# AMERICAN CHEMICAL SOCIETY
## Division of Environmental Chemistry

# Preprints of Extended Abstracts

Presented at the

## 220th ACS National Meeting
## Washington, D.C.

## August 20-24, 2000
## Vol. 40 No.2



Bonus

# Preprints of Extended Abstracts

Presented
at the
220th ACS National Meeting

Washington, DC
August 20-24, 2000

Volume 40 No. 2

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Division of Environmental Chemistry, Inc.
American Chemical Society

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**Division of Environmental Chemistry**
**American Chemical Society**

The Division of Environmental Chemistry was established as a Division of the American Chemical Society in 1913, as the Division of Water, Sewage, and Sanitation Chemistry. (The name was changed in 1959). The objectives of the Division are to promote research, disseminate information and improve education and public awareness regarding the chemistry of the environment, in all of its aspects. In addition, the Division provides assistance to the American Chemical Society and its committees and divisions in matters regarding the environment.

In fulfillment of the above objectives, the Division sponsors symposia at the two annual meetings of the American Chemical Society. These symposia are organized by volunteers from the Division under the guidance of the program chair. For information on upcoming symposia at national meetings or to volunteer to organize a symposia, contact the **Program Chair:**

**Michael L. Trehy**
Solutia Inc.
P.O. Box 66760
St. Louis, MO 61366-6760
314-674-1515

Extended abstracts of papers presented in symposia sponsored by the Division of Environmental Chemistry are published twice each year by the Division. These extended abstracts generally are two to four pages in length and contain data, figures and references. The extended abstracts appear in "Preprints of Extended Abstracts...", which are sent to all members of the Division as part of their benefits of membership. Copies of this volume and previous volumes are available from the **Publication Chair:**

**Ruth A. Hathaway**
1810 Georgia St.
Cape Girardeau, MO 63701-3816
573-334-3827

Membership in the Division of Environmental Chemistry is open to all members and National Affiliates of the American Chemical Society upon request to the Secretary of the Division and payment of dues. A person who is not a member or National Affiliate but wishes to participate in the activities of the Division may become a Division Affiliate provided that person is not a chemist or chemical engineer, resides in the United States, and pays all dues. For information regarding membership in the Division or the American Chemical Society, contact the **Business Office:**

**Ruth A. Hathaway**
1810 Georgia St.
Cape Girardeau, MO 63701-3816
573-334-3827

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Copies of this volume are available for $50.00 each. Remittance payable to **ACS Division of Environmental Chemistry** must accompany your order. Send payment and order to the **Publications Chair**, at the address listed above.

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## Symposia




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## EXECUTIVE COMMITTEE

The Executive Committee is the governing body for the Division of Environmental Chemistry. The committee regularly addresses programming for future National meetings, membership dues and benefits, finances, and involvement of the Division in environmental activities of the American Chemical Society and related organizations. All members of the Division are encourage to participate in the governance of the Division.

**The Executive Committee meeting will begin at 7:00 PM on Sunday, August 20, 2000 in the Lafayette Park Room at the Grand Hyatt. All Division members are invited to attend.**

### OFFICERS

**Chair** **Martha J.M. Wells**
Water Center
Tennessee Technological University
Box 5033
Cookeville, TN 38505
931-372-6123

**Secretary** **Larry LaFleur**
NCASI
PO Box 458
Corvallis, OR 97339
541-752-8801

**Chair Elect** **Allan M. Ford**
1050 Edgewater Ln.
Gulf Breeze, FL 32561
850-934-1790

**Treasurer** **Kenneth E. Smith**
Multi-Pure Corporation
7251 Cathedral Rock Drive
Las Vegas, NV 89128
702-360-8880 ext 291

**Past Chair** **Robert W. Paddock**
Great Lakes WATER Institute
600 E. Greenfield Ave.
Milwaukee, WI 53204
414-382-1731

### Members at Large

**Charles R. Bennett**
BL Associates
224 W. Jacaranda Place
Fullerton, CA 92832
714-773-5525

**Todd Anderson**
The Institute of Environmental and Human Health
Texas Tech University
PO Box 41163
Lubbock, TX 79409-1163
806-885-4549

**Janet Hering**
Cal Tech
Mail Code 138-78
1200 E. California Blvd.
Pasadena, CA 91125
626-395-3644

**Tracy Williamson**
Office of Pollution Prevention and Toxics (7406)
US EPA
401 M Street, SW
Washington, DC 20460
202-260-3960

### Councilors

**V. Dean Adams**
Dept. of Civil Engineering/258
University of Nevada-Reno
Reno, NV 89557
775-784-1474

**Roger A. Minear**
Dept. of Civil and Environmental Engineering
University of Illinois, Urbana-Champaign
1101 W Peabody Ave
Urbana, IL 61801
217-333-2503

**Jurgen H. Exner**
2 Waverly Ct.
Alamo, CA 94507
925-743-1870

**Alan W. Elzerman**
Dept. of Environmental Engineering & Science
LG Rich Environmental Research Lab
Clemson University
Clemson, SC 29634-0919
864-656-5568

**Alternate Councilors**

| | | | |
|---|---|---|---|
| **Theodore Mill**<br>Chemlab P 273<br>Stanford Research Institute<br>Menlo Park, CA 94025<br>650-859-3605 | **Victor Turoski**<br>345 East Wisconsin Avenue<br>Neenah, WI 54956<br>920-729-9281 | **Michael L. Trehy**<br>Solutia Inc.<br>P.O. Box 66760<br>St. Louis, MO 61366-6760<br>314-674-1515 | **Robert W. Paddock**<br><br>see address above |

**COMMITTEE CHAIRS**

| | | | |
|---|---|---|---|
| **Awards** | **Glenn C. Miller**<br>Dept of Environmental & Resource Sciences, MS 199<br>University of Nevada - Reno<br>Reno, NV 89557<br>775-784-4108 | **Nominating** | **Robert W. Paddock**<br><br>see address above |
| **Editor, EnvirofACS** | **Larry H. Keith**<br>Waste Policy Institute<br>Suite 2100<br>2000 Kraft Dr.<br>Blacksburg, VA 24060<br>540-557-6095 | **Program** | **Michael L. Trehy**<br><br>see address above |
| **Editor, ES&T** | **William H. Glaze**<br>Carolina Environmental Program<br>University of North Carolina<br>Miller Hall, Campus Box #1105<br>Chapel Hill, NC 27599<br>919-966-9921 | **Publications Books** | **Victor Turoski**<br><br>see address above |
| **Division Business Office Manager** | **Ruth A. Hathaway**<br>1810 Georgia St.<br>Cape Girardeau, MO 63701<br>573-334-3827<br>573-334-2551 fax | | |
| **Division Web Site General** | http://acs-envchem.duq.edu | | |
| **Division Web Site Program** | http://gemini.tntech.edu/~mjw5030/acspage.html | | |

# Division of Environmental Chemistry
# Activities during the Washington National Meeting

## Technical Sessions:

| | |
|---|---|
| **Symposia:** | **Sunday-Thursday,** |
| **Division Poster Session:** | **Sunday** Evening, Grand Hyatt, 5:15-7:00 p.m. |
| **Division Poster Session:** | **Monday** Evening, Grand Hyatt, 5:15-7:00 p.m. |
| **Division Poster Session/Social Hour:** | **Wednesday** Evening, Grand Hyatt, 5:00-7:00 p.m. |
| **ACS Sci-Mix** | **Monday** Evening, Convention Center, 8:00 - 10:00 p.m. |

## Division Business:

| | |
|---|---|
| **Long Range Planning Committee:** The future of the Division is discussed and planned. Issues dealing with membership, finances, and programs may be discussed. All members of the Division are welcome and encouraged to participate. | **Sunday** Afternoon, Lafayette Park Room, Grand Hyatt, 2:30-5:30 p.m. |
| **Program Planning Committee:** Future symposia topics are considered and discussed. All members interested in participating in the technical session planning for the Division are encouraged to attend this meeting | **Sunday** Afternoon, Lafayette Park Room, Grand Hyatt, 2:30-5:30 p.m. |
| **Executive Committee Meeting:** Financial and program issues are addressed and decided in this meeting. All members of the Division are encouraged to attend. | **Sunday** Evening, Lafayette Park Room, Grand Hyatt, 7:00-10:00 p.m. |
| **Division Business Meeting:** This is the official meeting at which nominations and other Division actions that must be approved by the membership are presented and voted upon. | **Monday** Evening, Grand Hyatt, 5:00 - 5:30 p.m. |

