroscopy of Polymers* (POLY)			E			
From Sensors to Functional Instruments Honoring Richard D. Smith (ACS Award in Analytical Chemistry) and Jesse L. Beauchamp (Field & Franklin Award)					D	
Size-Exclusion Chromatography with Multiple Detection Techniques**				P		
Environmental Management Science Program Symposium* (ENVR)				PE	D	
Process Analytical Chemistry**					A	
Capitalizing on Data Diversity					A	
Radiochemistry at RIA* (NUCL)					D	
Microelectrochemical Systems and Arrays					P	

## The Division of Analytical Chemistry Dinner at the New Orleans Meeting



The dinner will be held on Monday evening March 24th, at the Palace Cafe, with cocktail hour at 6:00 PM and dinner at 7:00 PM.

Menu: Crabmeat Cheesecake • Werlein Salad  
• Andouille Crusted Fish  
• Palace Cafe Pecan Pie • Coffee, Tea

Price, including tax and gratuity, \$42.

The Palace Cafe is located at 605 Canal Street, between Chartres and Royal Streets - at the entrance to the French Quarter, within walking distance of downtown.

Please make reservations when you register for the meeting!

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## Homeland Defense, a Nobel Laureate, and Chemists Performing “Impossible” Feats: Highlights of The New Orleans Mtg.

by David Pinkston, ANYL Chair.

Come join your colleagues in the Division of Analytical Chemistry for the 225<sup>th</sup> National ACS Meeting in New Orleans. The Division's program will feature a Nobel Laureate and Award Symposia for the recipients of 4 ACS National Awards. In addition to these giants of science, a variety of symposia will cover cutting-edge science. Here's a summary of the highlights:

- Nobel Laureate John Fenn will be featured in a full-day symposium on the “Fundamentals of Electrospray Ionization”.

- The fundamentals and applications of mass spectrometry will also be in the spotlight in a joint symposium in honor of Richard Smith, recipient of the ACS Award in Analytical Chemistry, and of Jesse Beauchamp, recipient of the Field

and Franklin Award. Isiah Warner will be honored as the recipient of the ACS Award for Encouraging Disadvantaged Students into Careers in the Chemical Sciences. William Hancock will receive the ACS Award in Chromatography.

- Analytical chemistry is a critical component of Homeland Defense. Advances in “function-based” and other novel sensors for Homeland Defense will be discussed in one symposium, while another will treat instrument miniaturization. Complementing these topics will be a symposium featuring the practical aspects of turning sensors into functional instruments.

- In “That'll Never Work – Analytical Chemists Doing the Perceived Impossible”, a group of world-renowned analytical chemists will

take an entertaining look at the recent past, while future challenges will be the topic in “Present and Future Technologies in Chemical Instrumentation”. “Analytical Chemistry Workforce of the 21<sup>st</sup> Century” will also take a glimpse at the future.

- The Separations Subdivision of the Division has contributed two symposia dealing with separations of macromolecules and particles. One will focus primarily on field-flow fractionation, the other on size-exclusion chromatography.

- Other symposia will deal with exciting advances in process analytical chemistry, in microelectrochemical systems, and in the interface area of informatics and measurements.

## Of Flying Elephants & Pride



By David Pinkston, ANYL Chair

Did you hear it? I think I did. In fact, I was one of the participants. I'm talking about the collective cheer that went up from analytical chemists around the world on October 9, 2002. That's when it was announced that John B. Fenn, Koichi Tanaka, and Kurt Wüthrich would be awarded the Nobel Prize in Chemistry "for the development of methods for identification and structure analyses of biological macromolecules". Our collective chests swelled with pride! Beyond the tremendous accomplishments of these individuals and their colleagues, ANALYTICAL chemistry was being recognized for its impact on science and on the world! To paraphrase the words of Kelsey D. Cook (J. Am. Soc. Mass Spectrom. 2002, 13, 1359), we trust that John, Koichi, and Kurt will not fault us for reveling a little in their triumph, as we congratulate them on their remarkable individual achievements.

When I discussed these events with my two adolescent boys over dinner that evening, one asked, "What did they do to deserve the prize?" I raised some eyebrows when I replied, "They made elephants fly." That took a bit of explaining, of course. And the boys were a bit

disappointed that it didn't involve "real" elephants. But this analogy, stolen from the title of one of Prof. Fenn's talks at the upcoming ACS National Meeting in New Orleans, is a good one in light of what these three scientists and their colleagues accomplished in the 1980's and 90's.

I hope you'll pay special attention to this edition of the Division's newsletter, your newsletter. Roland Hirsch, Councilor, and Al Ribes, Newsletter Editor, have included a special section on the history and by-laws of the Division and of the Subdivision of Chromatography. As I looked through this section, I was amazed at the tremendous volunteer effort and foresight that have made our Division what it is, one of the largest and healthiest in the ACS. Great thanks to all our current and former volunteers for their diligent work and dedication.

Come join us as we celebrate analytical chemistry at the ACS meeting in New Orleans, March 23-27. The meeting will feature 2 talks by Nobel Laureate Fenn, symposia honoring 4 National ACS Award winners, and a variety of symposia discussing advances on the cutting edge of analytical chemistry. See you there!

## Treasurer's Report

By Carolyn Ribes.

The Division of Analytical Chemistry had a very successful year, from the financial perspective. Approximately half of our income is obtained from external sources, and we are extremely grateful to our sponsors who generously support our programs. Without their support, the Division Awards, Graduate Fellowships, and Graduate Travel grants would not be possible. Many sponsors provide financial support for special symposia at National Meetings. Since we had a cash surplus in 2002, we plan on expanding our programming efforts in 2003 to include more symposia at National Meetings and enhanced programming at some Regional Meetings. We hope to attract internationally-known analytical chemists as invited speakers. We are supporting the 2003 Gordon Research Conference on Analytical Chemistry. We will continue to give out a substantial number of awards to undergraduate and graduate students. If you have any suggestions for additional ways to improve our programming and outreach to members of the Division, please contact me by July 1. The 2004 budget will be prepared in August and approved in September, and I welcome your suggestions.



## Subdivision of Chromatography News

### Subdivision Meeting at the Pittsburgh Conference:

The annual meeting of the Subdivision of Chromatography and Separations Chemistry of the Division of Analytical Chemistry

(DAC) of the American Chemical Society (ACS) will be held at the 2003 Pittsburgh Conference (Pittcon) in Orlando. The Subdivision invites all separation scientists to join officers in planning programs for the

Continues on page 17

# Does MS Have a Future after the Nobel Prize?

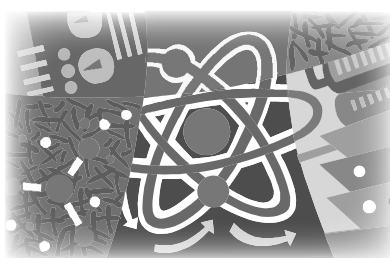
By Catherine Fenselau. University of Maryland. Reprinted with permission from *Anal. Chem.*, December 1, 2002, 74(23),597A. Copyright 2002 American Chemical Society.

The global community of analytical chemists greeted the October 9th announcement of the Nobel Committee's choice for chemistry with a loud HOORAH. John Fenn and Koichi Tanaka were recognized for electrospray ionization and soft laser desorption, and Kurt Wüthrich for advances in NMR. Their contributions in chemical analysis, as applied to biological macromolecules, were cited by the Nobel Foundation for making it possible "to understand biology and medicine at the molecular level" ([www.nobel.se](http://www.nobel.se)).

Electrospray ionization and soft laser desorption are the techniques that respectively interface MS to liquid separation techniques and to surfaces and arrays. Together, they are the enabling technologies for biological MS and proteomics. Tanaka reported the soft laser desorption of lysozyme and its multimers above 70,000 Da and their analysis by time-of-flight MS at a Joint Japan-China Symposium on Mass Spectrometry in Takarasuka, Japan, September 15-18, 1987. Fenn and co-workers reported the successful electrospray ionization and analysis of proteins, including alcohol dehydrogenase up to 40,000 Da on a quadrupole mass spectrometer, at the 36th Annual Conference of the American Society for Mass Spectrometry in San Francisco, June 5-10, 1988.

The 2002 prizes are the latest in a distinguished line of Nobel awards to analytical and bioanalytical scientists. In chemistry for example, Arne Tiselius was recognized in 1948 for electrophoresis, Archer Martin and Richard Synge in 1952 for partition chromatography, Jaroslav Heyrovsky in 1959 for polarography, Dorothy Hodgkin in 1964 for X-ray studies, Aaron Klug

in 1982 for electron microscopy, Richard Ernst in 1991 for NMR, and Kary Mullis in 1993 for PCR. Additional entries can also be drawn from the list of physics Nobelists. In the week following the announcement, an assistant professor asked at dinner if these awards signal the apogee of research in MS. She wondered if young scientists should move their efforts to a different field, one where the prize is yet to be earned. History (and everyone else at that dinner table) answered with a resounding NO. Awards have been presented several times for advances in laser spectroscopy, for example, and multiple prizes have been given for



X-ray crystallography. In fact, this is not the first Nobel recognition for MS! F. W. Aston received the chemistry prize in 1922 for the discovery of isotopes using a mass spectrograph of his own invention, and in 1934, Harold Urey received the prize for his discovery of deuterium using MS. Richard Curl, Harold Kroto, and Richard Smalley were honored in chemistry in 1996 for discovering fullerenes using a mass spectrometer. The prize in physics was given to Wolfgang Paul in 1989 for the ion trap technique. Gray heads at the dinner table also suggested that it is not realistic to make decisions about research areas on the basis of wanting to win a Nobel prize. Consider the statistics. We cannot know what important and

exciting advances still lie ahead for MS; perhaps discoveries that will allow facile analysis of intact DNAs and RNAs; perhaps inventions that will move sensitivity to the single-molecule level. One of the great strengths of investigator-initiated research is its unpredictability. Many more prizes—Nobel and otherwise—will be given in MS and analytical chemistry.

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## 2003 Gordon Conference on Analytical Chemistry "Measuring the Chemistry of Life"

June 15-20, 2003  
Connecticut College, New London,  
Connecticut

<http://www.grc.org/programs/2003/anachem.htm>

The objective of the conference is to bring together researchers from both the biological sciences and analytical chemistry to discuss the opportunities and challenges represented by the new approach to biology. A variety of analytical methods will be covered in the conference but they are linked by focus on studying biological complexity. The information covered should be of interest to analytical researchers as well as industrial scientists in the instrument, biotechnology, diagnostic, and pharmaceutical industries.

# ACS Founders Were Analytical Chemists, Too

Roland F. Hirsch U.S. Department of Energy. Reprinted from *Anal.Chem.*, March 1, 2002, 74(5), 153A-158A.  
Published 2002 by the American Chemical Society.

Analytical chemists are usually a modest bunch who quietly do great things, but their significance to chemical sciences and the development of the world's largest scientific society is undeniable and often under-appreciated. Members of our discipline have provided the leadership that helped create the American Chemical Society (ACS) and make it a national organization that has ties worldwide and welcomes chemical scientists from all sectors of academe, industry, and government. Analytical chemists have also played roles in developing the ACS's publication program.

Due to space limitations, I will mention the names of only a small number of leaders who have participated in the dialogue between our discipline and the Society. I will also try to cover, important milestones for science, ACS, and the wider public.

## At the beginning

Analytical chemistry became a distinct subdiscipline by the middle of the 19th century. The academic chemistry centers were still in Europe, but contributions to analytical chemistry were being made in the United States at the time of ACS's founding. Becker balances were manufactured in New York beginning in the 1860s; J. L. Smith introduced the fusion method for decomposition of silicates in 1871, which was used to analyze minerals; Frank Austin Gooch invented the Gooch crucible in the mid-1870s; and, in the early 1880s, Stephen Babcock developed the method for determining fat content in milk and milk products. Federal and state governments and the mining industries

had substantial analytical chemistry groups. A few U.S. academic centers had been developed, notably under electrochemists Wolcott Gibbs at Harvard and Edgar Fahs Smith at the University of Pennsylvania. Analytical chemists were leaders of the ACS from the start—indeed, many were presidents of the Society in its early years .

In 1887, Edward Hart, professor of analytical chemistry at Lafayette College in Pennsylvania, began publication of the *Journal of Analytical*

## The 125-year growth of the American Chemical Society and the development of analytical chemistry are closely intertwined.

Chemistry. Hart was a cofounder of the Baker & Adamson Chemical Co. and author of textbooks on volumetric analysis. He started the journal to disseminate new analytical methods to industry. The contributing editors for the journal's first issue included two future ACS presidents: Frank Clarke of the U.S. Geological Survey and Harvey Wiley of the U.S. Department of Agriculture. The analytical journal proved so successful that Hart was asked to become editor of the *Journal of the American Chemical Society (JACS)* in 1893. Today, that would be considered a high honor, but back then it was not even certain that JACS, which had been launched in 1878, would survive. In 1892, the journal garnered a mere \$44.36 in subscription income (1). During his nine-year reign as editor, Hart consolidated the *Journal*

of Analytical Chemistry into JACS, increasing the size and quality of the journal and raising the circulation substantially.

Wiley and Clarke, along with fellow analytical chemist Charles Monroe of the U.S. Torpedo Station in Newport, R.I., played a critical role in making ACS a truly national society. By the late 1880s, the organization was, "the parochial New York-centered chemical club" (2). The membership had shrunk from 192 at the end of 1876 to 167 at the end of 1889, with the majority in the New York City area. Monroe founded the Rhode Island ACS local section, the very first local section, and hosted the Society's first national meeting in Newport. To create a national organization, Wiley and Clarke formed a federation of 11 regional and topical societies and invited the existing ACS to join as the New York local section of the new ACS!

The accurate determination of the atomic weights of the elements was a major scientific contribution by analytical chemists at this time. In fact, the first "official" table of atomic weights anywhere was prepared in 1892 by Clarke, at the request of ACS. One important contributor, Theodore William Richards, professor at Harvard University, determined the atomic weights of 28 elements and received the Nobel Prize in Chemistry for 1914. Richards was the first American to receive the chemistry prize.

## Into the 20th century

Richards serves as a bridging figure between the 19th and 20th centuries.

# ACS Founders Were Analytical Chemists, Too

Like most 19th-century chemists, he studied in Germany with Wilhelm Ostwald and Walther Nernst, among others. “[Richards’] laboratory became a mecca for graduate students in the first quarter of the 20th century” (3). He not only led an influential research program, but also chaired the department of chemistry at Harvard for nine critical years at the start of the century and was president of ACS in 1914.

Meanwhile, the U.S. federal government was turning to analytical chemists for scientific assistance. “Passage of the Pure Food and Drug Act in 1906 assured a greatly expanded role for chemical analysis and for Harvey Wiley’s Bureau of Chemistry in enforcing the new legislation,” (2). For this role, Wiley became the only analytical chemist and the only ACS president to date to appear on a U.S. postage stamp, issued in 1954. (In fact, few chemists have appeared on U.S. stamps. Among those featured have been Joseph Priestley and Percy Julian, and—perhaps for reasons other than their accomplishments as chemists—Mary Lyon, professor of chemistry and president of Mount Holyoke College, and Notre Dame University’s football coach Knute Rockne.)

Overall, the early part of the 20th century was characterized by the refinement and application of analytical methods rather than innovation. “During the first three decades of the century, analytical chemistry was a rather unspectacular handmaiden of the other fields of chemistry,”(3). Wet chemical techniques predominated. Improvements in gravimetric and volumetric methods and reagents were made, and equilibrium principles were systematically applied to the understanding and improvement of methods for the first time. William

Hillebrand and Gustav Lundell of the National Bureau of Standards (now the National Institute of Standards and Technology) did particularly significant work in this area.

Hillebrand also served as ACS president in 1906, the year publication of Chemical Abstracts was approved. A committee chaired by Hillebrand also recommended to the ACS Council in 1906 that the Society seek a more active role for industrial chemists. The result was the founding of the Journal of Industrial and Engineering Chemistry, from which Analytical Chemistry would be born. Without Hillebrand’s advocacy for the interests of technical chemists, it is likely that a separate society would have formed, and perhaps the current ACS would now be a much smaller, less influential organization.

Lundell wrote one of the most influential essays on our discipline, “The Chemical Analysis of Things as They Are”, originally published in 1933 (4). This essay is still relevant today. Lundell notes a trend toward specialization and a narrowness of viewpoint, such that “so many talks and articles on analytical subjects deal with ‘The Chemical Analysis of Things as They Are Not’” because of a tendency to study only “the final act of a chemical analysis, and less and less time to [study] chemical analysis itself” (4).

Emission spectroscopy was the one purely instrumental analytical technique widely used in the first decades of the 20th century. “As early as 1920 it had reached a high level of usefulness” (3). The technique made it possible to detect trace amounts of many elements and semitrace concentrations of most elements. As photographic plates and film became more reliable, this

technique moved from qualitative to semiquantitative.

In 1929, the Analytical Edition of Industrial and Engineering Chemistry was founded. Harrison Howe, editor of the parent journal, established the News Edition in 1923, which later became Chemical & Engineering News. The Analytical Edition started as a quarterly, went bimonthly in 1933, and finally monthly in 1937. The articles in it were primarily about method development and improvements in lab equipment; basic science papers in our field continued to be published in JACS until the 1950s.

The ACS Division of Analytical Chemistry emerged in the 1930s. The Division of Microchemistry was initiated in 1936 and established in 1938. In 1940, it merged with the Analytical Section of the Division of Physical and Inorganic Chemistry to form the Division of Analytical and Microchemistry. Separate sections of the analytical and micro groups were organized within the division, and in 1949 the division was renamed as the Division of Analytical Chemistry (DAC).

Howe died in 1942, and Walter J. Murphy became his successor at Industrial and Engineering Chemistry, Chemical & Engineering News, and the Analytical Edition. Murphy appointed Lawrence Hallett as associate editor. Hallett, who later became editor, had a Ph.D. in analytical chemistry and substantial experience from his days at Eastman Kodak and General Aniline and Film. Another key contributor was Ralph H. Müller, who wrote a monthly feature on instrumentation for Analytical Chemistry. Many of the articles were devoted to basic concepts that were often—as stated



# ACS Founders Were Analytical Chemists, Too

by later Editor Herb Laitinen—"well ahead of their analytical applications" (5). The Analytical Edition was renamed Analytical Chemistry in 1948, and its Annual Reviews were published beginning in 1949.

## Mid-century

The renaming of the division and Analytical Chemistry suggests that a turning point was reached. I. M. "Piet" Kolthoff, who taught at the University of Minnesota and probably was the most important analytical scientist in the United States at that time, would recall, "The situation in analytical chemistry was very unfavorable [in this country] when I came here [in 1927].... People would officially major in physical chemistry and satisfy the requirements of a minor in my field, but I would be their major adviser." Even in 1950, he said, "There was still that feeling that analytical chemistry was not a real science" (6).

One reason that the status of analytical chemistry changed was the development of many classes of sophisticated instrumentation, initiated during World War II. Although Arnold Beckman introduced the pH meter in 1935 and the UV-vis spectrophotometer in 1940, analytical chemists had to solve many new and complex problems. The war effort and especially the Manhattan Project saw the rise of MS as an inorganic analytical technique, soon to be followed by applications in the petroleum industry that required further research into principles and techniques (7). At the same time, basic components of instrumentation, such as strip-chart recorders, oscilloscopes, and photomultiplier tubes and amplifiers, became affordable.

Within ACS, the standing of analytical chemistry was improving.

Although N. Howell Furman of Princeton University was the only analytical chemist to be elected president of ACS during this period (1951), Analytical Chemistry had the largest circulation of any of the Society's disciplinary journals and a growing amount of advertising revenue. The Division and the journal jointly initiated an annual summer symposium. The first, in May 1948, covered "Nucleonics and Analytical Chemistry". The 24th, on "Analytical Chemistry: Key to Progress on National Problems", was held at the National Bureau of Standards in 1971. The final symposium, on "Separation Science Applied to Contemporary Biology", took place in 1993 at Northeastern University in Boston.

The first ACS awards honoring contributors to the field were the Award in Analytical Chemistry, established in 1947 and sponsored by Fisher Scientific, and the Award in Chemical Instrumentation, begun in 1953 and sponsored initially by Beckman Instruments and currently sponsored by The Dow Chemical Foundation. In 1949, the Merck Graduate Fellowship was started, which was a precursor to a program of full-year and summer fellowships beginning in 1966 that was sponsored by several organizations.

## Growth of the discipline

Despite technological advances and increasing recognition, analytical chemistry faced serious problems by the mid-1960s. Many prestigious universities were phasing out their analytical chemistry programs. The quick acceptance of new instruments developed in the 1950s, such as atomic absorption spectrometers and gas chromatographs, made many previously demanding analyses routine. The commercialization of

powerful, reliable, and relatively easy-to-operate instruments such as NMR and mass spectrometers was also undermining the standing of analytical chemistry. By the 1960s, much of the analytical work was no longer being done by analytical chemists. "Analytical chemistry seemed to have burned out," recalled well-known electrochemist Larry Faulkner in his 2001 Pittsburgh Conference talk. "It seemed to be producing neither new scientific concepts nor new tools that the rest of science found valuable. Advances in what we now recognize as analytical chemistry were being made, but mostly by others outside the field."

What changed? Faulkner offers a key clue: Analytical chemistry became essential to progress in issues that were central to society. Environmental remediation became a high priority in the 1970s, requiring far more information than ever before. Analytical chemists became forefront contributors to the practice of medicine and to research in the life sciences. Industry also became more focused on quality and began pushing the limits of purity of materials, such as for semiconductor production.

A new generation of analytical scientists changed the face of academic analytical chemistry. I would give much credit to Howard Malmstadt at the University of Illinois. He educated many individuals who became leaders at American and Canadian universities in the 1960s and 1970s, and his approach to teaching analytical instrumentation was widely adopted. Among many others who should be mentioned are Charlie Reilley at the University of North Carolina, Chapel Hill; Buck Rogers, who taught at the MIT, Purdue University, and the U. of Georgia;

# ACS Founders Were Analytical Chemists, Too

and Cal Giddings at the University of Utah. Although these three are no longer with us, their significant influence continues through their research, textbooks, and students.

At the same time, many companies made significant commitments to supporting analytical instrumentation and its development. Research laboratories specializing in analytical chemistry were established, notably in the chemical and pharmaceutical industries. As new instruments were developed, a substantial instrumentation industry emerged.

In addition, the national laboratories of the Atomic Energy Commission (AEC), created during World War II, broadened their missions; and some, such as Oak Ridge and Ames, became leaders in analytical research. The U.S. and Canadian governments eventually would support analytical chemistry through many agencies, such as the Canadian National Research Council and the U.S. National Science Foundation (NSF). Our field was fortunate to have the foresight of leaders such as Fred Findeis at NSF; Gerry Goldstein at AEC (later the Department of Energy); and Bill Raub and Caroline Holloway at the National Institutes of Health, who strengthened the ties between the analytical research community and researchers in the life sciences.

Analytical scientists also began to work in teams, collaborating with researchers across the discipline and in other fields. Put another way, analytical chemists in academe or industry today are more likely to partner with the scientists or engineers solving a problem, instead of just providing a service. The late Tomas Hirschfeld of Block Engineering and the Lawrence Livermore National

Laboratory exemplified the modern analytical scientist, applying his wide-ranging knowledge of spectroscopy and instrumentation to problems in the environmental and life sciences in close collaboration with scientists in those fields (8).

As a result, analytical chemistry has become more prominent within the ACS. The Division membership now exceeds 10,000, second only to the Division of Organic Chemistry, and is growing rapidly. Its articles have a high-impact factor, as noted recently by Editor Royce Murray (9). The journal also retains close ties with DAC, reserving an ex-officio place on its Editorial Advisory Board for the division chair.

Three analytical chemists have recently played an especially important role within ACS. Helen Free of Miles Laboratories (now Bayer Corp.) is a noted clinical chemist. As a Board of Directors member and former ACS president, she has, in my opinion, made interaction on a personal level between the Society's members and the general public a high priority. This type of interaction may be the most important new direction adopted by ACS in the past two decades. Allen Bard of the University of Texas at Austin, a leading electrochemist, recently retired as editor of JACS after 20 years. John Crum, formerly on the staff of Analytical Chemistry, is currently the Society's executive director. (And the electroanalytical chemist Richard Nicholson serves as executive officer of the American Association for the Advancement of Science, the second-largest scientific society.)

## More to do

The future of our science looks great. Analytical chemistry provided capil-

lary electrophoresis, the essential enabling tool for the most publicized science story of recent years, for sequencing of the human genome (10). Analytical chemistry also is the critical element in proteomics, the next step in tracing the meaning of gene sequences and imaging the chemistry in living cells. (In fact, the founding editor of ACS's new Journal of Proteome Research is Bill Hancock, a well-known bioanalytical chemist at Thermo Finnigan and a former associate editor of Analytical Chemistry.) I believe the application of analytical chemistry to these fields will continue to revise basic concepts in biology.

Analytical chemistry is also a key to major initiatives outside the life sciences. New techniques will be needed to characterize nanomaterials, which will make new kinds of instrumentation possible. Major challenges remain in environmental cleanup—just characterizing contamination will require greatly improved analytical technologies. And, when hazardous materials cannot be destroyed, long-term stewardship of disposal and storage sites will also require innovations in analytical chemistry.

## Suggested reading

- A History of Analytical Chemistry; Laitinen, H. A., Ewing, G. W., Eds.; Division of Analytical Chemistry, ACS: Washington, DC, 1977.
- Analytical Chemistry, 50 Years: The Journal and the Science; Laitinen, H. A., Ed.; ACS: Washington, DC, 1979 (reprint of articles in the Nov. and Dec. 1978 issues of Analytical Chemistry).
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- Grasselli, J. G. *The Analytical Approach*; ACS: Washington, DC, 1983.
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## History of the Division of Analytical Chemistry

From the original writings of Galen W. Ewing and Theodore Williams. Updated by Al Ribes and Roland Hirsch.

[A history of the first twenty years of the Division can be found in *Analytical Chemistry*, Volume 31, Number 4, page 17A, 1959, and references cited therein. Also “A History of Analytical Chemistry”, edited by H. A. Laitinen and G. W. Ewing, published during the ACS Centennial (1976) chronicles the history of modern analytical chemistry.]

### Growth, Development and Coalescence

For several years papers on analytical chemistry were presented at ACS national meetings through the Analytical Section of the Division of Physical and Inorganic Chemistry. This was manageable until a monograph by Fritz Pregl on quantitative organic microanalysis sparked a significant increase in analytical contributions. The differentiation started as early as September 1935, when a symposium on Microchemistry was organized, filling a half-day session.

In February 1936 the News Edition (predecessor of *Chemical & Engineering News*) commented: “Since microchemistry cannot be included wholly within the scope of any of the existing Divisions of the ACS, and because of the general applicability of this technique to almost all of the major branches of chemistry, a separate Division of the ACS devoted entirely to microchemistry is under consideration.”

A group of chemists headed by A. A. Benedetti-Pichler and F. Schneider, was authorized by the Society to organize a separate program for the April 1936 ACS meeting in Kansas City. The nine papers given in the half-day session covered the techniques involved in working with

smaller analytical samples than those required in classical methods. At subsequent meetings, the number of papers on the problems and applications of microchemistry in the research laboratory continued to increase. So successful were the meetings that a petition was presented to the Council meeting in Milwaukee requesting official recognition of a Division of Microchemistry. The first official meeting of the new Division was held in Baltimore in April 1939.

At about that time, the Analytical Section of the Division of Physical and Inorganic Chemistry voted to separate from its parent organization. A committee was formed to consult with the Division of Microchemistry on a possible merger of the two groups. This committee consisted of Hobart H. Willard of the University of Michigan, N. Howell Furman of Princeton University, I. M. Kolthoff of the University of Minnesota (all of whom were members of the advisory board of the Analytical Edition of *Industrial and Engineering Chemistry*), and G. Frederick Smith of the University of Illinois. These prominent analytical chemists met with the executive committee of the Division of Microchemistry to discuss their mutual interests. Both committees agreed to the merger, and proposed that a new title and bylaws should be drawn up, provided the merger was approved by the membership.

At the business meeting of the Division of Microchemistry, held in Boston in 1939, the proposed merger was announced to the membership. The minutes stated that “the discussion was favorable.” The question was voted on and approved in the Fall of 1940 by an overwhelming

# History of the Division of Analytical Chemistry

vote of 76 to 2 in favor of combining the two groups. As a result, a petition was presented to the Council Meeting in Detroit, requesting that the name of the Division be changed to the Division of Analytical and Microchemistry.

On September 11, 1940, the two groups met to elect officers for the new Division. The minutes stated that "it is to be an unwritten understanding that the chairman and vice-chairman be elected to represent the two fields." G. E. F. Lundell was elected chairman of this newly amalgamated group; G. L. Royer, vice-chairman; and F. W. Power, secretary-treasurer.

The first notice to prospective authors of the Division bore evidence of the existence of the two fields. It was proposed that separate as well as joint sessions be held. Those planning to present papers were requested to indicate the group before which they preferred to speak—the "Micro" group or the "Analytical" group. The first officially arranged program of the new Division was a two-day session in St. Louis (April 1941). A symposium on Newer Analytical Techniques constituted an all-day meeting, with one half of the second day devoted to analytical chemistry and the other half to microchemistry.

There was considerable interest in the early 1940s to expand and modernize the only ACS journal serving primarily analytical chemistry—The Analytical Edition of Industrial and Engineering Chemistry. The editor, Harrison Howe, felt that the Analytical Edition should emphasize papers on specific analytical methods, rather than broad treatments of the fundamental chemistry of such methods. After Howe died in 1943,

the new editor Walter J. Murphy recognized that instrumentation was making revolutionary changes in the practice of analytical chemistry, and added several instrumentalists to the advisory board, including Ralph H. Mueller of New York University and M. G. Mellon of Purdue. He also appointed Louis T. Hallett as assistant editor, the first trained analytical chemist to hold such a position with the journal. Hallett later became editor, serving from 1956 until he was succeeded by Herbert A. Laitinen in 1966, by George H. Morrison in 1980, and by Royce Murray in 1991.