## Division Social Events:

| | |
|---|---|
| **Social Hour and Dinner:** All members and their guests are invited. We select the restaurant for its quality and atmosphere. You will have the opportunity to meet with other Division members in a relaxing atmosphere. | **Tuesday** Evening,<br>BET on Jazz Restaurant<br>730 11th St., NW<br>**Social Hour:** 6:30-7:30 p.m. (COD) |
| **Tickets must be purchased by Monday, August 21.** Tickets can be purchased at the meeting registration area or at the Division Desk. | **Dinner:** 7:30 p.m.<br>$56 per person |

# Division of Environmental Chemistry

# Activities during the Washington National Meeting

| Event | Sun | Mon | Tues | Wed | Thurs |
|---|---|---|---|---|---|
| Long Range, Program Planning, and Executive Committee Meetings | | | | | |
| Division Business Meeting | | | | | |
| Division Social Hour and Dinner (BET on Jazz Restaurant) | | | | | |
| ACS Sci-Mix | | | | | |
| **Division Symposia** | | | | | |
| Division Poster Session/Social Hour | | | | | |
| General Papers | | | | | |
| Sequestration of Organic Solutes in Natural Organic Matter and Mineral Aggregates | | | | | |
| Electrochemical Methods for the Environmental Analysis of Trace Metal Biogeochemistry | | | | | |
| Scientific Uncertainty and Risk Management (Cosponsored with the ACS Committee for Environmental Improvement) | | | | | |
| Membrane Separation Processes in Aquatic Systems | | | | | |
| Chemical-Biological Interactions in Contaminant Fate (cosponsored with Division of Geochemistry) | | | | | |
| Chemical Speciation and Reactivity in Water Chemistry and Water Technology: A Symposium in Honor of James J. Morgan | | | | | |
| Environmental Chemistry Awards Symposium | | | | | |
| Environmental Chemistry: Emphasis on EPA and EPA Supported Research | | | | | |

**For changes in times or events, please stop at the Division Information Desk, which will be located in the Grand Hyatt, near the Division's Symposia.**

## DIVISION OF ENVIRONMENTAL CHEMISTRY

Listed below are upcoming symposia scheduled for the Division of Environmental Chemistry at future National ACS meetings. If you are interested in presenting a paper at a symposium or assisting in symposia organization, please contact the appropriate symposium organizer listed below or the Program Chair: Michael L. Trehy, Solutia Inc., P.O. Box 66760, St. Louis, MO 61366-6760; Phone (314) 674-1515, Fax (314) 674-5640, mltreh@soluia.com. Papers should be sent to the Environmental Division Office: Ruth A. Hathaway, 1810 Georgia St., Cape Girardeau, MO 63701-3816; Phone (573)334-3827, Fax (573)334-2551, scifair@semovm.semo.edu.

### SAN DIEGO, APRIL 1-5, 2001

The Online Abstract Submittal System (OASys) is now available for instant paper submissions at www.acs.org/meetings. If you do not have web access, please send one original hardcopy abstract form to the individual listed. Original plus 2 copies of extended abstract should be sent to respective symposium organizers. Deadlines: Electronic submittals by November 27, 2000. Hardcopy submittals must be received by November 1, 2000. All general papers will be presented in the Division's poster session. The Extended Abstract Instructions. Links to this and other important meeting information are also available on the ACS Environmental Division Program Web Page.

**General Papers.**

- M.L. Trehy (see above)

**ACS Award for Creative Advances in Environmental Science & Technology (Sponsored by Air Products & Chemicals, Inc.)**

- R.A. Hathaway (see above)

**Biogeochemistry of Environmentally Important Trace Elements.**

- Y. Cai, Department of Chemistry and Southeast Environmental Research Center, Florida International University, University Park, Miami, FL 33199; (305) 348-6210, Fax (305) 348-3772, cai@fiu.edu.

**Elegant Analytical Chemistry Applied to Environmental Problems — A Practical Symposium.**

- V. Turoski, 345 East Wisconsin Ave., Neenah, WI 54956; (920) 729-9281, vturoski@execpc.com.
- J. Plude, Department of Environmental and Analytical Chemistry, University of Wisconsin - Oshkosh Campus, 800 Algoma Blvd., Oshkosh, WI 54901; (414) 424-7098, Fax (414) 424-7317, plude@uwosh.edu.

**Environmental Trends.**

- T.L. Wade, Texas A&M University, Geochemical and Environmental Research Group, 833 Graham Road, College Station, TX 77845; (979) 862-2323 ext 134, Fax (979) 862-2361, terry@gerg.tamu.edu

**Field Analytical Chemistry: Techniques, Technologies, and Applications.**

- E. Koglin, U.S. EPA, P.O. Box 93478, Las Vegas, NV 89193-3478; (702) 798-2432, Fax (702) 798-2261, koglin.eric@epa.gov
- L.H. Keith, Waste Policy Institute, Suite 2100, 2000 Kraft Drive, Blacksburg, VA 24060-6354; (540) 557-6095, Fax (540) 557-6043, Larry_Keith@wpi.org
- W.H. Batschelet, Air Force Center for Environmental Excellence (HQ AFCCEE/ERC), 3207 North Road, Brooks AFB, TX 78235-5363; (210) 536-5658, Fax (210) 536-5989, william.batschelet@hqafcee.brooks.af.mil
- D. Crumbling, U.S. EPA, Technology Innovation Office, MS/5102G, Ariel Rios Building, 1200 Pennsylvania Ave. NW, Washington, DC 20460; (703) 603-0643, Fax (703) 603-9135, crumbling.deanna@epa.gov

**Molecular Biology Tools in Environmental Engineering Microbiology.**

- R.L. Ely, Department of Chemical Engineering, Environmental Engineering Program, Yale University, P.O. Box 208286, New Haven, CT 06520-8286; (203) 432-4386, Fax (203) 432-2881, roger.ely@yale.edu
- A.M. Spormann, Department of Civil and Environmental Engineering, Stanford University, Terman Engineering Center, M-27, Stanford, CA 94305-4020; (650) 723-3668, Fax (650) 725-3164, spormann@ce.stanford.edu
- D.A. Stahl, Department of Civil Engineering, Northwestern University, 2145 Sheridan Road, Evanston, IL 60208; (847) 491-4997, Fax (847) 491-4011, d-stahl@nwu.edu.

**Nuclear Weapons and the Chemical Sciences: Perspectives on Health, Environmental, Moral, and Policy Questions.**

- L.K. Moret, Past President, Association for Women Geoscientists, 80 Terrace Drive, Concord, CA 94518; phone/FAX (925) 609-9650, leurenmoret@yahoo.com
- A.I Toupadakis, Western States Legal Foundation, 1440 Broadway, Suite 500, Oakland, CAJ 94612; (925) 454-3357, toupadakis@home.com

## CHICAGO, IL, AUGUST 26-30, 2001

The Online Abstract Submittal System (OASys) is now available for instant paper submissions at www.acs.org/meetings. If you do not have web access, please send one original hardcopy abstract form to the individual listed. Original plus 2 copies of extended abstract should be sent to respective symposium organizers. Deadlines: Electronic submittals by April 11, 2001. Hardcopy submittals must be received by March 28, 2001. All general papers will be presented in the Division's poster session. The Extended Abstract Instructions are available on the Web. Links to this and other important meeting information are also available on the ACS Environmental Division Program Page.

**General Papers.**

- M.L. Trehy (see above)

**Environmental Chemistry Awards Symposium.**

- T. Anderson, The Institute of Environmental and Human Health, Texas Tech University, P.O. Box 41163, Lubbock, TX 79409-1163, (806)885-4549 ext. 231, Fax (806)885-4577, tanderson@ttu.edu

**Themes in Potable Water Chemistry.**

- E.T. Urbansky, U.S. Environmental Protection Agency, National Risk Management Research Laboratory, Water Supply and Water Resources Division, 26 West Martin Luther King Drive, MS-681, Cincinnati, OH 45268; (513) 569-7655, Fax (513) 569-7658, urbansky.edward@epa.gov.

# The Environmental Chemistry Division of the American Chemical Society

**Presents the Following Awards in Recognition of Excellence in the Environmental Sciences:**

- **Distinguished Service Award** (sustained and distinguished contributions to the field of environmental chemistry and to the Division)
- **Certificate of Merit** (first notable presentation)
- **Kenneth G. Hancock Memorial Scholarship in Green Chemistry** (contribution in green chemistry)
- **Graduate Student Award** (excellence in graduate studies)
- **Graduate Student Research Paper Award** (excellence in research and presentation)

## Distinguished Service Award

Members of the Division who demonstrate continued and active participation in the Division and in environmental chemistry will be considered for this award. The nominee must have been a member of the Division for at least ten years and active through presentations at and organization of symposia, effective work on Division committees, regular attendance and participation at National meetings, holding office in the Division and a general attitude and willingness to help in the Divisional work. The award is presented annually at the Fall ACS meeting.

## Certificate of Merit Award

A certificate of merit award is given for a notable first appearance before the Environmental Division. If you are planning to make your first presentation at a National American Chemical Society meeting, please notify the Program Chair at the same time you submit your ACS abstract forms and Extended Abstract.

**For further information regarding the Distinguished Service Award, the Edward Bartow Award, the Fraser Johnstone Award, or the Certificate of Merit, contact: Glenn C. Miller, Dept. of Environmental & Resource Sciences, MS 199, University of Nevada-Reno, Reno, NV 89557, (775)784-4108.**

## Kenneth G. Hancock Memorial Scholarship in Green Chemistry

To honor his contributions in the field of Green Chemistry, Dr. Hancock's colleagues from academia, government, and industry established the Kenneth G. Hancock Memorial Scholarship in Green Chemistry, offered under the auspices of the American Chemical Society's (ACS's) Division of Environmental Chemistry. The Kenneth G. Hancock Memorial Scholarship is awarded annually in conjunction with the Presidential Green Chemistry Challenge Awards Ceremony, administered by the U.S. Environmental Protection Agency (EPA) at the annual Green Chemistry and Engineering Conference sponsored by EPA, ACS, and other chemical organizations associated with industry, government, and academia. The scholarship provides national recognition for outstanding student contributions to furthering the goals of Green Chemistry (i.e., the research, development, and implementation of fundamental and innovative chemical technologies that incorporate the principles of Green Chemistry into chemical design, manufacture, and use, and that have the potential to be utilized in achieving national pollution prevention goals). The Kenneth G. Hancock Memorial Scholarship is open to all undergraduate and graduate students.

**For further information regarding the Kenneth G. Hancock Memorial Scholarship in Green Chemistry,**

**contact: Tracy Williamson, Office of Pollution Prevention and Toxics (Mail Code 7406), U.S. Environmental Protection Agency, 401 M Street, SW, Washington DC 20460, (202)260-2659.**

## Graduate Student Award in Environmental Chemistry

The Division of Environmental Chemistry sponsors up to 25 annual awards to full-time graduate students currently enrolled in a United States educational institution in chemistry, environmental engineering or other programs emphasizing environmental chemistry. These students must have completed one full year of graduate study at their current institution by the date of announcement of the awards (January or February).

The award is based upon students' records in course work, evidence of research productivity, and on statements from graduate faculty advisors. Primary emphasis will be given to the students' potential for future contributions as professionals in environmental chemistry. The application for the award is submitted by the graduate students' faculty advisors.

Graduate students who receive the award will receive a one year membership in the Division of Environmental Chemistry (which includes the Preprints of Extended Abstracts for the two National meetings and the Division newsletter, EnvirofACS) and a one year subscription to Environmental Science & Technology. Awardees will be publicized in the Preprints, ES&T and EnvirofACS.

## Graduate Student Research Paper Award

The Division of Environmental Chemistry also sponsors the Graduate Student Research Paper Award, the highest honor granted by the Division for students. Up to five awards are presented annually. All graduate students enrolled full-time in chemistry, environmental engineering or other programs emphasizing environmental chemistry are eligible.

The research paper must be relevant to environmental chemistry, the student must be the first and major author, and the work must have been done while attending the student's current institution. The paper may have been submitted to a journal at the time of submission, but it should not have already been published or presented at another meeting.

Graduate students who receive this award will present their papers at the American Chemical Society National meeting in the Fall. Each awardee will also receive a $500 cash award at the Environmental Division Dinner at the national meeting, a one year membership in the Environmental Divison, and recognition in EnvirofACS, the newsletter of the Division and in ES&T.

Application materials and announcements regarding the Graduate Student Award in Environmental Chemistry and the Graduate Student Research Paper Award are distributed in the Fall of each year. If you do not receive the announcement or have **further questions regarding eligibility or application requirements, contact: Todd A. Anderson, The Institute of Environmental and Human Health, Texas Tech University, P.O. Box 41163, Lubbock, TX 79409-1163, (806)885-4549 ext 231, Fax (806)885-4577, tanderson@ttu.edu.**

## Division of Environmental Chemistry
## Distinguished Service Award Winners

| | |
|---|---|
| 1957 | W.D. Collins |
| | A.N. Buswell |
| | Edward Bartow |
| | A.S. Behrman |
| | R.C. Bardwell |
| 1958 | F.W. Mohlman |
| | W.D. Hatfield |
| 1959 | J.R. Baylis |
| | D.K. French |
| 1960 | C.S. Howard |
| | O.M. Smith |
| 1961 | William Steriker |
| | Fred Lindsey |
| 1962 | Hovhaness Heukelekian |
| | L.D. Betz |
| 1963 | Willaim Allan Moore |
| | William L. Lamar |
| 1965 | Louis F. Warrick |
| | Clair S. Boruff |
| 1967 | S. Ken Love |
| | Richard D. Hoak |
| 1968 | John J. Maguire |
| | H. Gladys Swope |
| 1969 | Hilding B. Gustafson |
| | Henry C. Marks |
| 1970 | George Hatch |
| | A.A. Berk |
| 1971 | J. Fred Wilkes |
| | T.E. Larson |
| 1972 | Robert Ingols |
| | Calvin Calmon |
| 1973 | James P. Lodge, Jr. |
| | S. Charles Caruso |
| 1975 | Henry C. Bramer |
| | Benjamin F. Willey |
| | Louis F. Wirth, Jr. |
| | Francis L. Estes |
| 1977 | Alvin P. Black |
| | John J. Dwyer |
| | J. Carrell Morris |
| 1978 | Robert A. Baker |
| | Aaron A. Rosen |
| 1979 | Frank M. Middleton |
| | C. Ellen Gonter |
| 1984 | Nina I. McClelland |
| | Donald F. Adams |
| | John I. Tealsey |
| 1985 | Lawrence H. Keith |
| | Leslie B. Laird |
| | Roger A. Minear |
| 1986 | Robert L. Jolley |
| 1987 | Herbert E. Allen |
| 1988 | J. Donald Johnson |
| 1989 | Gordon E. Bellen |
| 1990 | Irwin H. (Mel) Suffet |
| | V. Dean Adams |
| 1992 | Richard G. Zepp |
| 1998 | Alan W. Elzerman |
| 1999 | Jurgen Exner |