Murphy introduced the concept of a combined magazine and research journal, thus providing at the same time a platform for the presentation of scholarly research reports, for news items and articles of general interest to analytical chemists, in a form that would attract advertising, hence lowering the subscription rates.

The name of the Division was changed in 1949 to the Division of Analytical Chemistry to reflect that the field had broadened to such an extent that microchemistry was only one of a number of disciplines represented in the continually growing field of Analytical Chemistry.

In 1948, the Division started an annual Summer Symposium, co-sponsored by Analytical Chemistry and the Division. These Symposia met with instant success at the time. With the second Symposium, the Journal started publishing the Symposium contributions. This continued for eleven years until 1958, when the Symposium chairman (Norman H. Nachtrieb) started publishing instead a summary of the

Symposium papers. This evolved into the Journal reporting on the Symposium each year in its A-pages. Due to decreasing attendance and to the emergence of other forums, the Symposium was discontinued after 1993.

The Subdivision of Chromatography and Separation Chemistry was created in 1984 with Satinder Ahuja as chairman, Clifford G. Scott as secretary, and John G. Nikelly as treasurer. The main objectives were to sponsor symposia on the above-related fields and to increase the professional contacts between practitioners. Some feared that the creation of one Subdivision would lead eventually to many others and to the fragmentation of the Division. Others saw a possibility of chromatographers leaving the Division if a Subdivision was not authorized. As it has turned out, the Subdivision thrives within the Division with a current membership of over eleven hundred. And since 1996 the newsletter of the Subdivision is being published as a section of the DAC newsletter, reaching out to the whole membership of DAC, which numbers 11,000 strong.

## Awards in Analytical Chemistry

The ACS Award in Analytical Chemistry sponsored by the Fisher Scientific Company was established in 1947, and is one of the oldest of the ACS national awards. Fisher sponsored this Award until 2002, and from 2004 it will be sponsored by the Battelle Memorial Institute. Two additional ACS National Awards that fall within the scope of analytical chemistry are the ACS Award in Chromatography, established by Lab-Line in 1959 and sponsored by Supelco since 1970, and the Frank H. Field and Joe L. Franklin Award

# History of the Division of Analytical Chemistry

for Outstanding Achievement in Mass Spectrometry, sponsored from 1983 by Extranuclear Laboratories, with Bruker Daltonics providing sponsorship since 2001.

Analytical chemists in recent years have also received several other ACS National Awards, including the ACS Award for Encouraging Disadvantaged Students into Careers in the Chemical Sciences and the ACS Award for Encouraging Women into Careers in the Chemical Sciences, both sponsored by the Camille and Henry Dreyfus Foundation; the ACS Award in Separations Science and Technology, sponsored by IBC Advanced Technologies, Inc.; the ACS Award in Pure Chemistry, sponsored by Alpha Chi Sigma; the Francis P. Garvan—John M. Olin Medal; the Charles Lathrop Parsons Award, and the ACS Award for Research at an Undergraduate Institution, sponsored by Research Corporation.

In addition to the awards administered by the Society, the Division created over the years six awards, each supported by an industrial sponsor. The first one, the Award in Chemical Instrumentation, originated in 1953 as an ACS National Award sponsored by Beckman Instruments, Inc. In 1976, it became a Division Award sponsored by the Instrumentation Specialties Company and later by Hamilton Company. Currently, the Dow Chemical Company Foundation sponsors it.

In 1982 the Division established the Award for Excellence in Teaching. The Procter & Gamble Company sponsored it until 1984, E. I. DuPont de Nemours, & Company sponsored

it from 1985-1998 and the Dekker Foundation has sponsored it ever since. In 1998, the name of the late J. Calvin Giddings was added to the title of the award. The first award was granted in 1983 went to one of the founding fathers of the Division, Professor I. M. Kolthoff.

In 1986, the Award in Spectrochemical Analysis was created, sponsored by the Perkin-Elmer Corporation, and shortly after the Award in Electrochemistry was established in 1987, sponsored by the Electrochemical Instruments Division of EG&G Princeton Applied Research. The Electrochemistry award was presented for the first time at the Division's 50th Anniversary meeting in September 1988. This award currently is sponsored by the Cole-Palmer Corporation.

The Division established in 1996 the Arthur F. Findeis Award for Achievements by a Young Analytical Scientist, sponsored by the Philip Morris Companies. It was first awarded in 1996 at the Eastern Analytical Symposium.

The most recent award is the Award for Distinguished Service in the Advancement of Analytical Chemistry, sponsored by Waters Corporation. It was established in 1997 and it was awarded for the first time in 1998.

## **Developing new researchers in the field of Analytical Chemistry.**

### **The Graduate Fellowships Program**

The Graduate Fellowship Program has endeavored to be a model of the benefits of cooperation between the academic and industrial com-

munities. In this Program, chemical companies sponsor fellowships (both academic-year and summer) for outstanding analytical graduate students. Companies benefit directly, by having access to the top graduate students in the discipline for recruiting purposes, and indirectly, by supporting students who will become analytical faculty and who will prepare future generations of students.

The first DAC Graduate Fellowship was awarded in 1949. This fellowship, sponsored by Merck & Company, provided a \$2,500 stipend to support a full year of graduate study. Merck was the sole sponsor for several years. The recipients of these early DAC Fellowships contributed a great deal to the field of analytical chemistry following their graduate work. The record of these recipients sparked interest in expanding the Program. Professor Frank Karasek sought to increase the number of fellowships and convinced the ACS Analytical Division to take ownership in the awards by contributing Division funds to supplement the corporate funds. Horace McDonell, a former C.E.O. of the Perkin-Elmer Company, took a special interest in the Program and appealed to his colleagues at other instrument companies to support fellowships.

Summer fellowships were initiated in 1966, and additional academic-year fellowships were added in 1970. The Graduate Fellowship Program has had a distinguished list of sponsors, who not only provide the funds for the fellowship stipends but also appoint staff scientists to evaluate student applications and to select the fellowship recipients. Procter & Gamble and DuPont have been

# History of the Division of Analytical Chemistry

long-time academic-year fellowship sponsors. The Society for Analytical Chemists of Pittsburgh (co-sponsors of the annual Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, the PittCon®) have supported four summer fellowships for many years. Dow, Eli Lilly and Eastman Chemical have sponsored fellowships for many years, while Merck and the R.W. Johnson Pharmaceutical Research Institute have recently begun sponsoring fellowships. Perkin-Elmer, GlaxoSmithKline, Olin, Gow-Mac and Beckmann Instruments have provided support for the Program in the past.

The Graduate Fellowship Program has benefited from the leadership of those who have chaired the DAC Graduate Fellowship Committee. These individuals are: Andrew J. Frank, 1967-70; Frank Karasek, 1970-71; Lockhart B. Rogers, 1972-73; Theodore Williams, 1973-82; Margaret V. Merritt, 1983-87; Charles Earnest, 1988-90; Doris Warren, 1991-95; Robert Libby, 1995-99; and Richard F. Dallinger, 1999-present. Frank, Karasek and Rogers used their talents and influence in the analytical community to organize the Graduate Fellowship Program and to increase the number of sponsoring companies. However, with the expansion of the number of awards it became important for the chair of the committee to be a person not involved with graduate education; since 1973 the chair has been someone whose primary position was teaching undergraduate students.

## **Pfizer Graduate Travel Awards.**

In 2002 the Division established the Pfizer Graduate Travel Awards

in Analytical Chemistry. The award provides funding for graduate students to travel to an ACS National Meeting and to present the results of their research in the form of a poster at the Poster Session of the Division of Analytical Chemistry.

## **The Undergraduate Award in Analytical Chemistry**

In October 1968, the Division initiated this Award, which currently consists of an academic year's subscription to Analytical Chemistry, honorary membership in the Division, and subscription to the DAC Newsletter. Each college and university on either the ACS approved list or a self-initiated request list is invited to select a recipient for this Award. Currently, approximately 350 Awards are given.

## **Summer Intern Program**

In 1973 the Professional Status Committee established a Summer Intern Program, which assisted in placing a number of outstanding undergraduates in summer jobs in industry. The Division no longer actively manages this program, but industrial companies continue providing internships to students.

## **Travel Grants**

The I. M. Kolthoff Enrichment Award was established in 1988, at the celebration of the 50th anniversary of the founding of the Division. It provides grants to undergraduate students to present their research at national ACS meetings.

## **Cooperation with Other Groups**

The Division actively cooperates with other organizations. One such group is the Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), which held

its first annual meeting in Atlantic City in November 1974. Currently, these organizations comprise FACSS, in addition to the Division: ANACHEM, the Instrumentation, Systems and Automation Society (ISA), the Coblenz Society, the Royal Society of Chemistry, and the Society for Applied Spectroscopy.

In 1996 the Division also became a full co-sponsor of the Eastern Analytical Symposium, joining the North Jersey and New York local sections of the American Chemical Society and units of the Society for Applied Spectroscopy, the American Microchemical Society, and the Chromatography Forum of the Delaware Valley. The Division is also a supporter of the Gordon Conferences focused on Analytical Chemistry.

The international scope of analytical chemistry and the common interests shared with colleagues in other countries has led the Division to take active roles in international meetings. The ACS currently co-sponsors Pacificchem, the International Chemical Congress of Pacific Basin Societies (with Canada, Japan, and other countries bordering on the Pacific Ocean). Thus far the Pacificchem meetings have been held in Honolulu, Hawaii about every five years. This meeting has a substantial program in analytical chemistry, organized jointly by the Division and counterparts in the co-sponsoring countries.

## **Communications**

The DAC Newsletter is published twice per year and mailed to all Division members. It is published to coincide with the national ACS meetings. For many years it con-

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## DAC Graduate Fellowships

### Applications for 2004 Fellowships due December 2003

Fellowships for graduate students in analytical chemistry are sponsored by various companies/organizations and are awarded through the ACS Division of Analytical Chemistry. The number of fellowships awarded may vary from year to year, depending on the number of sponsoring companies.

The purposes of these Fellowships are to encourage basic research in the field of analytical chemistry, to promote the growth of analytical chemistry in academic institutions and industry, and to provide recognition of future leaders in the field of analytical chemistry.

The Graduate Fellowship Committee of the ACS Division of Analytical Chemistry, which evaluates the applications and makes the fellowship awards, is comprised of representatives from the sponsoring companies, analytical faculty from undergraduate institutions and scientists from national laboratories.

Both academic-year (\$18,000) and summer (\$6,000) Fellowships are available. Most applicants apply for both awards unless mitigating circumstances (summer commitments, impending completion of degree requirements, etc.) exist.

#### **Academic-Year Fellowships**

(\$18,000) provide for nine months of graduate study and research in analytical chemistry at any ACS accredited institution of the appointee's choice.

The Fellowship may not be accepted concurrently with any other external fellowship. Because the purpose of the Fellowship is to provide opportunity for research, the holder will

not engage in outside work for added compensation during the period of the Fellowship. Academic-year award recipients are paid in nine monthly installments, beginning either on June 1 or September 1 of the year awarded, at the recipient's option. Tuition is not to be paid out of the grant, nor is the university permitted to deduct any administrative costs. If the university operates on a quarter system, it is expected that at least one quarter during the award period will be devoted to full-time research.

If the university follows a semester system, at least the summer months are to be spent in full-time research. It is expected that the student will take regular academic vacations during the Fellowship period, but the accumulated vacation time for the year is not to exceed 30 days. It is requested that any publications which result from the studies done during the Fellowship period is acknowledged. At the end of the Fellowship period, a brief report of the accomplishments or achievements made by the student should be submitted to the Chair of the Graduate Fellowship Committee and to the sponsor.

#### **Summer Fellowships (\$6,000)**

Summer Fellowships provide stipends to support research in analytical chemistry during the summer months. Summer Fellowship award recipients are paid in three monthly installments beginning on June 1 of the year awarded. The university is encouraged to pay fees and summer tuition when these are required. The acknowledgment and report procedures are the same for summer Fellows as for academic-year Fellows. Completed applications are due in

early December. The committee members read and evaluate the applications in January and February and meet during PittCon in early March to select the fellowship recipients. Applicants are notified of the results of the Committee's deliberations after the PittCon meeting, in March or April.

The student applicant must be a full-time student working toward a Ph.D. in analytical chemistry and must have completed the second year of graduate study by the time the fellowship period begins. (Such eligibility assures that the applicant is enrolled in a department of chemistry with a Ph.D. program in analytical chemistry and that his/her dissertation research is being supervised by an analytical chemistry faculty member.)

The applicant's research supervisor must be a member of the American Chemical Society Division of Analytical Chemistry. Only one nomination per research supervisor will be accepted. Student applicants must demonstrate outstanding research ability and accomplishment, as evidenced by peer-reviewed publications in analytical chemistry. Consequently, the Fellowships are normally awarded to students in their third or fourth years of graduate study when they have established a publication record.

Applicants for awards in previous years are encouraged to reapply. Previous academic-year fellowship recipients are not eligible for a second award.

For further information consult: [//www.wabash.edu/acsgraduatefellowship/home.htm](http://www.wabash.edu/acsgraduatefellowship/home.htm)

# History of the Division of Analytical Chemistry

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tained the abstracts for papers in the Division's program until 2000, when their inclusion in the Division's web site started.

The Division's web site is a major resource for members, continuously updated. It was started in 1995, under the leadership of Roland Hirsch, with Thomas Isenhour arranging hosting on a server in the Department of Chemistry and Biochemistry at Duquesne University ([www.acs-analytical.duq.edu](http://www.acs-analytical.duq.edu)). The site has bloomed into an large collection of web pages with information on Division business, by-laws, meetings, certification of analytical chemists and laboratories, award deadlines and guidelines, and resources of interest to analytical chemists (education, organizations, databases). As of 2002 the site received approximately 2,000 hits per month.

## Conclusion

As we reflect about and pay our respects to the many workers who laid the foundations and built the structure that has brought the Division to its present state of activity and service, we must consider the challenges of tomorrow. The future of the Division depends on our members for support and guidance. Get involved! The sense of accomplishment and satisfaction you get in return are significant and guaranteed.

# The Division of Analytical Chemistry On the World Wide Web

By Roland Hirsch, DAC Web Master and Councilor

The screenshot shows the homepage of the American Chemical Society's Division of Analytical Chemistry. At the top, there is a header with the ACS logo and the text 'Division of Analytical Chemistry'. Below this is a navigation menu on the left side with the following items: 'ACS Division Information', 'Awards, Grants and Fellowships', 'Publication Information For Analytical Chemists', and 'Education Information'. The main content area starts with a 'Welcome!' section, followed by a paragraph of introductory text. Below that is the name of the Chair, J. David Fickton, and the Division's mission statement. At the bottom, there is a section titled 'Of Current Interest' which lists two items: 'Nominations for the 2003 Division elections for Chair-Elect, Secretary, Councilor (two opening Alternate Councilor are open; contact Nominating Committee Chair Catherine Fenzelaj with recom March 31, 2003)' and 'Pfizer Graduate Travel Awards in Analytical Chemistry The deadline for application for the Fall, 2003 National Meeting is March 1, 2003'. The footer contains the text 'Website designed by: Sarsfield, Inc.' and 'Department of Chemistry and Biochemistry Duquesne University Homestead, PA 15122' and 'Editor: Roland E. Hirsch'.

The World Wide Web quickly became established in the 1990s as the best means for making information available to people around the world, first in scientific disciplines and then for all kinds of information. In 1995 the Division Executive Committee decided to start a web site devoted to Division business and information of interest to analytical chemists. Several organizations offered to host the web site, with Duquesne University being selected. Thomas L. Isenhour, chair of the Department of Chemistry and Biochemistry there, arranged for this service to the Division. Roland F. Hirsch a Division Councilor, became the editor of the web site, with the Executive Committee serving as the editorial board.

From the beginning, the web site has provided information about the business of the Division, including listings of officers, chairs of committees, future program plans, and announcements of awards and fellowships. Minutes of the Executive Committee meetings have been published on the web since the late 1990s. Beginning in 2000, the complete set of abstracts for the

Division's programs at ACS National Meetings has been made available at the web site. While the abstracts for each upcoming ACS Meeting are made available on the web by the Society, the Division's abstracts for past meetings are available only at our web site.

The web site also has many links to information of general interest to analytical chemists. From the start links have been provided to home pages for analytical chemistry graduate study programs at universities around the world. At the end of 2002, 120 such links were provided to analytical programs on all continents. Information is also provided for meetings of interest to analytical chemists, including the meetings that the Division cosponsors (Eastern Analytical Symposium, FACSS) and meetings in all specialty areas worldwide. There also is a web page devoted to resources for analytical chemists and one devoted to organizations that are important for the discipline. Suggestions of new links for any of these pages are always welcome.

In 2000 the web site was completely redesigned with the help of Jeff



## The DAC on the WW Web

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Martin, Rob Offutt and Paul Hirsch of the Santasoft Company, who introduced a consistent style with a contemporary design and easy navigation among the various pages. As a result the usage of the pages has increased to 2000 "hits" on the home page each month, with more than 400 users a month of the education information page.

The ACS is currently evaluating electronic balloting for Division officers, and once this is approved, the Division of Analytical Chemistry will certainly shift to that mechanism. Under discussion is a plan to make abstracts from the Division's National Meeting programs prior to 2000 available on the web site. Also, it is planned to add Associate Editors for specific aspects of the web site in the near future.

## ACS Award for Young Investigators in Separation Science:

In the fall election, the members of the Subdivision approved by a 10:1 margin creating the ACS Award for Young Investigators in Separation Science. The award will aim at recognizing the contributions of chemists or chemical engineers who have been working in the field of separations for less than ten years since obtaining their Ph.D. or other advanced degree. The award will complement the existing ACS Awards in Chromatography and in Separation Science for established investigators. The award will consist of a plaque, a cash prize, and a special technical award session at the Pittsburgh Conference. We are now in the process of obtaining financial sponsorship for this award. If any individual or company



## Subdivision of Chromatography and Separations Chemistry News

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ACS Meetings and to develop other initiatives that further the science of separation. Attendance is open to all members of the Subdivision as well as all analytical chemists attending Pittcon who have an interest in chromatography. The meeting is scheduled for Monday, March 10, from 12:05 to 13:30 PM at Office A4, which is on Level 3 of the Convention Center. A box lunch will be provided for the first twenty attendees by courtesy of International Scientific Communications, Inc.

The agenda will include nomination and election of new officers, program proposals and organizers. Join your friends and come.

### Fall Election News:

The officers of the Subdivision are:  
 Chair: Victoria L McGuffin  
 Chair Elect: John G. Dorsey  
 Past Chair: Richard A. Henry  
 Secretary: Robert L. Stevenson

The Exec. Committee members are:  
 Susan V. Olesik. Brian A. Bidlingmeyer. Linda B. McGown. And John Nikelly

Contact details for the officers can be obtained from the DAC web site or in this issue of the DAC newsletter.

[Chromatographic news continues below on column 1]

is interested in becoming a sponsor, please contact Victoria McGuffin (jgshabus@aol.com).

## Chromatographic Programming at the Upcoming ACS Meetings

Most of us thought that we had escaped New Orleans for a year, but no, we keep floating back as if we are trapped in an eddy on the big muddy. The program for NO is impressive:

Macromolecules to Particles: Analyses with Field Flow Fractionation (FFF). Biotech scientists are concerned that aggregation of large proteins may change potency and trigger fatal immunogenic reaction as the product sits on the shelf. Many of these particles are too large

to pass through size exclusion columns. Thus, there is a need for new separation technology for purification and analysis. Professor S. Kim Ratanathanawongs Williams of the Colorado School of Mines has organized a symposium on FFF. It will be an interesting mix of new FFF technology for generating the force fields as well as applications in the areas of protein aggregation, bacteria, dissolved organic matter, humic acids, and nano particles. If you are interested in molecules larger than 100 KDa and smaller than 100  $\mu$ m, this is a must attend symposium.

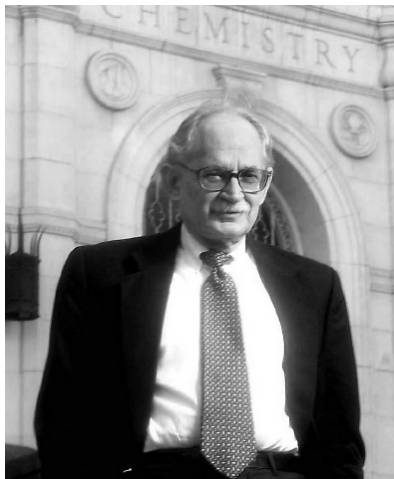
Size-Exclusion Chromatography (SEC) with Multiple Detection Techniques. SEC is used for analysis of polymers. With multiple detectors, SEC is especially useful in finding small differences in molecular structure that create changes in properties of the polymer. Traditional techniques use

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# The Fall and Rise of Analytical Chemistry in the 20<sup>th</sup> Century

## What's Next? Looking at the Past and Thinking About the Future

by Allen J. Bard, UT @ Austin  
Presented at the 2002 Pittsburgh Conference



## Chromatographic Programming at the Upcoming ACS Meetings

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light scattering, flow viscometers, and concentration sensitive detectors such as UV-VIS absorbance or refractometers. At this symposium, mass spectrometry and photo bleaching will be discussed in addition to the traditional detection modes. Dr. Andre M. Striegel of Solutia Inc. has assembled a program that will have something for the experienced practitioner as well as to help the neophyte form a vision of the future needs and capabilities.

The Fall ACS National Meeting in New York will feature several timely sessions. Professor Ira Krull of Northeastern University is organizing a symposium on the separation and analysis of prions. Dr. J. David Pinkston of Procter and Gamble is arranging a session on supercritical fluid chromatography. In addition, a symposium on nanoscale separations is planned to complement the ACS-DAC program on Analytical Chemistry at the Nanoscale: Electrochemical, Mechanical, and Optical. Finally, a session on the history of chromatography is being sponsored jointly by the Subdivision and the Division of History of Chemistry. There is still plenty of time to participate in these exciting programs or to present a poster!

I'd like to trace the history of analytical chemistry in a some detail. The early years (well before my time!) were largely taken up with the empirical development of methods. These were largely classical methods - gravimetric and titrimetric, because what instrumentation existed at the time was difficult to use and slow. Recall that to take a single absorption spectrum of a solution involved measurements with a photographic plate and densitometer and could take days. The same measurement today takes minutes (so there is a effective speed up of  $\sim 10^4$ ). There were colorimetric methods, but these involved visual comparison of solutions, as with the venerable Duboscq colorimeter. A good deal of work was done on the discovery of organic colorimetric reagents and spot tests for metals, an activity that is now back in fashion (although the practitioners now talk more of "molecular recognition" and call these reagents "sensors"). A key event then was the publication of the details of analytical methods,

e.g., in Scott's Standard Methods of Chemical Analysis in 1917. Up to that time industrial laboratories pretty much felt that their analytical methods were trade secrets. The Analytical Edition of Industrial and Engineering Chemistry was first published in 1929 (becoming the independent journal Analytical Chemistry in 1947).

However, gravimetric and volumetric methods dominated the scene. They had the advantage that they were inexpensive and accurate absolute methods that didn't need calibration steps. They were, however, slow and often inconvenient. For example, even as late as 1954 when I was a student working in the analytical lab of the NY Naval Shipyard (the Brooklyn Navy Yard), when we had to analyze for gases on an aircraft carrier, we used the old Orsat apparatus. At the time the hydraulics lifts on the deck elevators were being flushed with nitrogen to prevent fires starting in the heated hydraulic fluid when oxygen was present. We had to go down to the bowels of the ship and test how much oxygen was left in the gas. Doing that carrying an Orsat apparatus full of glass tubes and liquids was not fun.

A major change in analytical chemistry occurred with the introduction of concepts from physical chemistry into the design of analytical methods and with the technological advances that made new instrumental approaches, although still often rather cumbersome and slow, possible. This led, for example, to the widespread use of equilibrium and

## What's Next?

### Looking at the Past and Thinking About the Future

activity concepts in understanding gravimetric and titrimetric methods. A key figure in this approach was I. M. Kolthoff, whose books on pH indicators, potentiometric methods, and especially his *Textbook of Quantitative Inorganic Analysis*, first published in 1936, led to the adoption of this new view.

The rise of truly electronic instruments began with the introduction of the electronic Model G pH meter, followed by polarographic and spectrophotometric instrumentation (such as the Beckman DU). The DU was developed because of analytical problems, e.g. the need to measure vitamin A in soldiers' rations at the start of the second World War. The pH meter resulted from the desire to determine the pH of soil and water by the citrus industry. These methods advanced with the growth of electronics (based in those days on vacuum tubes) during the second World War. Let me trace the trends briefly by showing the evolution of electrochemical instrumentation, i.e., the polarograph. The earliest instruments for taking current-potential curves with a dropping mercury electrode were simple manual instruments, really no more than a potentiometer for applying a potential and a sensitive light-beam galvanometer for measuring the current. Only those who have made measurements with a light beam galvanometer, watching the cursor swing back and forth as the mercury drop grew and fell off (rivaled only by watching the needle swing back and forth on the two pan balances that were used into the early 50s) can know how tedious this was. A number of companies made polarographic instruments, but only the Sargent Company could use this term, since they held the

copyright. In making these instruments, other companies had to come up with clever names, like the Fisher Eledropode, and later, the Leeds and Northrup Electrochemograph, the Metrohm Polarecord, and the Cambridge Instruments Voltamograph. These were naturally followed by instruments that used photographic recording (since strip chart recorders were not available). These photographic systems were more convenient than the manual ones, but still pretty tedious, since one had to load the sensitive film in a dark room and not see what kind of



curves were recorded until the film was later developed. I believe the photographic recording polarograph made by Heyrovsky was one of the first automatic analytical instruments. The rise of strip chart recorders using servo amplifiers greatly improved the business of recording voltage-time curves. Making short time measurements, especially of transients, was still pretty difficult, however. One had to photograph the screen of an oscilloscope with a 35-mm camera (waiting until the roll of film was finished and developed before seeing the final results).

Pittcon started (and actually was held in Pittsburgh!) in 1950, just

as electronic instrumental methods were taking off. The introduction of strip-chart recorders, that could measure and record  $V$  vs.  $t$  ( $y$ - $t$ ) allowed much more convenient measurements, although they were pretty slow. The shortest times that could be measured depended upon how fast the recorder could spew out the chart paper and how well the pen would write. The  $x$ - $y$  recorder came on the scene in about 1957, and was the main medium for recording voltammograms until PCs came along in the 80s. The real revolution came with the introduction of vacuum tube operational amplifiers in the late 50s, like the venerable Philbrick K2-W into analytical instrumentation, greatly increasing the power and flexibility of the measurements that could be made. However the vacuum tube instruments were still pretty cumbersome for the more elaborate measurements, like square wave polarography. With the introduction of solid state electronics, first as discrete elements and then in integrated circuits, complex instrumentation became much more accessible and instruments like the Princeton Applied Research Model 170 electrochemical system were introduced. Interestingly, the major manufacturers of polarographic instruments at the time didn't recognize the changes going on in electrochemistry and quickly went out of the business and were replaced by companies that could produce state-of-the-art instruments.

The obvious importance of instrumentation and the replacement of the more tedious "classical" methods with instrumental ones led many analytical chemists to work on electronics and the design or improvement of instruments, for their own sake. However this

## What's Next? Looking at the Past and Thinking About the Future

move away from true "chemistry", as well the continued emphasis in the analytical curriculum on gravimetric and titrimetric methods led to considerable pressure on analytical chemistry in academia. As Larry said, "Analytical chemistry seemed to have burned out." The field seemed to be still be emphasizing thermodynamic and phenomenological (macroscopic) approaches, while many of the other fields of chemistry were adopting a more microscopic (molecular) view. For example physical chemists became interested in the kinetics of elementary processes, as studied, for example, by molecular beams, and the correlation of the results with quantum mechanical calculations. Inorganic chemistry had moved beyond the world of Werner coordination compounds to organometallic chemistry, such as the metallocenes, and ligand field theory. Physical organic chemists were rapidly advancing their understanding of reaction mechanisms and adopting a molecular orbital view. The results of this perception of analytical chemistry by chemists in other fields, as well as excessive hubris among some of our colleagues in other fields, led to the disappearance of academic analytical chemistry from a number of universities, e.g., the ivy league schools (except for Cornell), and west coast schools like Berkeley, Stanford and UCLA, with considerable pressure at other places. This occurred even though it seemed clear that there were important analytical problems around and fundamental advances under way. This is what I mean by the "fall" of analytical chemistry.

However analytical chemistry was undergoing a rebirth. Charles N. Reilley represented someone who

successfully bridged the older classical analytical chemistry and the evolving new approaches. Fields advance because of "pulls" and "pushes". The pulls are existing important problems or questions that need addressing. In the late 50s and 60s, for example, it was important to develop methods to measure trace impurities in silicon in connection with the fabrication of semiconductor devices. Indeed, analysis often is key to solving fundamental problems or controversies. The question of polywater was settled by a careful analysis that demonstrated that the modified properties of water con-



densed in small capillaries, proposed as a new form of water, was caused by impurities. I would guess that the question of hydrogen storage on carbon nanotubes that is currently being debated will similarly be solved by good analyses.