## Graduate Student Award Winners for 2000

Sponsored by the Division of Environmental Chemistry

| Name | Advisor | Graduate Program |
|---|---|---|
| Joel Bandstra | Paul Tratnyek | Oregon Graduate Institute |
| Paul Hartmann | James Quinn | University of Rhode Island |
| Haojiang Zhou | Yuefeng Xie | Penn State Harrisburg |
| Katrice Lippa | A. Lynn Roberts | Johns Hopkins University |
| C. Andrew Ramsburg | Kurt Pennell | Georgia Institute of Technology |
| Sarunya Hengpraprom | Cindy Lee | Clemson University |
| Alexa Rihana | Peter Adriaens | University of Michigan |
| Jens-Uwe Kuhn | Richard Foust | Northern Arizona University |
| Ted Wu | Todd Anderson | Texas Tech University |
| Julia Rogers | Kenneth Reardon | Colorado State University |
| Mehmet Kitis | Tanju Karanfil | Clemson University |
| Julie Zimmerman | Kim Hayes | University of Michigan |
| Tie Li | James Farrell | University of Arizona |
| Jeffrey Chen | Menachem Elimelech | Yale University |
| Brian Desharnais | Barbara-Ann Lewis | Northwestern University |
| Weihong Wang | Barbara Finlayson-Pitts | UC-Irvine |
| Shaun Mendonsa | Robert Hurtubise | University of Wyoming |
| Rajat Chakraborti | Joseph DePinto | SUNY-Buffalo |
| Darryl Roberts | Donald Sparks | University of Delaware |
| Reggie Spaulding | M. Judith Charles | UC-Davis |
| Kavitha Subramaniam | Sotira Yiacoumi | Georgia Institute of Technology |

## Graduate Student Award Winners for 1999

Sponsored by the Division of Environmental Chemistry

| Name | Advisor | Graduate Program |
|---|---|---|
| Brian Mader | James Pankow | Oregon Graduate Institute |
| Eric Vrijenhoek | Menachem Elimelech | Yale University |
| David Adamson | Gene Parkin | University of Iowa |
| Heath Mash | Yu-Ping Chin | Ohio State University |
| Martin Johnson | Walter Weber | University of Michigan |
| Paul Brunciak | Steven Eisenreich | Rutgers University |
| Tammy Taylor | Kurt Pennell | Georgia Institute of Technology |
| William Arnold | A. Lynn Roberts | The Johns Hopkins University |
| Hiroshi Awata | Todd Anderson | Texas Tech University |
| Elizabeth Butler | Kim Hayes | University of Michigan |
| Tarek Ladaa | Cindy Lee | Clemson University |
| Robert Bruant | Martha Conklin | University of Arizona |
| William Mills | Peter Scheff | University of Illinois at Chicago |
| William Bedsworth | David Sedlak | UC-Berkeley |

## Graduate Student Paper Award Winners for 2000

Sponsored by the Division of Environmental Chemistry

"Abiotic Reduction of the Pesticides Oxamyl and Methomyl by Fe(II): Reaction Kinetics and Mechanism"

**Timothy J. Strathmann,** Alan T. Stone, Department of Geography and Environmental Engineering, The Johns Hopkins University

"Electrokinetic Water Splitting at Bipolar Interfaces of Ion Exchange Membranes and Soils"

**Brian Desharnais,** Barbara Lewis, Department of Civil Engineering, Northwestern University

"Intercalibration of LABS in Marine Sediment SRM1941A and Their Application as a Molecular Marker in Narragansett Bay Sediments"

**Paul Hartmann**, James Quinn, John King, S. Tsutsumi, Graduate School of Oceanography, University of Rhode Island

"Kinetic Distribution of Substrate Oxidation Potential as a Function of Geosorbent Characteristics: Implication of Contaminant Bioavailability and Kinetic Endpoints"

**Alexa N. Rihana,** Peter Adriaens, Department of Civil and Environmental Engineering, University of Michigan

"Vapor Pressures of Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Dibenzodioxins (PCDds) and Polychlorinated Dibenzofurans (PCDFs): Measurements and Evaluation of Estimation Techniques"

**Brian Mader,** James F. Pankow, Environmental Science and Engineering, Oregon Graduate Institute

## Graduate Student Paper Award Winners for 1999

Sponsored by the Division of Environmental Chemistry

"Genesis of Selectivity and Reversibility for Sorption of Synthetic Aromatic Anions onto Polymeric Sorbents"

**Ping Li,** Arup K. SenGupta, Department of Civil and Environmental Engineering, Lehigh University

"Simulated Diagenesis of Natural Sediment Organic Matter and Its Impact on Sorption/Desorption Equilibria"

**Martin D. Johnson,** Weilin Huang, Walter J. Weber, Jr., Department of Civil and Environmental Engineering, University of Michigan

"X-ray Absorption Spectroscopic Investigation of Aqueous Co(II) Sorption at Clay-Water Interfaces"

**Chia-Chen Chen**, Kim F. Hayes, Department of Civil and Environmental Engineering, University of Michigan

"Reaction Pathways Involved in the Reduction of Monochloramine by Ferrous Iron"

**Peter Vikesland**, Richard L. Valentine, Department of Civil and Environmental Engineering, The University of Iowa

"Pathways and Kinetics of Chlorinated Ethylene and Chlorinated Acetylene Reaction with Fe(0)"

**William A. Arnold**, A. Lynn Roberts, Geography and Environmental Engineering, The Johns Hopkins University

Note: **Student paper award winners are presented in bold**; faculty advisors are underlined

# Books Available From: ACS Books

### Based On Division of Environmental Chemistry Symposia

Several of the Symposia presented by the Division of Environmental Chemistry have been organized and published by ACS Books and are available for purchase. These titles include:

**Aquatic Chemistry: Interfacial and Interspecies Processes.** Chin Pao Huang, Charles R. O'Melia, and James J. Morgan, Editors, Advances in Chemistry Series 244, $131.95

**Benign by Design: Alternative Synthetic Design for Pollution Prevention.** Paul T. Anastas and Carol A. Farris, Editors, Symposium Series 577, $62.95

**Bioremediation Through Rhizosphere Technology.** Todd A. Anderson and Joel R. Coats, Editors, ACS Symposium Series 563, $62.95

**Designing Safer Chemicals: Green Chemistry for Pollution Prevention.** Stephen C. DeVito and Roger L. Garrett, Editors, Symposium Series 640, $89.95

**Electromagnetic Fields: Biological Interactions and Mechanisms.** Martin Blank, Editor, Advances in Chemistry Series 250, $129.95

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| 40(1) | 219, Spring, 2000 San Francisco | Issues in the Analysis of Environmental Endocrine Disruptors; Specialty Chemicals in the Environment; Exploring the Environmental Issues of Mobile, Recalcitrant Compounds in Gasoline; ACS Award for Creative Advances in Environmental Science and Technology: Honoring Dr. R.K.M. Jayanty (Sponsored by *Air Products and Chemicals, Inc*.); Computational Methods in Environmental Chemistry; Environmental Chemistry of the Atmosphere: 2000 and Beyond; Environmental Chemistry of Water: 2000 and Beyond; General Papers | 25.00 print |
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| 39(1) | 217, Spring, 1999 Anaheim | Persistent, Bioaccumulative, Toxic Chemicals; Natural Organic Matter and Disinfection By-Products: Characterization and Control in Drinking Water; Interfacial and Colloidal Phenomena in Aquatic Environments; ACS Award for Creative Advances in Environmental Science & Technology: Honoring James F. Pankow - Gas/Particle Partitioning: The State of Science (Sponsored by *Air Products and Chemicals, Inc*.); ACS Award for Creative Advances in Environmental Science & Technology: Honoring Terry F. Bidleman (Sponsored by *Air Products and Chemicals, Inc*.); Green Chemistry in Academia, Industry, and Government; Green Chemistry Education; Recent Advances in Environmental Chemical Sensors and Biosensors; General Papers | 25.00 print<br>15.00 CD |
| 38(2) | 216, Fall, 1998 Boston | Humic Substance-Mediated Environmental Reactions; Environmental Impact of Fossil Fuel Utilization; Risk Assessments of Radioactive/Chemical Contamination; Intentional Environmental Tracers; Environmental Chemistry Awards; Advances in the Analysis of Environmental Endocrine Disruptors; Research and Education Challenges in Environmental Chemistry; General Papers | 20.00 |

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| 37(2) | 214, Fall, 1997 Las Vegas | Isolation, Fractionation, Characterization, and Reactivity of Environmental Colloids; Soil Contaminant Remediation Issues; Mechanisms and Effects of Resistant Sorption Processes of Organic Compounds in Natural Particles; Student Awards Symposium; Environmental Programs in Nevada; General Papers | 20.00 |
| 37(1) | 213, Spring, 1997 San Francisco | Redox Reactions in Natural and Engineered Aqueous Systems; Global Climate Change: Uncertainties and Research Needs; Environmental Application of Biosensors; Green Chemistry/Environmentally Sustainable Manufacture as a Competitive Advantage; Field Testing of Innovative Subsurface Remediation Technologies; ACS Award for Creative Advances in Environmental Science and Technology in Honor of Charles E. Kolb: Atmospheric Chemistry as a Science and a Service; Degradation of Chemicals with Significant Environmental Impact; Environmental Fate and Effects of Gasoline Oxygenates; General Papers | 20.00 |
| 36(2) | 212, Fall, 1996 Orlando | Application of Molecular Markers to Environmental Geochemistry; Fundamentals of Membrane Separation Processes in Aquatic Systems; Environmental Chemistry Resources on the Internet; Student Awards Symposium; General Papers | 20.00 |
| 36(1) | 211, Spring, 1996 New Orleans | Development and Applications of Immunoassays for Environmental Analysis; Environmental Restoration of Bays and Estuaries; ACS Award for Creative Advances in Environmental Science and Technology: Honoring Donald H. Stedman; Petroleum Contamination in the Environment: Assessment and Remediation; General Papers | 20.00 |
| 35(2) | 210, Fall, 1995 Chicago | Molecular Modeling and Environmental Computational Chemistry; Spectroscopy of Atmospheric Aerosols; Chlorine and Chlorine Compounds in the Paper Industry; Aqueous Oxidants and Photooxidants: Mechanisms and Process Kinetics (A Symposium in Honor of Jurg Hoigne); Mechanistic Environmental Photochemistry; Student Awards; Disinfection By-Products and NOM Precursors: Chemistry, Characterization, Control; General Papers | 12.00 |
| 35(1) | 209, Spring, 1995 Anaheim | Cloud and Aerosol Atmospheric Chemistry; Chemistry of Herbicide Metabolites in Surface and Ground Water; Urban Atmospheric Chemistry; Influence of Coupled Chemical-Biological Processes on Transport and Remediation of Contaminant in the Subsurface; Colloidal and Interfacial Phenomena in Aquatic Environments; Contaminant Remediation with Zero-Valent Metals; General Papers | 12.00 |
| 34(2) | 208, Fall, 1994 Washington, DC | Design for Environment: The Environmental Paradigm for the Twenty-first Century *(A Memorial to Kenneth G. Hancock);* Implementations of Current Environmental Regulations on Petroleum and Fuel Industries: Technology and Policy Issues; The Environmental Fate of Pharmaceuticals and Other Complex Organic Molecules; Groundwater Contamination and Control: The State of the Art; Municipal Solid Waste: Problems and Solutions; Student Awards Symposium; Advances in Replacements for Ozone Depeleting Compounds; Environmental Risk Decision Making: Values, Perceptions and Ethics; General Papers | 12.00 |
| 34(1) | 207, Spring, 1994 San Diego | Scientific and Regulatory Issues Associated with Sediment Contamination; Earth in the Balance: Global Environment, Energy, Technology Transfer and Policy Issues for Industrial and Developing Nations; Remediation of Hazardous Waste Sites; Human Health Perspectives on Exposure to Chemicals at Hazardous Waste Sites; Physical-Chemical Processes Controlling Contaminant Mobility in Aquatic Environments; Solving Problems in Environmental Chemistry using Stable Isotope Labeled Compounds; ACS Award for Creative Advances in Environmental Science and Technology; Honoring Steven J. Eisenreich; Surfactant-Enhanced Remediation of Subsurface Contamination: Emerginging Technologies; Atmospheric Chemistry of Biogenic Hydrocarbons; Environmental Successes in the Chemical Industry; General Papers | 12.00 |

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| 33(2) | 206, Fall, 1993 Chicago | Advances in Environmental Analytical Chemistry; Disinfection By-Products in Water Treatment: The Chemistry of Their Formation and Control; Environmental Successes in the Chemical Industry; Student Awards Symposium; Redefining the MDL; Policy and Technical Implications; Alternate Synthetic Design for Pollution Prevention; General Papers | 12.00 |
| 33(1) | 205, Spring, 1993 Denver | NMR Spectroscopy in Environmental Science and Technology; Electromagnetic Fields and Environmental Health Effects; 1993 ACS Award for Creative Advances in Environmental Science and Technology: Recent Advances in Atmospheric Chemistry; Alternative Fuels and the Environment; Applications of Supercritical Fluid Extraction; Continuous Flow Liquid-Liquid Extraction and Other Methods for Isolating Trace Organic Pollutants in Water; Environmental Successes in the Chemical Industry; General Papers | 12.00 |
| 32(2) | 204, Fall, 1992 Washington, D.C. | Molecular Biological Tools in Environmental Chemistry, Biology and Engineering; Lead Poisoning in Children: Exposure, Abatement and Program Issues; Environmental Success in the Chemical Industry; Assessing the State of the Environment; Student Awards; Environmental Chemistry of Dyes; General Papers | 10.00 |
| 32(1) | 203, Spring, 1992 San Francisco | Environmental Aspects of Surface and Aquatic Photochemistry; Solid Phase Extraction in Environmental and Clinical Chemistry; Oxidation-Reduction Transformations of Inorganic and Organic Species in the Environment; Environmental Successes in the Chemical Industry; Receptor Models for Airborne Particles: In Honor of G.E. Gordon, Recipient of the 1992 ACS Award for Creative Advances in Environmental Chemistry; Aquatic Chemistry (Honoring W. Stumm); Environmental Epidemiology: Detecting and Quantifying Effects of Environmental Chemicals on Human Health; Environmental Chemistry of Sustainable Agriculture; Environmental Chemistry and Toxicity of Surfactants; General Papers | 10.00 |
| 31(2) | 202, Fall, 1991 New York | Chemistry and Microstructure of Solidified Waste Forms; Soil Gas Analysis-Environmental Containments; The Quantitative Ranking of Environmental Problems According to Risk-What Must We Yet Know to Accomplish This Task?; EPA's Hazard Ranking System and Decision Methodology-What is the Basis of EPA's Listing of Sites for Superfund?; Remedial Action Plan-Program for the Great Lakes; Special Topics and General Papers | 10.00 |
| 31(1) | 201, Spring, 1991 Atlanta | Acid Rain Mitigation-Liming Technologies and Environmental Considerations; Biotechnology for Wastewater Treatment; Environmental Chemistry of Lakes and Reservoirs; Organics in the Environment; Pollution Prevention and Process Analytical Chemistry; Shallow Aquifer Chemistry; Wetland Chemistry; Southern Oxidants Study; General Papers | 10.00 |
| 30(2) | 200, Fall, 1990 Washington, D.C. | Energy and the Environment; Efffective and Safe Waste Management: Interfacing Sciences and Engineering with Monitoring and Risk Analysis; Integrated Pest Management: Environmentally Sound Agriculture for the 90's; Disinfection By-Products; Impact of Future Legislation on Disposal of Municipal Wastewater Sludges; Measurement of Airborne Compounds: Sampling, Analysis, and Data Interpretation; General Papers | 10.00 |
| 30(1) | 199, Spring, 1990 Boston | Luminescence Applications in Geochemistry and Hydrology; Chemical Kinetics and the Environment; Environmental Chemistry of Small Watersheds; Organic Substances and Sediments in Water (Pedagogical Symposium; Humic and Other Natural Substances; Aquatic Particle-Organic Chemical Interactions: Characterization and Contaminant Geochemistry; Fate and Transport; Interfacial and Organic-Inorganic Processes; Analytical; Soils and Sediments-Sorption Interaction with Soils, Sediments, and Dissolved Organic Matter; Soils and Sediment-Biodegradation of Organic Contaminants in Soils and Sediments; Biological Processes; Biotransformation, Bioavailability, Bioaccumulation and Bioturbation); General Papers and Poster Session | 10.00 |
| 29(2) | 1988, Fall, 1989 Miami | Environmental Partitioning of Complex Mixtures; Acid Aerosols in the Environment; Environmental Chemistry of Art Conservation; Global Environmental Chemistry-Challenges and Initiatives; Emerging Technologies in Hazardous and Nuclear Waste Management; Chemical and Biochemical Detoxification of Hazardous Waste; Field Analytical Methods for Superfund Sites | 10.00 |

# SYMPOSIA, SPECIAL TOPICS AND ORGANIZERS

## GENERAL PAPERS

**MICHAEL L. TREHY** is a senior research specialist at Solutia, Inc. He has been actively involved in environmental issues related to waste water, chlorination by-products in drinking water, methods development for analyzing for trace components in the environment and the fate of surfactants such as linear alkylbenzene sulfonate in the environment. He obtained his B.S. in chemistry from Eckerd College, his M.S. in chemistry from Florida Atlantic University and his Ph.D. In chemistry at the University of Florida. Dr. Trehy is the program chair and an alternate councilor for the Division of Environmental Chemistry.