The 'pushes' come from the discovery of new principles or the availability of new instruments that can be applied to analysis. Examples of this are the invention of the laser (and the eventual availability of rugged and inexpensive ones) and the rise of solid state electronics, with the dawning of the computer age. Such

pushes, combined with a molecular view of chemistry among younger chemists, as well as fundamental advances in electrochemistry, mass spectrometry, separations, and spectroscopy, led to major advances in analytical chemistry in the last quarter of the 20<sup>th</sup> century. As Faulkner said last year at Pittcon, the field of analytical chemistry is now healthy, and analytical chemists have helped advance fields well outside the traditional areas of analytical chemistry. It is also heartwarming to see the top physical and organic chemists working on analytical problems, publishing in *Analytical Chemistry*, and speaking at Pittcon. Physicists and electrical engineers are working on sensors. By the mid-80s it was clear that analytical chemistry was an important and academically vital field and at least some of the departments that discontinued this field were having second thoughts about their action.

What are our prospects in the 21<sup>st</sup> century? As that great American philosopher, Yogi Berra, said "It's tough to make predictions, 'specially about the future." In fact, by looking at the Pittcon program one can get a good idea of new areas that are developing (miniature mass spectrometers, analysis on a chip, and increasing sophistication and power in spectroscopy, separations and electrochemistry). With instruments so sophisticated, the power to do experiments has increased many fold. How can one define this relative power? We can consider the time it takes to do a given experiment and the improvement in the measurement sensitivity or resolution. Consider electrochemical instrumentation again. To obtain a voltammogram manually took almost one hour. The recording

## What's Next? Looking at the Past and Thinking About the Future

instruments did this in the order of 10 minutes and with modern instrumentation this is down to the order of 1 minute or less. So the time factor is of the order of  $10^2$ . Similar, or more impressive, time gains have been seen in spectrophotometry, x-ray crystallography and other fields. The resolution factor is a little less clear, but as an estimate, one can say that one has increased current sensitivity over the same 50-year period by a factor of at least  $10^4$  (e.g., from 0.01  $\mu\text{A}$  to 1 pA). Similar gains have been made in sensitivity, spatial resolution (from 0.1  $\mu\text{m}$  to 1 nm) and temporal resolution (from 1  $\mu\text{s}$  to  $<1$  ps). Thus, very roughly, the gain in relative power of instrumentation is of the order of  $10^2 \times 10^4$ , or something like 1 million. That's really impressive! However we have to remember that the limiting step, at least for now, is often the human that has to run the experiment and interpret the data, and unfortunately the relative power for this is still probably 1.

To look to the future, we can search for pulls from the fields that will be important in society, such as health care, the environment and economic competitiveness, and especially the fields of nanoscience and information technology. These fields will surely require the support of analytical chemistry. Add to that the important analytical needs in biology and security. It is much harder to define the "pushes" and the new scientific and technological discoveries that will be made in the coming years that will impact analytical chemistry.

There will be a continued need for spatially and temporally resolved analysis, especially at high resolu-

tion. In semiconductor devices, identifying small amounts of surface impurities can be important, and as the size scale shrinks, the needed sensitivity of the analytical technique will have to be higher. As an example, I show an example of the use of Raman microscopy and spectroscopy to identify a small defect on a Si surface. Raman spectroscopy, incidentally, is a very good example of how a push (the availability of lasers) can lead to new analytical methodology. When discovered in 1928, the Raman effect, while interesting, was of little practical value, because the signal-to-noise was poor with the available light sources. It remained that way for the next 30 years, but the advent of lasers made Raman spectroscopy a practical technique. A second push came from the discovery of SERS, increasing the sensitivity by orders of magnitude to the point where the type of microscopy just described is practical and even single molecules can be detected. Thus one sees a technique going from too weak to be of interest to one that is suitable for single molecule detection. This example illustrates the effect of both pushes and pulls on new analytical methodology.

Single molecule detection, not now really considered an analytical technique, will continue to be developed. As nanotechnology proceeds, finding and identifying single or small numbers of molecules will become more important. For example, examining the behavior of small polymer light emitting devices, identifying the structural features or concentrations of impurities that control device performance will be necessary. Indeed, as organic molecule based electronic devices come into use, methods for

the characterization of these materials and identification of impurities at the ppm or ppb level, as now routinely done with Si-based devices, will need to be developed.

The power of scanning probe methods will increase. Right now these methods have only marginal use in analytical chemistry because, except for SECM, they are not really "chemically sensitive." However continued improvements in selectivity, along the lines of chemical AFM are possible. So are methods involving spectroscopic characterization by NSOM (where a compact, inexpensive laser that is tunable, e.g., by changing voltage or pressure, through the whole visible-near UV region would be of immense value). There is also the possibility of magnetic resonance SPM and perhaps SPM techniques that have elemental specificity. Perhaps the original dream of recognizing individual molecules by looking at the image, e.g. in sequencing DNA and proteins, will finally become a reality. This will require not only advances in tip design and resolution, but also advances in sample preparation. Indeed, in thinking about analysis of single molecules, which can be of interest in DNA and protein chemistry, sample handling is of prime importance. It is unlikely that single molecule analysis will be done in a three-dimensional sample (i.e., of a dissolved species), so one really is talking about immobilization of the molecule of interest on a surface. The question then becomes how does one rapidly move a molecule to a particular location on a surface and immobilize it for examination. Techniques like electrically driven motion (migration or electrophoretic motion) come to mind.

Continued on page 29

# At the Boston meeting

Don Bly (l)  
2002 DAC  
awardee,  
John Nelson  
COO  
Waters  
Corporation,  
and Catherine  
Fenselau,  
DAC 2002  
Chair



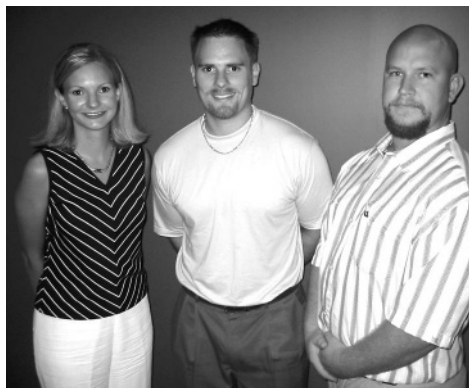
Geraldine  
Richmond  
(l)  
2002 DAC  
Awardee  
with  
Catherine  
Fenselau,  
DAC 2002  
Chair.



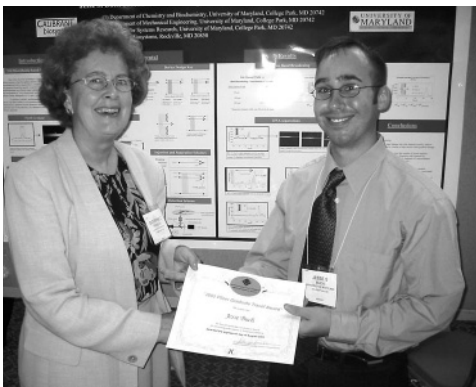
Jeffrey  
Stuart (r),  
2002 Pfizer  
Graduate  
Travel  
Awardee with  
Thea  
Kjellstrom,  
DAC  
Alternate  
Councilor



Jennifer  
Thomas,  
Mick Hurrey,  
and Bryan  
Ray (r),  
2002 Pfizer  
Graduate  
Travel  
Awardees.



Jesse Buch,  
2002 Pfizer  
Grad Travel  
Awardee  
with  
Catherine  
Fenselau,  
DAC  
2002 Chair



Thomas  
Chester  
with  
Victoria  
McGuffin  
DAC  
Subdivision  
Chromatogr.  
2002 Chair



Jonathan  
Sweedler (l)  
DAC 2002  
Awardee with  
Catherine  
Fenselau,  
DAC 2002  
Chair and  
Carolyn  
Ribes, Dow  
Chemical.



Catherine  
Fenselau,  
DAC 2002  
Chair  
with  
James Taylor,  
DAC 2002  
Awardee



## Good Chemistry Continues at ACS Regional Meetings

Regional Meetings...

1) Bring technical programming to local audiences through symposia, professional development workshops, and poster sessions. 2) Present programs for graduate and undergrad. students. 3) Recognize achievements by chemists in the local area through industrial and academic awards. 4) Provide opportunities for networking with colleagues from your area as well as ACS staff. 5) Sponsor programs for HS teachers, and 6) Help you reap more from your ACS membership.

Plan to participate in 2003! Watch your C&EN issues or visit [chemistry.org/meetings/regional/calendar.html](http://chemistry.org/meetings/regional/calendar.html) for more information on the upcoming meetings.

## DAC Support for Regional Meetings

The Division has a speaker's fund to support programming at the regional ACS meetings. Awards will generally be made to support a thematic symposium. Funds can be used to support travel expenses of an expert in the field who would not normally attend that particular regional meeting. It is expected that local speakers will then be included to fill out the symposium. Alternatively, funds can be requested to provide more modest levels of support to several speakers from the region. The Division will help regional planners identify possible speakers for symposia topics, if necessary. Applications for support are considered on a rolling basis until the yearly allocation of funds has been expended. There is no formal application process. Anyone interested in applying for an award should contact Tom Wenzel ([twenzel@bates.edu](mailto:twenzel@bates.edu)) by email to discuss the nature of the symposium and the funds that are needed to help support the program.

## Pacificchem 2005

Call for Symposium Proposals  
December 15 - 20, 2005  
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The program coordinators are now accepting proposals for symposia in:

1. Agrochemistry - Sara J. Risch ([Sjrisch@aol.com](mailto:Sjrisch@aol.com)).
2. Analytical Chemistry - Mike Ramsey ([ramseyjm@ornl.gov](mailto:ramseyjm@ornl.gov)).
3. Biological Chemistry - Guenter Grethe ([guenter@mdli.com](mailto:guenter@mdli.com)).
4. Chemistry & the Community - ([annn@cameron.edu](mailto:annn@cameron.edu)).
5. Environmental. V. Dean Adams ([vdadams@unr.nevada.edu](mailto:vdadams@unr.nevada.edu)).
6. Inorg. Chem., geochem. & nucl. Robert Crabtree ([Robert.crabtree@yal.e.edu](mailto:Robert.crabtree@yal.e.edu)).
7. Macromolecular Chemistry. Bill Brittain ([brittain@polymer.uakron.edu](mailto:brittain@polymer.uakron.edu)).
8. Materials Chem. & Nanotech. Karen L. Wooley ([klwooley@artsci.wustl.edu](mailto:klwooley@artsci.wustl.edu)).
9. Medicinal Chem. - pharmaceuticals. George Trainor ([george.trainor@bms.com](mailto:george.trainor@bms.com)).
10. Organic Chemistry. Amos B. Smith, III ([smithab@sas.upenn.edu](mailto:smithab@sas.upenn.edu)).
11. Physical and Theor. Chemistry. Joseph Francisco ([francisc@purdue.edu](mailto:francisc@purdue.edu)).

Details can be found at  
<http://www.pacificchem.org>.

## American Chemical Society Legislative Program

The Legislative Action Network (LAN) is a free online program that gives ACS members an easy, effective way of providing sound, non-partisan advice to elected officials on issues important to chemists and chemical engineers. The program is designed to facilitate communications with legislators on issues like research funding, K-12 science education, and the environment.

By joining, you will receive approximately six e-mail alerts per year prior to key congressional decisions. These alerts provide background on the issue, the potential effect on the scientific enterprise, and the ACS policy position. By clicking on a Web

link, you will access the Legislative Action Center Web page where you can review action alerts, edit sample letters, and send messages to your members of Congress within minutes. In addition, the monthly Capitol Connection electronic newsletter will keep you up-to-date on decisions being made in both the Congress and the White House.

Joining the LAN is easy. Visit [www.chemistry.org/government/action.html](http://www.chemistry.org/government/action.html) to fill out and submit the online form.

Our elected officials recognize the important role science and technology play in assuring the nation's

well being. However, Congress and the White House point out that scientists and engineers frequently do not weigh in on key science issues as constituents. By participating in the LAN, you will help ensure that your representatives know what is important to the scientists and engineers across the country. We look forward to working with you on public policy matters of importance to the chemical enterprise in the future.

Sincerely,  
Brian J. Dougherty  
Director, ACS Office of Legislative and Government Affairs  
202/872-4386  
[chemistry.org/government](http://chemistry.org/government)

# Division of Analytical Chemistry Awards

## Nominations for 2004: Submission Deadline Nov 1, 2003

The rules given below apply to nominations for the following awards administered by the Division:

\*ACS Division of Analytical Chemistry Award in Chemical Instrumentation  
Sponsored by the Dow Chemical Company Foundation.

\*ACS Division of Analytical Chemistry J. Calvin Giddings Award for Excellence in Education Sponsored by the Dekker Foundation.

\*ACS Division of Analytical Chemistry Award in Spectrochemical Analysis  
Sponsored by the Perkin-Elmer Corporation

\*ACS Division of Analytical Chemistry Award in Electrochemistry sponsored by the Cole Palmer Co.

\*ACS Division of Analytical Chemistry Arthur F. Findeis Award for Achievements by a Young Analytical Scientist Sponsored by the Philip Morris Companies

\*ACS Division of Analytical Chemistry Award for Distinguished Service in the Advancement of Analytical Chemistry  
Sponsored by Waters Corporation

Specific information on each of these Awards follows the general information on eligibility, deadlines, and nominating procedures.

These rules are extracted and paraphrased from the complete guidelines, which are available from the Division Chair. However, they are sufficient to prepare a proper nomination for consideration by the appropriate award jury.

### Eligibility

Eligibility is not restricted to members of the Division of Analytical Chemistry. Nominees for the Award for Excellence in Teaching must, however, have been a full-time faculty member at a college or university in the United States or Canada for at least five years at the

time the award is presented. Nominating and seconding letters may be submitted by persons who are not members of the Division.

### Deadlines

All nominations must be sent to the chairperson of the Division and must be received by November 1 of each year. The immediate past chairperson of the Division shall in turn transmit the nominations to the chairpersons of the appropriate juries. Nominations that are unsuccessful will be retained for jury consideration for the following three years.

For the 2004 Awards, nominations shall be sent no later than November 1, 2003 to:

Dr. J. David Pinkston  
Principal Scientist,  
Corporate Analytical  
The Procter & Gamble Co.  
Miami Valley Laboratories  
P.O. Box 538707  
Cincinnati, OH 45253-8707  
(513) 627-2269  
FAX (513) 627-1233  
pinkston.jd@pg.com

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### NOMINATIONS

Nominations shall consist of:

1. A letter of nomination.
2. At least one but no more than six seconding letters.
3. A biographical statement emphasizing the accomplishments of the nominee which pertain to the award. The nominating documents shall be submitted in one package and shall not exceed 12 pages of text, including the nominating and seconding letters, biographical statement, and attachments to the nomination. Contributions by a candidate which have been recognized by a prior Divisional or ACS national award generally will not be considered by the jury for a Divisional award, especially if an award has been received within the past three years and within a similar area. Previous award winners for the divisional awards are listed below. The jury shall receive from its chairperson a list for each nominee of any such prior awards, their dates, and their citations. Any candidate previously nominated for an award who was not chosen as the awardee must be renominated for consideration in a succeeding year.