## SEQUESTRATION OF ORGANIC SOLUTES IN NATURAL ORGANIC MATTER AND MINERAL AGGREGATES

Sequestration refers to processes by which the environmental reactivity of a contaminant is reduced by virtue of its transfer to another phase or complexation with other materials. The extent and rate of sequestration may be controlled by equilibrium sorption, rate-limited sorption, and/or mass transfer limitations. The objectives of this symposium are to elucidate the equilibrium and nonequilibrium mechanisms controlling the sequestration of organic solutes in natural organic matter and mineral aggregates and the effects of sequestration on larger-scale systems. A better understanding of these areas is critical to the development of models which can predict the fate of organic chemicals in surface and subsurface environments. Topics of interest include: experimental and modeling studies on sequestration mechanisms and effects, aggregate characterization using model and natural solids, solid-water interface studies, and experimental methods.

**CHARLES J. WERTH** is an Assistant Professor of Environmental Engineering and Science at the University of Illinois in Urbana-Champaign. He performed his Ph.D. and post-doctoral research at Stanford University, where he studied the sorption of organic chemicals on soils and sediments. At the University of Illinois Dr. Werth is continuing to work on sorption, in addition to research in the areas of pore-scale characterization of DNAPL entrapment and interphase mass transfer and bioavailability. He is a recipient of the NSF CAREER Award; and his work has been published in several journals including *Environmental Science and Technology* and *Water Resources Research*.

**EUGENE J. LE BOEUF** is an Assistant Professor in the Department of Civil and Environmental Engineering at Vanderbilt University, where he teaches courses in environmental and water resources engineering. He received his BS in Civil Engineering from Rose-Hulman Institute of Technology in 1985, MS in Industrial Engineering and Management Science from Northwestern University in 1986, MS in Civil Engineering from Stanford University in 1993, and PhD in Environmental Engineering from The University of Michigan in 1998. He served 7 years on active duty with the U.S. Army prior to his return to graduate studies at Stanford in 1992. Dr. LeBoeuf's research interests concern physicochemical processes affecting the fate and transport of contaminants in natural and engineered systems, natural organic matter characterization, contaminated sediment management, engineering management, and environmental security. His work has been published in *Environmental Science and Technology, Journal of Environmental Toxicology and Chemistry, Colloids and Surfaces A: Physicochemical and Engineering Aspects*, and *Water Science and Technology*. He is the recipient of a NSF CAREER Award, and the Environmental Chemistry Division's Outstanding Graduate Student Award.

## ELECTROCHEMICAL METHODS FOR THE ENVIRONMENTAL ANALYSIS OF TRACE METAL BIOGEOCHEMISTRY

Studies have increasingly shown the importance of determining the speciation of trace metals analytically to understand their behavior in gorundwaters, sediments, lakes, rivers, estuaries, and oceans. Recent advance in electrochemical techniques have been used by scientists to directly measure specific trace metals, ligand concentrations, complexation constants, and redox species in natural systems. Using these techniques a more accurate picture of trace metal cycling and bioavailability has emerged. The goal of this symposium is to provide a platform where recent electrochemical techniques can be described, compared,a nd evaluated as to their usefulness in expanding our knowledge of trace metal biogeochemistry.

**TIM F. ROZAN** is a NSF post-doctoral fellow at the College of Marine Studies, University of Delaware. He received his B.A. in earth and planetary sciences from Johns Hopkins University, He then spent six years as a nuclear submarine officer in the U.S. Navy before receiving his Ph.D. from Yale University. His research focuses on trace metal cycling in fresh waters. Currently, he is working with Dr. George Luther researching the effects of sulfides on trace metal speciation in natural waters.

**MARTIAL TAILLEFERT** is a new Assistant Professor of Geochemistry in the School of Earth and Atmospheric Sciences at the Georgia Institute of Technology. Until recently, he was a postdoctoral fellow in the College of Marine Studies at the University of Delaware. He completed his Ph.D. in the Department of Civil Engineering at Northwestern University, and obtained a M.S. in Analytical Chemistry at the University of Geneva (Switzerland). His research interests include the chemical speciation of trace metals and redox species in freshwater and marine environments using analytical and

mathematical techniques. His main goal is to characterize the dynamics of geochemical processes in aquatic systems to predict the temporal and spatial distribution of chemical species at oxic-anoxic interfaces. His current interests involve the application of electrochemical techniques in situ to determine the distribution of chemical species with high spatial resolution in sedimentary systems.

## SCIENTIFIC UNCERTAINTY AND RISK MANAGEMENT
## (Cosponsored with the ACS Committee for Environmental Improvement)

This symposium intends to explore methods for risk management of potential environmental threats in the face of scientific information subject to scientific debate. It will emphasize the impact of science on risk management which is designed to incorporate technical, societal, legal, and economic uncertainties in choosing action or inaction. Science can be the basis for recognizing potential environmental threats, can define ways of testing potential benefits, and can define whether a course of action meets risk management goals. The symposium will explore important environmental issues, their scientific foundations and the controversy surrounding them.

**JURGEN H. EXNER** is a principal and president of JHE Technology Systems, Inc., a consulting company specializing in waste management, technology commercialization and application, and legal support services. Dr. Exner has 23 years of experience in hazardous waste management, seven of which were as an executive for waste management companies, and an additional seven years in the chemical industry. He has experience in assessing environmental information and developing effective solutions based on regulatory, economic, technical, social, and legal considerations. He has expertise in waste treatment and management, site investigation and feasibility studies, remediation, and in the application of thermal, chemical, physical, and biological treatment methods to solve environmental problems. He has evaluated and commercialized technology by combining market and regulatory knowledge with process development skills. He has carried out laboratory treatability, pilot plant and field demonstrations through startup of operations. He obtained a Ph.D. in physical organic chemistry from the University of Washington and a B.S. from the university of Minnesota.

**MICHAEL L. TREHY**

(see above)

## MEMBRANE SEPARATION PROCESSES IN AQUATIC SYSTEMS

Increasingly stringent regulations have stimulated interest in the use of membrane separation processes. Membranes are being used in diverse applications, including desalination of seawater and brackish waters, removal of dissolved species from natural and waste waters, removal of natural organic matter from drinking water supplies, and solid-liquid separation. Our symposium will focus on basic research on the use of pressure-driven membrane processes in environmental separations. These processes include microfiltration (MF), ultrafiltration (UF), nanofiltration (NF), and reverse osmosis (RO). Possible topics are: chemical and physical characterization of membranes, process sustainability, colloidal fouling, natural organic matter fouling, precipitate fouling, biological fouling, characterization of fouled membranes, concentration polarization phenomena, transport of inorganic and organic solutes through membranes, membrane selectivity, membrane-chemical interactions, membrane integrity, and rejection of dissolved, macromolecular, colloidal, particulate, and microbial contaminants.

The symposium is divided into two topics. The first deals with various aspects of membrane fouling by colloidal particles and natural organic matter. The second part of the symposium focuses on physical and chemical aspects of membrane characterization and the impact of membrane and solute properties on membrane performance.

**MENACHEM ELIMELECH** is the Llewellyn West Jones Professor of Environmental Engineering at Yale University and Director of the newly established Environmental Engineering Program. Prior to coming to Yale, Professor Elimelech was a Professor and Vice Chair in the Department of Civil and Environmental Engineering at UCLA. Professor Elimelech received his Ph.D. from Johns Hopkins University in 1989 in Environmental Engineering. In Fall 1996, he was a Visiting Associate at the California Institute of Technology (Environmental Engineering Science) and later (Spring and Summer 1997) a Guest Professor at the Swiss Federal Institute of Technology (ETH), Institute of Terrestrial Ecology. His main research interests center on problems involving physicochemical and colloidal processes in aquatic systems. Professor Elimelech is the principal author of the 1995 book "*Particle Deposition and Aggregation*". Professor Elimelech was a recipient of the W.M. Keck Foundation, Engineering Teaching Excellence Award in 1994, and the American Society of Civil Engineers, Walter L. Huber Civil Engineering Research Prize in 1996.

**GARY L. AMY** received his Ph.D. in Civil/Environmental Engineering from the University of California at Berkeley in 1978. From 1978 through 1990, he was a faculty member in the Environmental Engineering Program within the Department of Civil Engineering at the University of Arizona. He is presently a Professor of Environmental Engineering within the

Department of Civil, Environmental, and Architectural Engineering at the University of Colorado, Boulder. At Arizona and now at Colorado, he has been involved in research pertaining to potable water treatment, aquatic chemistry, and hazardous waste treatment, and in teaching graduate and undergraduate courses in Environmental Engineering. His water treatment research has focused on (i) characterization of natural organic matter (NOM) and implications thereof for treatment process selection, (ii) removal of NOM by ozone oxidation, chemical coagulation, activated carbon adsorption, and membranes processes, and (iii) evaluation of disinfection (chlorination and ozonation) byproduct (DBP) formation and control, with a recent emphasis on brominated ozonation by-products. His aquatic chemistry research has largely been in the area of subsurface contaminant transport, with a focus on humic facilitated transport of trace metals and polynuclear aromatic hydrocarbons (PAHs) in groundwater, and the fate of organochlorine compounds during wastewater effluent recharge through the soil mantle. His industrial/hazardous waste treatment research has focused on characterization and removal of organochlorine compounds in Kraft Mill wastewaters, and removal of volatile organic chemicals by air stripping and carbon adsorption. He has directed the research of 25 Ph.D. and almost 50 M.S. students. He has been the recipient of research grants from NSF, USEPA, USGS, USDOE, AWWARF, as well as various water and wastewater utilities. He is an active member of the American Water Works Association, the American Chemical Society, and the Association of Environmental Engineering Professors. Dr. Amy has served as an Environmental Consultant to various engineering firms and water utilities on various water quality issues. He is the author of almost 100 technical articles/papers.

**MARK CLARK** is an Associate Professor of Environmental Engineering at the university of Illinois at Urbana-Champaign. He received his Ph.D. from the Johns Hopkins University (1985), and has done a post-doc in France at the Ecole Nationale Superieure des Industries Chimiques. His research focuses in two main areas, membrane science and coagulation/ flocculation. The membrane work includes studies of the surface properties of polymeric membranes, and uses techniques like streaming potential, atomic force microscopy, and direct adsorption measurements. Recent research has also developed models of colloidal transport in membrane systems and the adsorption of natural organic matter on membrane surfaces. Coagulation/flocculation work has focused on a reexamination of the equations for small scale relative particle motion in fluids, and numerical solution of the general dynamic equation, which includes terms for particle breakup. Dr. Clark is a 1990 winner of the NSF Presidential Young Investigator Award.

## CHEMICAL-BIOLOGICAL INTERACTIONS IN CONTAMINANT FATE
## (Cosponsored with the Division of Geochemistry)

The fate of contaminants in geological environments is determined by complex interactions between chemical and biological processes. A full understanding of these interactions requires a genuinely interdisciplinary perspective, which makes research in this area a continuing challenge. This symposium will address recent progress on topics that are joined by this theme, such as (i) mobilization and immobilization of metals by dissimilatory reduction, (ii) mediation of redox reactions by natural organic matter, (iii) coupled/competing abiotic-biotic dechlorination processes, and (iv) fate and effects of extracellular enzymes, cofactors, and chelators. This symposium is partially funded with an ACS PRF grant.

**PAUL G. TRATNYEK** is currently Associate Professor in the Department of Environmental Science and Engineering at the Oregon Graduate Institute (OGI). He received a B.A. in Chemistry from Williams College in 1980 and a Ph.D. in Applied Chemistry from the Colorado School of Mines in 1987. Then he served as a National Research Council Postdoctoral Fellow at the U.S. Environmental Protection Agency Laboratory in Athens, GA, during 1988 and as a Research Associate at the Swiss Federal Institute for Water Resources and Water Pollution Control (EAWAG) from 1989 to 1991. His research concerns the pathways, kinetics, mechanisms, and other fundamental, molecular aspects of the reactivity of organic substances in the biogeochemical environment. He co-organized the first symposium on contaminant remediation with zero-valent metals (ACS, Anaheim, CA, April 1995) and the first major symposium on the environmental fate of fuel oxygenates such as MTBE (ACS, San Francisco, CA, April 1997). (http://www.ese.ogi.edu/tratnyek)

**PETER ADRIAENS** is Associate Professor in the Environmental and Water Resources Engineering (EWRE) Department at The University of Michigan. His research concerns laboratory and field investigations of natural and enhanced biotransformation processes, and the quantification of their potential role in natural attenuation scenarios. At the Institute for Environmental Sciences, Engineering and Technology (IESET), his interests emphasize the analysis and prioritization of science and technology applications for environmental sustainability in developing countries within the context of sociological and economic parameters. Dr. Adriaens received his B.S. and M.S. in Agricultural Engineering at the State University of Gent (Belgium), and his Ph.D. in Soil and Environmental Sciences at the University of California-Riverside.
(http://www.engin.umich.edu/dept/cee/research/adriaens/)

**ERIC RODEN** is an Associate Professor of Biological Sciences at the University of Alabama, Tuscaloosa, AL. He received a B.S. in Biology from Lebanon Valley College in 1983, and a Ph.D. In Marine-Estuarine-Environmental Science from the University of Maryland in 1990. Dr. Roden's areas of research interest include biogeochemical cycling in aquatic environments, with emphasis on rates of and controls on microbial metabolism in anaerobic soils and sediments; the physiology and ecology of anaerobic respiratory bacteria; and bioremediation of metal contaminants in anaerobic soils and sediments.

Recent research is focused on microbial Fe(III) oxide reduction and associated biogeochemical processes in freshwater wetland soils, shallow aquifer sediments, and experimental (laboratory) reactor systems.
(http://www.as.ua.edu/biology/faculty/faculty/er.html)

## CHEMICAL SPECIATION AND REACTIVITY IN WATER CHEMISTRY AND WATER TECHNOLOGY: A SYMPOSIUM IN HONOR OF JAMES J. MORGAN

Major advances have been made in the understanding of the behavior of chemicals in natural and engineered aquatic systems because of the recognition of the importance of chemical speciation. The mobility of chemical species in surface- and groundwater, the effects of chemicals on the biota, and the efficiency of contaminant removal in treatment processes are all governed by chemical speciation. The fields of water chemistry and water technology have greatly benefited from the work of Jim Morgan, founding editor of *Environmental Science and Technology*, and his many scientific associates. This symposium will address current research and prospects for future advances in topic areas including: redox processes, surface chemistry, aggregation processes, interaction between the biota and the chemical environment, mobility of chemicals in surface and groundwater, and contaminant removal in water treatment. This symposium has received funding from Montgomery-Watson, The Association of Environmental Engineering Science Professors (AESP), California Air Resources Board, and John Wiley and Sons, Inc.

**JANET HERING** is an Associate Professor of Environmental Engineering Science at the California Institute of Technology. She received her A.M. in Chemistry from Harvard University in 1981 and her Ph.D. in Oceanography from the Massachusetts Institute of Technology -- Woods Hole Oceanographic Institution Joint Program in Oceanography in 1988. She was a post-doctoral researcher at the Swiss Federal Institute for Environmental Science and Technology (EAWAG) from 1988 to 1991. She was a faculty member in the Department of Civil and Environmental Engineering at the University of California, Los Angeles as an Assistant Professor from 1991 to 1995 and Associate Professor from 1995 to 1996. She serves as a reviewer and member of the Advisory Board for the ACS journal *Environmental Science and Technology*. She was a recipient of a National Science Foundation Young Investigator Award in 1992 and the Presidential Faculty Fellows Award in 1995. Her research interests concern the environmental chemistry of trace metals.