### AWARD IN SPECTRO-CHEMICAL ANALYSIS

Advancing the fields of spectrochemical analysis and optical spectrometry in one or more of the following:

- Conceptualization and development of unique instrumentation that has made a significant impact on the field.
  - Development of novel and important instrumentation.
  - Elucidation of fundamental events or processes important to the field.
- Authorship of important research papers and/or books that have had an influential role in the development of the field.

### PREVIOUS AWARDEES

1987 - James D. Winefordner  
1988 - Velmer A. Fassel  
1989 - Gary M. Hieftje  
1990 - P. W. J. Boumans  
1991 - John C. Wright  
1992 - Jean Michel Mermet  
1993 - Richard Keller  
1994 - Sanford Asher



# Division of Analytical Chemistry Awards

1995 - Michael Morris  
1996 - Gary Horlick  
1997 - Paul Bohn  
1998 - David L. Allara  
1999 - D. Bruce Chase  
2000 - Joseph A. Caruso  
2001 - M. Bonner Denton  
2002 - Geri Richmond

## AWARD IN ELECTROCHEMISTRY

Advancing the field of electrochemical analysis in the following:

- Conceptualization and development of unique instrumentation that has made a significant impact on the field.
- Development of novel and important instrumentation.
- Elucidation of fundamental events or processes important to the field.
- Authorship of research papers or books that have had an influential role in the development of the field.

## PREVIOUS AWARDEES

1988 - Allen J. Bard  
1989 - Ralph N. Adams  
1990 - Royce W. Murray  
1991 - Robert A. Osteryoung  
1992 - Gary A. Rechnitz  
1993 - Keith Oldham  
1994 - Fred Anson  
1995 - Theodore Kuwana  
1996 - Janet G. Osteryoung  
1997 - Stanley Bruckenstein  
1998 - Stephen W. Feldberg  
1999 - Michael Weaver  
2000 - Richard L. McCreedy  
2001 - R. Mark Wightman  
2002 - (no award given due to lack of corporate sponsor).

## AWARD IN CHEMICAL INSTRUMENTATION

Advancing the field of instrumentation through achievement of one or more of the following:

- Conceptualization and development of unique instrumentation that has made a significant impact on the field.
- Demonstration of innovative use of instrumentation in chemical measurement.
- Stimulation of other researchers to use instrumentation in chemical measurement.

- Authorship of research papers or books that have had an influential role in the use of chemical instrumentation.

## PREVIOUS AWARDEES

1955 - R. Bowling Barnes  
1956 - Harold H. Washburn  
1957 - Ralph H. Mueller  
1958 - Maurice F. Hasler  
1959 - Howard Cary  
1960 - (No award given)  
1961 - Marcel J. E. Golay  
1962 - Howard K. Schachman  
1963 - Howard V. Malmstadt  
1964 - Robert Homer Cherry  
1965 - James N. Shoolery  
1966 - Leonard T. Skeggs  
1967 - Robert L. Bowman  
1968 - J. Raynor Churchill  
1969 - Dale J. Fisher  
1970 - Norman D. Coggeshall  
1971 - Fred W. McLafferty  
1972 - Edward B. Baker  
1973 - Jack W. Frazer  
1974 - Christie G. Enke  
1975 - Myron T. Kelley  
1976 - (No award given)  
1977 - (No award given)  
1978 - James D. Winefordner  
1979 - John P. Walters  
1980 - Donald E. Smith  
1981 - Jon Amy  
1982 - Harry L. Pardue  
1983 - Velmer A. Fassell  
1984 - R. Graham Cooks  
1985 - Gary M. Hieftje  
1986 - Fred E. Lytle  
1987 - Edward S. Yeung  
1988 - Milos Novotny  
1989 - M. Bonner Denton  
1990 - Alan G. Marshall  
1991 - Joel Harris  
1992 - James W. Jorgensen  
1993 - R. Samuel Houk  
1994 - R. Mark Wightman  
1995 - Richard Zare  
1996 - Norman J. Dovichi  
1997 - Donald Hunt  
1998 - Milton L. Lee  
1999 - Joseph Wang  
2000 - John B. Fenn  
2001 - Stanley Crouch  
2002 - Jonathan Sweedler

## J. CALVIN GIDDINGS AWARD FOR EXCELLENCE IN EDUCATION

Enhancing the personal and professional development of students in the study of analytical chemistry in one or more of the following ways:

- Authorship of an influential textbook for an analytical chemistry course.
- Design and implementation of a successful new approach to teaching analytical chemistry.
- Stimulation through teaching or research mentorship a significant number of students to become analytical chemists.
- Development and publication of innovative experiments.
- Design of improved equipment for teaching labs.
- Publication of widely quoted articles on teaching analytical chemistry.

## PREVIOUS AWARDEES

1983 - Isaac M. Kolthoff  
1984 - Howard V. Malmstadt  
1985 - Lockhart B. Rogers  
1986 - Herbert A. Laitinen  
1987 - Henry Freiser  
1988 - Gary D. Christian  
1989 - Theodore R. Williams  
1990 - Dennis G. Peters  
1991 - Richard W. Ramette  
1992 - Douglas A. Skoog  
1993 - John P. Walters  
1994 - Galen Ewing  
1995 - James Winefordner  
1996 - Stanley R. Crouch  
1997 - William R. Heineman  
1998 - Gary M. Hieftje  
1999 - Thomas J. Wenzel  
2000 - Harold M. McNair  
2001 - Howard Strobel  
2002 - James Taylor

## ARTHUR F. FINDEIS AWARD FOR ACHIEVEMENTS BY A YOUNG ANALYTICAL SCIENTIST

Purpose. To recognize and encourage outstanding contributions to the fields of analytical chemistry by a young analytical scientist.

Rules of Eligibility. The awardee must have earned his or her highest degree within ten years of January 1 of the year of the award. Both the nationality of the young analytical scientist and the

## Division of Analytical Chemistry Awards

arena (e.g., academic, industrial, national laboratory) in which the contributions of the young analytical scientist have been made are unrestricted. Presentation of the award will be made annually at the Eastern Analytical Symposium.

Evidence shall be presented for one or more of the following outstanding accomplishments:

- Conceptualization and development of unique instrumentation that has had an enabling impact upon analytical chemistry and has substantively advanced the field.

- Development of novel and important analytical methods or methodologies that have found significant beneficial applications in the chemical sciences.

- Elucidation of fundamental events or processes involved in or important to analytical chemistry.

- Authorship of books, patents, and/or research papers that have had an influential role in the development of analytical chemistry.

- Other significant contributions to the furtherance of analytical chemical sciences

### PREVIOUS AWARDEES

1996 - Jay K. Trautman  
 1997 - Jonathan Sweedler  
 1998 - Robert T. Kennedy  
 1999 - David E. Clemmer  
 2000 - Kimberly A. Prather  
 2001 - Sylvia Daunert  
 2002 - (no award given)

### AWARD FOR DISTINGUISHED SERVICE IN THE ADVANCEMENT OF ANALYTICAL CHEMISTRY

For an individual who through professional service in activities such as teaching, writing, research, and administration has enhanced the field of analytical chemistry.

Eligibility is restricted to individuals whose contributions have not been specifically recognized by another ACS of Division of Analytical Chemistry Award Nominations should present evidence for one or more of the following outstanding accomplishments:

- Enhance the positive perception of analytical chemistry in the public eye
- Foster the development of analytical

chemistry research in academic institutions, government laboratories, or in private industries.

- Develop and implement programs that benefit the analytical community. These can be but are not limited to efforts within the Division of Analytical Chemistry or within the American Chemical Society

- Advance and promote the careers of analytical chemists in any area of employment

- Play a central role in improving the way analytical chemistry is practiced

### PREVIOUS RECIPIENTS:

1998 - Henry N. Blount, III  
 1999 - Wilbur D. (Dub) Shults  
 2000 - Roland F. Hirsch  
 2001 - Willie E. May  
 2002 - Donald Bly

### Chair

J. David Pinkston (2002-2003)  
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### Eastern Analytical Symposium (EAS)

Delegate and Alternate Delegate  
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Linda B. McGown (2002 – 10/2004)  
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## Some of the faces of the Division: Officers, Committe Chairs, and Councilors



Catherine Fenselau, immediate past chair



David Pinkston, chair



M. Bonner Denton, chair-elect



John Richardson, secretary



Carolyn Ribes, treasurer



Victoria McGuffin, chair subdivision chromatography



Sally Stafford, councilor



Roland Hirsch, councilor and web editor



Charles Wilkins, councilor and program planning chair



Isiah Warner, 2002 councilor



Al Ribes, editor newsletter



Thea Kjellstrom, alternate councilor

## Looking at the Past and Thinking About the Future

Continued from page 21

Clinical chemistry and diagnostics will remain a very fertile field. Screening using DNA chips (and later probably protein and carbohydrate chips) will almost surely become routine. So will analytical chemical approaches to identification of infectious agents. As recent events have tragically indicated, rapid and reliable methods are urgently needed for anthrax, small pox, and other potential biowarfare agents. Similarly we need diagnostic tests for diseases like Alzheimer's and Mad Cow disease. There will be continued interest in implantable sensors; an implantable glucose sensor seems to be on the horizon. These can then be used either to control drug dosage or could be the basis of information transmitted automatically and continuously to a health provider.

Miniaturization of instruments and labs on chips will continue, with increasing power and lower costs. These, when interfaced with more powerful computers capable of arti-

cial intelligence applications, could produce systems like that shown in the movie "Medicine Man," in which a sample is put into the machine (a gas chromatograph-like instrument) and the output is the complete structure of the unknown. It may seem impossible to believe in such instrumental power and artificial intelligence now, but remember when Chester Gould (via Dick Tracy) introduced the wrist radio in 1946. (Another thing Tracy has always been famous for is up-to-date technology. In 1964, he traded in his two-way wrist radio, which had been given to him by inventor Diet Smith, for a two-way wrist TV; and in '86 he exchanged the TV for a two-way wrist computer.) Despite the difficulties in the field of artificial intelligence, true expert systems (perhaps produced by computers reading books and interviewing experts) will eventually become a reality.

I close by saying that, while we analytical chemists share an interesting and quite amazing history, the best is yet to come.

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## Call for Nominations: 2004 DAC Officers

Please send nominations for willing candidates for the following offices by March 15th, by e-mail or mail to Catherine Fenselau (address included elsewhere in this newsletter).

Chair Elect: This is the year that our candidates must come from industry or government.

Secretary: Underpaid but indispensable.

Councilors: We need to elect two.

Alternate councilors: usually the third running candidate in the councilors' election.

## Eastern Analytical Symposium



The Eastern Analytical Symposium is the second largest meeting in the United States dedicated to the needs of analytical chemists and those in the allied sciences. Last year's move of the EAS to Somerset, NJ, was a notable success, with a near 20% increase in attendance over the previous year. Preparations for the 2003 Symposium to be held at the Garden State Exhibit Center in Somerset on November 17 – 20 are now underway. The call for papers for has been issued, with a deadline of April 15.

Sessions on chromatography and spectrometry are planned, along with new areas such as combinatorial chemistry, organoleptics and non-invasive clinical analysis. A complete list of the session topics can be found on the EAS web site ([www.eas.org](http://www.eas.org)). The EAS publication, the Retort, will also carry information about the upcoming meeting. If you want to be put on the Retort mailing list, contact EAS at [EASinfo@aol.com](mailto:EASinfo@aol.com) or call the EAS hotline at (610) 485-4633.

New this year is the method of submitting abstracts. All contributed abstracts are to be submitted electronically on the web site. No faxed, e-mailed, or mailed preliminary abstracts will be accepted. These abstracts will be the final ones, ready to be printed in the abstract book. The presenting authors of contributed submissions will be notified in June about the status of their abstract and the session to which it is assigned.

The Division is one of the organizations which sponsor the EAS. Please help make the 2003 meeting the best ever. Be a part of the program by contributing your own papers for inclusion in either the oral or poster sessions. Mark your calendar and plan to attend.

## Officers of the Division of Analytical Chemistry

Year	Chair	Secretary & Treasurer	Year	Chair	Secretary & Treasurer
1938	Walter R. Kirner	Lawrence T. Hallett	1955	William G. Batt	Ray P. Chapman
1939	Lawrence T. Hallett	George L. Royer	1956	Jesse W. Stillman	Warren W. Brandt
1940	Clyde W. Mason	George L. Royer	1957	Ray P. Chapman	Warren W. Brandt
1941	G. E. F. Lundell	Francis W. Power	1958	John H. Yoe	Charles N. Reilley
1942	George L. Royer	Francis W. Power	1959	Warren W. Brandt	Charles N. Reilley
1943	Harvey C. Diehl	Francis W. Power	1960	Herman A. Liebhafsky	Lockhart B. Rogers
1944	E. W. D. Huffman	Chester M. Alter	1961	Charles N. Reilley	Lockhart B. Rogers
1945	Francis W. Power	Chester M. Alter	1962	John Mitchell, Jr.	Donald H. Wilkins
1946	William M. MacNevin	Robert A. Burdett	1963	Lockhart B. Rogers	Donald H. Wilkins
1947	Mary L. Willard	Robert A. Burdett	1964	Howard V. Malmstadt	John K. Taylor
1948	Philip J. Elving	Robert A. Burdett	1965	Donald H. Wilkins	John K. Taylor
1949	Wayne A. Kirklin	William G. Batt	1966	W. Donald Cooke	Charles V. Banks
1950	Grant T. Wernimont	William G. Batt	1967	John K. Taylor	Charles V. Banks
1951	Hobart H. Willard	William G. Batt	1968	Edward C. Dunlop	James C. White
1952	Beverly L. Clarke	William G. Batt	1969	Fred W. McLafferty	James C. White
1953	Herbert A. Laitinen	William B. Batt	1970	Sidney Siggia	Richard S. Juvet, Jr.
1954	G. Frederick Smith	Ray P. Chapman	1971	James C. White	Richard S. Juvet, Jr.