**JERRY SCHNOOR** is the F. Wendell Miller Distinguished Professor of Civil and Environmental Engineering at the University of Iowa. Schnoor's research and writings cover a wide range of environmental issues including: toxic chemical fate and transport, water quality modeling, phytoremediation, and biogeochemistry of global change. His mathematical model for acid precipitation risk assessments was one of only three applied to lakes in the eastern U.S. as a part of the National Acid Precipitation Assessment Program. Together with several students, Jerry Schnoor has pioneered the use of phytoremediation for cleaning hazardous waste sites. His book, Environmental Modeling, (John Wiley and Sons, 1996) has been adopted as a text by more than 50 graduate programs throughout the U.S, Europe, Asia, and South America. Professor Schnoor was elected to the National Academy of Engineering in 1999.

## ENVIRONMENTAL CHEMISTRY AWARDS

The Division of Environmental Chemistry sponsors research paper awards for graduate students. These awards are competitive and judged on the basis of research and writing quality. Only five awards are granted each year. These awards represent the highest honor granted by the Division of Environmental Chemistry for students. This special symposium, held each year at the Fall ACS meeting, honors those students and provides an opportunity for them to present their research.

**TODD A. ANDERSON** is an Assistant Professor in the Institute of Environmental and Human Health at Texas Tech University. His teaching and research focuses on the movement of organic chemical contaminants in the environment in order to evaluate and better characterize exposure. He received M.S. and Ph.D. degrees in Environmental Toxicology from the University of Tennessee, Knoxville and was a Postdoctoral Associate and Research Affiliate Professor at Iowa State University from 1992-1996. In 1996, Dr. Anderson received the SETAC/Roy F. Weston Environmental Chemistry Award. In ACS, Dr. Anderson is a member of the Environmental Chemistry and Agrochemicals Divisions.

## ENVIRONMENTAL CHEMISTRY: EMPHASIS ON EPA AND EPA SUPPORTED RESEARCH

This symposium will showcase environmental research performed or sponsored by the U.S. Environmental Protection Agency. In addition to research in various Agency laboratories around the U.S., EPA sponsors research through competitive grants with its STAR (Science to Achieve Results) program. Moreover, environmental research is being led by EPA program offices (e.g., Offices of Pollution Prevention and Toxics; Water; Air; and Solid Waste), and EPA regional offices in support of their missions.

**ROBERT L. LIPNICK** is a senior chemist in the Office of Pollution Prevention and Toxics of the U.S. Environmental

Protection Agency in Washington, DC. Dr. Lipnick received a BS in chemistry with honors at the University of Maryland (College Park), and a Ph.D. in chemistry from Brandeis University. He came to EPA in 1979 after serving as a postdoctoral fellow in chemistry at the University of Minnesota and a research associate at the Sloan-Kettering Institute for Cancer Research, where he carried out syntheses and NMR dynamic conformational equilibrium studies of nucleoside analogues and stable isotope-enriched compounds. At EPA, Dr. Lipnick has developed and applied quantitative structure-activity relationships (QSAR) for assessing potential aquatic toxicity hazards posed by industrial chemicals for which few or no test data are available. He was selected for the Commerce Department's Science and Technology (ComSci) fellowship program for 1994-1995. As a ComSci Fellow, he served as a staff member of the Bureau of Oceans, Environment and International Scientific Affairs at the U.S. Department of State, and participated in the development of national and international policy fora, including a White House Conference on Environmental Technology. Dr. Lipnick was a co-organizer of a 3 ½-day Environmental Chemistry Division symposium "Persistent, Bioaccumulative, Toxic Chemicals," at the spring 1999 national meeting in Anaheim, CA and is co-editor of two forthcoming ACS Symposium volumes derived from this meeting. He is currently serving as a US delegate to the CEC's North American Working Group for the Safe Management of Chemicals, and the OECD's Expert Group on Aquatic Environmental Hazards.

**BARBARA KARN**

(not available at press time)

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**Presented before the**
**DIVISION OF ENVIRONMENTAL CHEMISTRY**
**American Chemical Society**
**220th National Meeting**
**Washington, D.C.**

**August 20-24, 2000**

## GENERAL PAPERS

### Session I: Environmental Analysis: Trends and New Analytical Techniques

**M.L. Trehy, Presiding**



### Session II: Remediation and Fate of Metals in the Environment

**M.L. Trehy, Presiding**

**Session III: Remediation and Fate of Organics in the Environment**

**M.L. Trehy, Presiding**



**Session IV: Pollution Prevention: Sustainable Chemistry**

**M.L. Trehy, Presiding**

**Session V: Potable Water: New Technology and Processes**

**M.L. Trehy, Presiding**



**Session VI: Predicting Ecological Effects and Endocrine Disruptors in the Environment**

**M.L. Trehy, Presiding**



**SEQUESTRATION OF ORGANIC SOLUTES IN NATURAL ORGANIC MATTER AND MINERAL AGGREGATES**

**Session I**

**C.J. Werth and E.J. LeBoeuf, Presiding**

**Session II**

**J.J. Deitsch, Presiding**



**Poster Session I**

**C.J. Werth and E.J. LeBoeuf, Presiding**

**Session III**

**T.E.M. ten Hulscher, Presiding**



**Session IV**

**J.C. White, Presiding**

**Poster Session II**

**C.J. Werth and E.J. LeBoeuf, Presiding**



**ELECTROCHEMICAL METHODS FOR ENVIRONMENTAL ANALYSIS OF TRACE METAL BIOGEOCHEMISTRY**

**Session I**

**T.F. Rozan and M. Taillefert, Presiding**



**Session II**

**T.F. Rozan and M. Taillefert, Presiding**

**SCIENTIFIC UNCERTAINTY AND RISK MANAGEMENT (Cosponsored with the ACS Committee for Environmental Improvement)**

**J.H. Exner and M.L. Trehy, Presiding**



**MEMBRANE SEPARATION PROCESSES IN AQUATIC SYSTEMS**

**Session I: Membrane Fouling**

**M. Elimelech, Presiding**

**Session II: Membrane Characterization and Performance**

**G.L. Amy, Presiding**



**CHEMICAL-BIOLOGICAL INTERACTIONS IN CONTAMINANT FATE (Cosponsored with the Division of Geochemistry)**

**Session I**

**P. G. Tratnyek, Presiding**



**Session II**

**E.J. Weber, Presiding**

**Session V**

**P. Adriaens, Presiding**



**Session VI**

**W.D. Burgos, Presiding**



**Poster Session**

**P.G. Tratnyek, P. Adriaens and E.E. Roden, Presiding**

**Session VII**

**D.R. Lovley, Presiding**

**Session VIII**

**R.G. Luthy, Presiding**



**CHEMICAL SPECIATION AND REACTIVITY IN WATER CHEMISTRY AND WATER TECHNOLOGY:**

**A SYMPOSIUM IN HONOR OF JAMES J. MORGAN**

**Session I: Biogeochemistry of Manganese**

**J.L. Schnoor, Presiding**



**Session II: Speciation and Bioavailability**

**J. Hering, Presiding**

**Session III: Complexation, Sorption, and Surface Reactions**

**K.F. Hayes, Presiding**



**Session IV: Molecular Characterization; Aggregation Processes**

**W.H. Casey, Presiding**

**Session V: Colloid Transport and Water Technology**

**M.R. Hoffmann, Presiding**



**Poster Session**

**J. Hering and J.L. Schnoor, Presiding**

**Session VI: Speciation and Reactivity**

**R. Schwarzenbach, Presiding**



**ENVIRONMENTAL CHEMISTRY AWARDS SYMPOSIUM**

**T.A. Anderson, Presiding**



**ENVIRONMENTAL CHEMISTRY: EMPHASIS ON EPA AND EPA SUPPORTED RESEARCH**

**Session I: Soil/Sediment: Fate and Transport, Part I**

**R.L. Lipnick, Presiding**

**Session IV: Environmental Impacts and Monitoring**

**M.L. Phillips, Presiding**

**Session V: Remediation: New Methodologies**

**R.L. Lipnick, Presiding**



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