Year	Chairman	Secretary	Treasurer
1972	Henry Freiser	W. Wayne Meinke	Rudolph S. Bottei
1973	Richard S. Juvet, Jr.	W. Wayne Meinke	Rudolph S. Bottei
1974	George H. Morrison	Frank A. Guthrie	Rudolph S. Bottei
1975	Robert A. Osteryoung	Frank A. Guthrie	Rudolph S. Bottei
1976	James D. Winefordner	Frank A. Guthrie	Rudolph S. Bottei
1977	John W. Miller	Frank A. Guthrie	Rudolph S. Bottei
1978	David M. Hercules	Alice J. Cunningham	Peter N. Keliher
1979	Lynn L. Lewis	Alice J. Cunningham	Peter N. Keliher
1980	Frank A. Guthrie	Roland F. Hirsch	Peter N. Keliher
1981	W. D. Shults	Roland F. Hirsch	Peter N. Keliher
1982	Harry L. Pardue	Roland F. Hirsch	Peter N. Keliher
1983	Warren B. Crummett	Roland F. Hirsch	William R. Heineman
1984	Charles H. Lochmuller	Leon N. Klatt	William R. Heineman
1985	Donald D. Bly	Leon N. Klatt	William R. Heineman
1986	Gary M. Hieftje	Leon N. Klatt	William R. Heineman
1987	Mary A. Kaiser	Leon N. Klatt	Fred M. Hawkrige, Jr.
1988	Roland F. Hirsch	Kenneth L. Busch	Fred M. Hawkrige, Jr.
1989	Sam P. Perone	Kenneth L. Busch	Fred M. Hawkrige, Jr.
1990	Gary D. Christian	Kenneth L. Busch	Fred M. Hawkrige, Jr.
1991	Jeanette G. Grasselli	Kenneth L. Busch	David J. Curran
1992	Charles L. Wilkins	Sarah C. Rutan	David J. Curran
1993	Joseph L. Glajch	Sarah C. Rutan	David J. Curran
1994	Janet G. Osteryoung	Sarah C. Rutan	David J. Curran
1995	Henry N. Blount, III	Sarah C. Rutan	Michelle Buchanan
1996	Edward S. Yeung	Robert Q. Thompson	Michelle Buchanan
1997	Stephen Wise	Robert Q. Thompson	Michelle Buchanan
1998	William R. Heineman	Robert Q. Thompson	Michelle Buchanan
1999	J. Michael Ramsey	Robert Q. Thompson	Carolyn Ribes
2000	Theodore R. Williams	John N. Richardson	Carolyn Ribes
2001	Bruce R. Chase	John N. Richardson	Carolyn Ribes
2002	Catherine Fenselau	John N. Richardson	Carolyn Ribes
2003	J. David Pinkston	John N. Richardson	Carolyn Ribes

## DAC Kolthoff Undergraduate Travel Award in Analytical Chemistry

The Division of Analytical Chemistry of the American Chemical Society established the I. M. Kolthoff Enrichment Award to encourage talented chemistry undergraduate students to pursue further studies in Analytical Chemistry. The Award honors the late Professor of Analytical Chemistry at the University of Minnesota who was one of the leaders of the profession in the 20th century, author of numerous influential textbooks and a major researcher in electroanalytical chemistry. The award provides funding for undergraduate students to travel to an ACS National Meeting and to present the results of their research in the form of a poster at the Poster Session of the Division of Analytical Chemistry. Funds from the Kolthoff Award may be applied toward registration, travel, and accommodations. Only U.S. citizens and permanent residents are eligible. Preference will be given to those applicants who have not made a previous presentation at a National scientific meeting.

Students who have received a prior award under this program are not eligible. Awards up to \$750 will be made on the basis of both scientific merit and financial need.

The deadline for applications for the Spring 2004 ACS National Meeting is October 15, 2003

**Application Submission Information:** Please direct any questions to Dr. Sylvia Daunert by E-mail at [daunert@pop.uky.edu](mailto:daunert@pop.uky.edu)

1. All required information must be submitted in hard copy form to:  
Dr. Sylvia Daunert  
Department of Chemistry  
University of Kentucky  
Lexington, KY 40506-0055

2. information for applying for the I. M. Kolthoff Enrichment Award:

- A completed application form may be downloaded from <http://www.acs-analytical.duq.edu/kolthoffaward.html>.

- A copy of the ACS abstract form that you will be submitting for presenting your work.

- A brief statement outlining the reasons, both financial and scientific, for applying for this award. Please describe how this award will enhance your future career objectives and professional goals, in particular as related to Analytical Chemistry.

- An official transcript.

- A brief resume of your educational and scientific training.

- A letter of recommendation from your research advisor, in support of your application. This letter should also indicate whether any funds are available from your institution for your travel. It should be submitted in a sealed envelope along with your application and additional documentation described above.

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## DAC Pfizer Graduate Travel Awards in Analytical Chemistry

The Division of Analytical Chemistry of the American Chemical Society has established the Pfizer Graduate Travel Awards in Analytical Chemistry. The award provides funding for graduate students to travel to an ACS National Meeting and to present the results of their research in the form of a poster at the Poster Session of the Division of Analytical Chemistry. Funds from the Pfizer Award may be applied toward registration, travel, and accommodations. Only U.S. citizens and permanent residents are eligible. Preference will be given to those applicants who have not made a previous presentation at a National scientific meeting. Five Awards up to \$1000 will be made annually on

## DAC Pfizer Graduate Travel Awards in Analytical Chemistry

(continued)

the basis of both scientific merit and financial need.

The deadline for receipt of applications is March 1, 2003, for participation in the ACS National Meeting in New York in September 2003.

**Application Submission Information.** Please direct any questions to Dr. Paul Edmiston by E-mail at [pedmiston@wooster.edu](mailto:pedmiston@wooster.edu)

1. The complete application must be received by the March 1, 2003 deadline in hard copy form by:  
Dr. Paul Edmiston  
Department of Chemistry  
The College of Wooster  
Wooster, Ohio 44691

2. Required information for applying for the Pfizer Graduate Travel Awards in Analytical Chemistry

- A completed application form may be downloaded from [http://www.acs-analytical.duq.edu/Pfizer\\_Award\\_Description.html](http://www.acs-analytical.duq.edu/Pfizer_Award_Description.html).

- A copy of the ACS abstract form that you will be submitting for presenting your work.

- A brief statement outlining the reasons, both financial and scientific, for applying for this award. Please describe how this award will enhance your future career objectives and professional goals, in particular as related to Analytical Chemistry.

- An official transcript

- A brief resume of your educational and scientific training.

- A letter of recommendation from your research advisor, in support of your application. This letter should also indicate whether any funds are available from your institution for your travel. It should be submitted in a sealed envelope along with your application and additional documentation described above.

# Bylaws of the Division of Analytical Chemistry

## BYLAW I. NAME AND OBJECTS

### Section 1.

The name of this organization shall be the Division of Analytical Chemistry (hereinafter the Division) of the AMERICAN CHEMICAL SOCIETY (hereinafter the SOCIETY).

### Section 2.

The objects of the Division shall be the promotion of analytical chemistry in all of its aspects, the presentation of programs of papers on analytical chemistry and related fields at national meetings of the SOCIETY and cooperation with local sections and regional groups, the organization and sponsorship of symposia on topics of interest to analytical chemists, the development of activities which will promote the growth of analytical chemistry, and the establishment of means for increasing the professional status of and the contacts between analytical chemists.

## BYLAW II. MEMBERS AND AFFILIATES

### Section 1.

Membership in this Division is open to all members of the SOCIETY who indicate their wish to join the Division and who pay the annual dues. Application for membership shall be sent to the Secretary of the Division.

### Section 2.

A National Affiliate may apply to become a National Affiliate of this Division of the SOCIETY. Provided that Division dues for National Affiliates are paid, a National Affiliate shall have all the privileges of membership in the Division except that of voting, holding an elective position of the Division, and serving as a voting member of its Executive Committee.

### Section 3.

A person who is neither a member nor a National Affiliate of the SOCIETY but who wishes to participate in the activities of this Division may enroll as a Division Affiliate provided that the person pay such dues as established for Division Affiliates. Division Affiliates have all of

the privileges of membership except that of voting, holding an elective position, or serving as a voting member of the Executive Committee.

### Section 4.

Members of the Division shall have the privilege of voting for and holding elective position in the Division, except that ASSOCIATE MEMBERS of the SOCIETY may not serve in the positions of Councilor, Alternate Councilor, or Temporary Substitute Councilor. Both members and affiliates shall have the privileges of receiving advance copies of abstracts of papers presented before the regular Division sessions at national meetings of the SOCIETY, that of purchasing at reduced rates the bound sets of abstracts for national meetings, that of receiving reprints of certain symposia, etc., as may be distributed from time to time, and that of participating in the activities of the Division.

### Section 5.

Any member may resign membership in the Division by submitting a letter of resignation to the Secretary of the Division during the year for which the member's dues are paid.

### Section 6.

Any member or affiliate of the Division who is in arrears in payment of dues by more than three months shall be considered to have resigned and shall be stricken from the rolls. Such a person may be reinstated upon payment of current dues.

### Section 7.

(a) Members of the SOCIETY having emeritus status, who have been members of the Division for at least 10 years, shall be continued as members of the Division, if they so desire, without payment of dues.

(b) Retired members of the SOCIETY and retired affiliates of the Division, who are at least 65 years of age and have paid Division dues for a minimum of 25 years, shall be continued as members or affiliates of the Division, if they so desire, without payment of dues.

## BYLAW III. OFFICERS AND EXECUTIVE COMMITTEE

### Section 1.

(a) The officers of the Division shall be members and shall consist of a Chair, a Chair-Elect, a Secretary, and a Treasurer. The posts of Secretary and Treasurer may be held by a single individual.

(b) No person who is not a member in good standing of the Division shall serve in any elective or appointive capacity, unless in a properly designated ex officio or consulting status.

### Section 2.

(a) The duties of the officers shall be such as usually pertain to the offices they hold, and also any other duties as may be delegated or herein prescribed.

(b) The Chair-Elect shall serve as Chair of the Scientific Program Committee for the Division, and is responsible for preparation of the preliminary and final programs for meetings of the Division.

(c) The Secretary shall carry out all of the duties outlined in the Constitution and Bylaws of the SOCIETY. The Secretary is responsible for the preparation of the annual report of the Division to the Council Committee on Divisional Activities and its submission, via the Executive Director of the SOCIETY, with copies to the officers of the Division. The Secretary is also responsible for preparation and distribution of a newsletter periodically throughout the year.

(d) The Treasurer shall provide information to the Secretary for incorporation into the annual report of the Division to the Council Committee on Divisional Activities.

(e) The duties of the Councilors and Alternate Councilors shall be to represent the Division at the Council meetings of the SOCIETY; to bring before the Council such matters as the Division officers may request; to report to the Executive Committee of the Division matters which have been presented before



## Bylaws of the Division of Analytical Chemistry

the Council and are of importance to the Division; and to safeguard the interests of the Division. It shall be an obligation for Councilors and Alternate Councilors to notify the Secretary of inability to attend Council meetings, in order that the Division may be fully represented at all times.

(f) The various committees of the Division, other than the Executive Committee and Nominating Committee whose duties have been defined elsewhere, shall have authority and perform such duties as may be determined from time to time by the Chair or Executive Committee.

### Section 3.

#### Election of Officers and Councilors

The Immediate Past Chair shall appoint a Nominating Committee, consisting of at least three members of the Division, by February 1. The Immediate Past Chair shall serve as Chair of the Nominating Committee. The election shall be held by mail according to the following formula:

A. Nominations shall be made as follows:

(a) On or before March 1, the Secretary shall inform the members of the offices to be filled at the next election, and shall invite suggestions for nominees. This call for nominations normally shall be made as part of the Division's spring newsletter. A return of one percent (1%) of the members suggesting a given individual for a specific office shall be a prerequisite for nomination in this manner. Such suggestions of nominees to be valid must be signed by the member making the nomination and received by the Nominating Committee no later than April 1.

(b) Except as provided for in paragraph (c) below, there shall be on the election ballot at least two (2) and not more than three (3) candidates for each of the offices of Chair-Elect, Secretary, and/or Treasurer. In years in which Councilors and Alternate Councilors are to be elected, there shall be at least one and no more than two more candidates than the

total number of Councilor and Alternate Councilor positions to be filled.

(c) The Nominating Committee shall determine which candidates meet the requirements for mail nomination according to paragraph (a) above. If the number of such candidates is less than the maximum specified in paragraph (b) above, the Committee may nominate one or more additional candidates, as it chooses, provided only that the total number of candidates is consistent with paragraph (b) above. If the total number of candidates for any office exceeds twice the maximum number specified in paragraph (b), the Nominating Committee shall, by selecting those with the highest number of nominating votes, reduce the number of candidates proposed in the mail nomination until the total number of candidates is not more than twice the specified maximum number.

(d) The Nominating Committee, after obtaining the consent of each candidate, shall by May 1 furnish the Secretary the names of candidates for each office to appear on the election ballot.

B. Elections shall be by secret ballot as follows:

(a) The Secretary shall mail to each member of the Division by June 1 an election ballot on which the candidates for each office are listed in alphabetical order.

(b) Each voter shall indicate a choice for Chair-Elect, Secretary, and Treasurer by appropriately marking the ballot. For the positions of Councilor and Alternate Councilor, the voter shall vote for not more than twice the number of Councilor positions to be filled. The ballot is then to be mailed to the Secretary so that it will be received no later than July 10. The Secretary shall count the ballots and report the results.

(c) A plurality of the votes cast for Chair-Elect, Secretary, and Treasurer shall constitute election. The position(s) of Councilor shall be filled in the order of votes cast, the next equal number of

candidate(s) being elected as Alternate Councilor(s).

(d) In case of a tie vote in the election, the Executive Committee, by secret ballot, shall break the tie. The candidate receiving a plurality of the votes cast by the Executive Committee shall be declared elected.

(e) The Secretary of the Division shall certify to the Executive Director of the SOCIETY not later than December 1 of each year the names, addresses, and terms of the elected officials of the Division for the ensuing year. This should also include all officers of the Division so that they can be included in the appropriate documents.

### Section 4.

#### Terms of Office

(a) The Chair-Elect shall automatically succeed to the office of Chair. The Chair and Chair-Elect shall serve for one year or until their successors are qualified. The Secretary and Treasurer shall serve for two years or until their successors are qualified. The terms of the Councilors and Alternate Councilors shall be three years, except that shorter terms may be substituted if necessary to produce rotation, in accordance with the SOCIETY's Bylaws.

(b) The terms of the Chair and Chair-Elect shall begin on October 1 of the year of their election and that of the Secretary, Treasurer, Councilors, and Alternate Councilors shall begin on January 1 of the following year.

(c) In the event of a vacancy in the office of Chair, the Chair-Elect shall succeed to the position. Vacancies in the offices of Chair-Elect, Secretary, Treasurer, or Alternate Councilor shall be filled by vote of the Executive Committee. The member so elected shall serve until the next regular election for that position. If a vacancy occurs in the position of Councilor, the Alternate Councilor who received the highest number of votes in the most recent election shall become Councilor and retain that position until the vacant term expires.

# Bylaws of the Division of Analytical Chemistry

## Section 5.

### The Executive Committee

(a) The Executive Committee shall consist of the officers of the Division, the immediate two past Chairs, the Councilors and Alternate Councilors, and the Editor of ANALYTICAL CHEMISTRY. A majority of the members shall constitute a quorum of the Executive Committee for approval and the transaction of business. The Executive Committee shall meet at least twice each year. A meeting may be called at any time by the Chair or by the request of any three members of the Executive Committee.

(b) The Executive Committee shall conduct the business of the Division and direct its activities. It shall authorize all expenditures.

## BYLAW IV. COMMITTEES

The Chair shall appoint such committees as may be necessary. These committees shall be constituted with the advice and consent of the Executive Committee unless otherwise provided for in the bylaws. The term of office of members of committees shall be specified by the Chair.

## BYLAW V. DUES

### Section 1.

Members of the Division, National Affiliates of the Division and Division Affiliates shall pay dues annually, the amount to be decided by the Executive Committee.

### Section 2.

National Affiliates of the Division and Division Affiliates, except regularly matriculated students specializing in chemistry or chemical engineering, shall pay annual dues at least equal to but not more than double those of Division members. Dues for Division Affiliates shall be in accordance with the Bylaws of the SOCIETY, which set minimum dues for Division Affiliates. Annual dues for students, described above, shall be between 50% and 100% of the member dues, the amount to be decided annually by the Executive Committee. Affiliation may be terminated by failure to pay dues in advance.

## BYLAW VI. MEETINGS

### Section 1.

The Division shall meet at each national meeting of the SOCIETY, unless the Executive Committee votes otherwise, provided that the requirements for a minimum number of meetings as specified in the SOCIETY Bylaws shall be met.

### Section 2.

The annual meeting of the Division shall be held at a national meeting of the SOCIETY.

### Section 3.

Special meetings of the Division may be called by the Executive Committee, if notice is given to the membership in writing or by publication in the official organ of the SOCIETY at least six weeks in advance.

### Section 4.

Those members of the Division present at any annual or special meeting shall constitute a quorum.

### Section 5.

The most recent edition of Robert's Rules of Order, Newly Revised, shall be the parliamentary authority in all matters not covered by these bylaws or in the SOCIETY's documents.

### Section 6.

The fee for registration at any special meeting shall be decided by the Executive Committee, in accordance with the Bylaws of the SOCIETY.

## BYLAW VII. PAPERS AND PUBLICATIONS

### Section 1.

All titles, abstracts, and manuscripts of papers must be in the hands of the Chair of the Scientific Program Committee of the Division, or the Chair's designee, on or before the date stated in the preliminary program announcements appearing in various publications of the SOCIETY. Authors must submit four copies of a 200- to 250-word abstract, and may be required to submit one copy of the complete paper or one copy of a 1000-word abstract if so noted in the publications listing deadlines for submission of such titles, abstracts, and manuscripts.

## Section 2.

The Chair of the Scientific Program Committee of the Division or any other individual so designated by the Executive Committee is empowered to approve or reject papers for presentation on the programs of the Division.

## Section 3.

The official organ of the Division shall be ANALYTICAL CHEMISTRY.

## Section 4.

A symposium organized by and presented before the Division is the property of the Division. No such symposium, or a significant number of papers therefrom, may be published without the approval of the Executive Committee, or the Chair of the Scientific Program Committee as its designated representative.

## BYLAW VIII. SUBDIVISIONS

### Section 1.

To fulfill the objects of the Division, the Division may establish Subdivisions devoted to specialized fields within the broad confines of analytical chemistry. Membership in a Subdivision is restricted to Division members, National Affiliates of the Division and Division Affiliates who are in good standing in the Division.

### Section 2.

Formation or discontinuance of a Subdivision shall be at the discretion of the Executive Committee of the Division. Formation of a Subdivision may be requested by a petition from a minimum of one percent (1%) of the eligible Subdivision members. Prior to formation or discontinuance of a Subdivision, the Secretary of the Division shall give notice of the pending action to those on the Division's mailing list. The scope of activities of any Subdivision shall be defined by the Executive Committee.

### Section 3.

Upon establishment of a Subdivision, the Executive Committee shall appoint a Chair, Chair-Elect, and Secretary who will serve for approximately one year, or until the next regular Division election, whichever is longer. Thereafter, members of the Subdivision shall elect successors. Only Subdivision members who are members of the Division shall

## Bylaws of the Division of Analytical Chemistry

be eligible for office in the Subdivision. The terms of Subdivision officers shall coincide with those of their counterparts in the Division.

### Section 4.

The Chair and Secretary of each Subdivision shall be nonvoting delegates to the Executive Committee of the Division. In addition to the usual duties associated with their respective offices, the officers of the Subdivision shall also serve as a steering committee for the Subdivision.

### Section 5.

Provision for annual registration as a member of each Subdivision shall be provided by the Secretary of the Division, and the roster of those so registered shall be furnished to the Subdivision.

### Section 6.

Financial support for each Subdivision shall be authorized by the Executive Committee of the Division from Division funds and shall be paid by the Treasurer of the Division upon proper verification.

## BYLAW IX. AMENDMENTS

### Section 1.

The bylaws may be amended at any annual meeting of the Division by a three-fifths affirmative vote of members present, provided that two weeks' notice of the proposed amendment with the text thereof has been sent to members of the Division. The bylaws may be amended by mail ballot by a three-fifths affirmative vote of those voting, provided that the deadline for receipt of ballots is at least 30 days after the texts of the proposed amendment and the ballot have been mailed.

### Section 2.

All amendments to these bylaws must be approved by the Committee on Constitution and Bylaws, acting for the Council of the SOCIETY and accepted by that body as not inconsistent with the Constitution and Bylaws of the SOCIETY. They shall become effective upon Council approval unless a later date is specified.

## BYLAW X. DISSOLUTION

Upon the dissolution of the Division and the discharge of its debts and the settlement of its affairs, any assets

of the Division remaining thereafter shall be conveyed to such organization then existent as is dedicated to objects similar to those of the Division and the AMERICAN CHEMICAL SOCIETY, or to the AMERICAN CHEMICAL SOCIETY, so long as whichever organization is selected by the governing body of the Division at the time of dissolution shall be exempt under Section 501(c)(3) of the Internal Revenue Code of 1954 as amended or under such successor provision of the Code as may be in effect at the time of the Division's dissolution.

Bylaws effective July 31, 1997. Approved, as amended, by the Committee on Constitution and Bylaws, acting for the Council of the American Chemical Society.

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## Bylaws of the Subdivision of Chromatography and Separations Chemistry

Division of Analytical Chemistry  
American Chemical Society  
Current version  
Effective 25 March 2000

## BYLAW I. NAME AND OBJECTS

### Section 1.

The name of this organization shall be the SUBDIVISION OF CHROMATOGRAPHY AND SEPARATIONS CHEMISTRY (hereinafter the Subdivision), Division of Analytical Chemistry (hereinafter the Division), American Chemical Society (hereinafter the Society).

### Section 2.

The objects of the Subdivision shall be the promotion of chromatography and separations chemistry in all their aspects; the presentation of programs or papers on the above related fields at national

meetings of the Society and cooperation with local sections and regional groups; the organization and sponsorship of symposia on topics of interest to separations chemists; the development of activities to promote the growth of separations science; and the establishment of means for increasing the professional status and the contacts between scientists interested in chromatography and separations chemistry.

## BYLAW II MEMBERS AND AFFILIATES.

### Section 1.

Membership in the Subdivision is open to all members of the Division, including any National Affiliates and Division Affiliates who indicate their wish to join the Subdivision and who pay the annual dues. Application for membership shall be sent to the Secretary of the Division.

### Section 2.

Members of the Subdivision shall have the privilege of voting for and holding elective positions in the Subdivision.

### Section 3.

Members may resign their membership in the Subdivision by submitting a letter of resignation to the Secretary of the Subdivision during the year for which the member's dues are paid.

## BYLAW III OFFICERS AND EXECUTIVE COMMITTEE

### Section 1.

(a) The officers of the Subdivision shall be members and shall consist of a Chair, a Chair Elect, and a Secretary. (b) No person who is not a member in good standing of the Subdivision shall serve in any elective or appointive capacity, unless in a properly designated ex-officio or consulting status.

### Section 2.

(a) The duties of the officers shall be such as usually pertain to the offices they hold, and also any other duties as may be delegated or herein prescribed. (b) The Chair-Elect shall serve as Chair of the Scientific Program Committee for

## Bylaws of the Subdivision of Chromatography

the Subdivision, and is responsible for preparation of the preliminary and final programs for approval by the Executive Committee of the Division. (c) The Secretary shall carry out all of the duties outlined in the Constitution and Bylaws of the Society, and is responsible for the preparation of any annual report of the Subdivision. The Secretary is also responsible for preparation and distribution of a Newsletter periodically throughout the year. (d) Various committees of the Subdivision, other than the Executive Committee and Nominating Committee whose duties have been defined elsewhere, shall have authority and perform such duties as may be determined from time to time by the Chair or Executive Committee.

### Section 3.

The Chair and Secretary of the Subdivision or their designees shall be nonvoting delegates to the Executive Committee of the Division. In addition to the usual duties associated with their respective offices, the officers of the Subdivision shall also serve as a steering committee for the Subdivision.

### Section 4.

Election of Officers and Executive Committee Members. The immediate past Chair shall appoint a Nominating Committee consisting of at least three members of the Subdivision, by February 1. The immediate Past Chair shall serve as the Chair of the Nomination Committee. The election shall be held by mail according to the following formula:

A. Nominations shall be made as follows:

(a) On or before March 1 the secretary shall inform the members of the offices to be filled at the next election, and shall invite suggestions for nominees. A return of one percent (1%) of the members suggesting an individual for a specific office shall be a prerequisite for nomination in this manner. Such suggestions of nominees to be valid must be signed by the member making the nomination and received by The Nominating Committee no later than April 1.

(b) Except as provided for in paragraph (c) below, there shall be on the election ballot at least one (1) and not more than

three (3) candidates each for the offices of Chair-Elect and Secretary.

(c) The Nominating Committee shall determine which candidates meet the requirements for mail nomination according to paragraph (a) above. If the number of such candidates is less than the maximum specified in paragraph (b) above, the Committee may nominate one or more additional candidates, as it chooses, provided only if the total proposed for any office in the mail nomination equals or exceeds the maximum specified in paragraph (b), the Nominating Committee shall add no more than one additional candidate for this office. If the total number of candidates now exceeds twice the maximum number specified in paragraph (b), the Nominating Committee shall, by selecting those with the highest number of votes or by voting on tied candidates, reduce the number of candidates proposed in the mail ballot until the total number of candidates (including the Committee nominee) is not more than twice the specified maximum number. The names of these candidates shall then appear on the election ballot.

(d) The Nominating Committee, after ascertaining that each candidate is a member of the Subdivision, and after obtaining the consent of each candidate, shall by May 1 furnish the Secretary the names of candidates for each office to appear on the election ballot.

B. Elections shall be by secret ballot as follows:

(a) The Secretary shall mail to each member of the Subdivision by May 15 an election ballot on which the nominees for each office are listed in alphabetical order.

(b) Each voter shall indicate his choice for each office to be filled by appropriately marking his ballot. The ballot is then to be mailed to the designated office committee so that it will be received no later than July 10.

(c) A plurality of the voters cast shall constitute election.

(d) In case of a tie vote in the election, it shall be the prerogative of the Executive Committee to break the tie by a secret ballot election. The candidate receiving a plurality of the votes cast by the

Executive Committee shall be declared elected.

C. The Chair-Elect shall automatically succeed to the Office of Chair. If for some reason the Chair-Elect cannot succeed to Chair, the office of Chair shall be filled as provided in Bylaw III, Section 5 (c).

### Section 5.

#### Terms of Office

(a) The Chair, the Chair-Elect and the Secretary shall serve for at least two years, or until their successors are qualified.

(b) The terms of the Chair and Chair-Elect shall begin an October 1 of the year of their election and that of the Secretary shall begin on January 1 of the following year.

(c) The Executive Committee may fill a vacancy in any office. The member so elected shall serve until the next regular election.

### Section 6.

#### Executive Committee

(a) The Executive Committee shall consist of the officers of the Subdivision, the immediate two past chairs and two or more additional members sufficient to make a total committee membership of eight. The additional members shall normally be elected to 2-year terms. A majority of the members shall constitute a quorum of the Executive Committee for approval and the transaction of business. The Executive Committee shall meet at least once each year. A meeting may be called at any time by the Chairman or by the request of any three members of the Executive Committee.

(b) The Executive Committee shall conduct the business of the Subdivision and direct its activities. It shall authorize all expenditures.

## BYLAW IV COMMITTEES

### Section 1.

The Chair shall appoint such committees as may be necessary. These committees shall be constituted with the advice and consent of the Executive Committee unless otherwise provided for in the

## Bylaws of the Subdivision of Chromatography

Bylaws. The term of office of members of committees shall be specified by the Chair:

### BYLAW V. DUES

#### Section 1.

Members of the Subdivision shall pay dues annually to the Division Treasurer as determined by the Executive Committee of the Division.

### BYLAW VI. MEETINGS

#### Section 1.

The Subdivision shall meet at each national meeting of the Society, unless the Executive Committee votes otherwise.

#### Section 2.

Any meeting of the Subdivision may be held in conjunction with the annual meeting of the Division or with any other national meeting related to analytical- or separations-chemistry.

#### Section 3.

The Executive Committee may call special meetings of the Subdivision, if notice is given to the membership in writing or by the publication in the official organ of Society at least six weeks in advance.

#### Section 4.

Those members of the Subdivision present at any annual or special meeting shall constitute a quorum. The most recent edition of Roberts Rules of Order shall be the authority in matters not covered by the Society Bylaws.

#### Section 5.

The fee for registration at any special meeting shall be decided by the Executive Committee, in accordance with the Bylaws of the Division and the Society.

### BYLAW VII PAPERS AND PUBLICATIONS

#### Section 1.

All titles, abstracts and manuscripts of papers must be in the hands of the Chair of the Scientific Program Committee of the Subdivision or his or her designee, on or before the date stated in the

preliminary program announcements appearing in various publications of the Division or the Society. Authors must submit four copies of a 200- to 250-word abstract and may be required to submit one copy of a complete paper or one copy of a 1000-word abstract if so noted in the publications listing deadlines for submission of such titles, abstracts and manuscripts.

#### Section 2.

The Chair of the Scientific Program Committee of the Subdivision or any other individual so designated by the Executive Committee is empowered to approve or reject papers for presentation on the programs of the Division.

#### Section 3.

A symposium organized by and presented before the Subdivision or the Division is the property of the Subdivision. No such symposium or a significant number of papers therefrom, may be published without the approval of the Executive Committee, or the Chair of the Scientific Program Committee as its designated representative.

### BYLAW VIII AMENDMENTS AND POSSIBLE CONFLICTS WITH DIVISIONAL BYLAWS

#### Section 1.

The Bylaws may be amended at any annual meeting of the Subdivision by a three-fifths affirmative vote of the members present, provided that two weeks notice of the proposed amendment with the text thereof has been sent to members of the Subdivision. The Bylaws may be amended by mail ballot by a three-fifths affirmative vote of those voting, provided that the deadline for receipt of ballots is at least 30 days after the texts of the proposed amendment and the ballot have been mailed.

#### Section 2.

In the event that any of these Bylaws are found to conflict with those of Division, the Division Bylaws shall supersede.

Approved by the Executive Committee of the Subdivision, 13 March 2000.

Approved by the Executive Committee, ACS Division of Analytical Chemistry, 28 August 1984 & 25 March, 2000.

Bylaw III, Section 4, A(d) amended by ballot August 1987.

J G. Nikelly, Secretary

30 August 1998.

Ronald E. Majors,

25 March, 2000.



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