

AMERICAN CHEMICAL SOCIETY

Division of Environmental Chemistry

Preprints of Extended Abstracts

Presented at the

222nd ACS National Meeting Chicago, IL

August 26-30, 2001 Vol. 41 No.2

- General Papers
 - ▶ T. Mill
- Analysis of Environmental Phenomena at Molecular Scales
 - ▶ B.E. Logan, P.G. Hatcher and K.A. Gray
- Remediation of Water and Soil Contaminated with Gasoline Oxygenates: *In situ* and *ex situ* Treatment Technologies (Cosponsored with the ACS Committee on Environmental Improvement)
 - ▶ D.D. Dionysiou and M.T. Suidan
- Chemical Transformations of Mercury in Aquatic Systems
 - ▶ P.L. Brezonik, P.R. Bloom and E.A. Nater
- Emerging Issues in the Great Lakes (Cosponsored with the ACS Committee on Environmental Improvement)
 - ▶ D.L. Swackhamer and K. Hornbuckle
- Elegant Analytical Chemistry Applied to Environmental Problems - A Practical Symposium
 - ▶ V. Turoski and S.D. Richardson
- Environmental Chemistry Awards (Cosponsored with the ACS Committee for Younger Chemists)
 - ▶ T.A. Anderson
- Themes in Potable Water Chemistry
 - ▶ E. T. Urbansky



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Martha J.M. Wells

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Theodore Mill

Secretary:
Larry LaFleur

Preprints of Extended Abstracts

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at the
222nd ACS National Meeting

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Volume 41 No. 2

Division of Environmental Chemistry, Inc.
American Chemical Society

**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**:

Theodore Mill
Chemlab P 273
Stanford Research Institute
Menlo Park, CA 94025
650-859-3605

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 **Publications Manager**:

Ruth A. Hathaway
1810 Georgia St.
Cape Girardeau, MO 63701-3816
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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**:

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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 26, 2001 in the Ohio Room, Sheraton.
All Division members are invited to attend.**

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Division Web Site General

<http://acs-envchem.duq.edu/>

Division Web Site Program

<http://gemini.tntech.edu/~mjlw5030/acspage.html>

**Division of Environmental Chemistry
Activities during the Chicago National Meeting**

Technical Sessions:

Symposia:	Sunday-Thursday
Division Poster Session/Social Hour:	Wednesday Evening, Hyatt Regency Chicago Riverwalk, 6:00-8:00 p.m.
ACS Sci-Mix	Monday Evening, 7:00-9:00 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, Ohio Room, Sheraton 4:00-5:00 p.m.
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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, Ohio Room, Sheraton 3:00-4:00 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, Ohio Room, Sheraton 7:00-10:00 p.m.
---	--

Annual Business Meeting: All members of the Division are encouraged to attend.	Monday Evening, Ohio Room, Sheraton 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, Topolobampo, 445 N. Clark Social Hour: 6:30-7:30 p.m. (COD)
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Tickets must be purchased by Monday, August 27. Tickets can be purchased at the meeting registration area or at the Division Desk.	Dinner: 7:30 p.m. \$66.00 per person
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**Division of Environmental Chemistry
Activities during the Chicago National Meeting**

Event	Sun	Mon	Tues	Wed	Thurs
Long Range, Program Planning and Executive Committee Meetings					
Division Business Meeting					
Division Social Hour and Dinner (Topolobampo)					
ACS Sci-Mix					
Division Symposia					
Division Poster Session/Social Hour					
General Papers					
Analysis of Environmental Phenomena at Molecular Scales					
Remediation of Water and Soil Contaminated with Gasoline Oxygenates: <i>In situ</i> and <i>ex situ</i> Treatment Technologies (Cosponsored with the ACS Committee on Environmental Improvement)					
Chemical Transformations of Mercury in Aquatic Systems					
Emerging Issues in the Great Lakes					
Elegant Analytical Chemistry Applied to Environmental Problems — A Practical Symposium					
Environmental Chemistry Awards (cosponsored with the ACS Committee for Younger Chemists)					
Themes in Potable Water Chemistry					

For changes in times or events, please stop at the Division Information Desk, which will be located in the McCormick Place - South, 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: Theodore Mill, Chemlab P 273, Stanford Research Institute, Menlo Park, CA 94025; Phone (650)859-3605, Fax (650)859-4321, ted.mill@sri.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, hathaway_consulting@hotmail.com.

ORLANDO, FL, APRIL 7-11, 2002

"**Short**" abstracts of presentations are required. These abstracts must be submitted to the ACS Online Abstract Submittal System (OASys). For information and submittal go to www.acs.org/meetings/abstract/abinfo.html. The deadline for submittal is November 20, 2001. "**Extended**" abstracts of presentations are required by the Environmental Division. Extended abstracts must be submitted for the paper to be considered for presentation at the national meeting. The Extended Abstract Instructions are available at: <http://gemini.tntech.edu/~mjlw5030/acspage.html>. Either an electronic copy may be e-mailed as an attachment to the respective symposium organizer OR an original plus 2 copies of extended abstract may be sent to respective symposium organizers. Extended abstracts must be received by November 27, 2001. All general papers will be presented in the Division's poster session.

General Papers.

- T. Mill (see above)

ACS Award for Creative Advances in Environmental Science and Technology

- R. Hathaway (see above)

Analysis of Emerging Contaminants Using LC/MS/MS.

- E.M. Thurman, U.S. Geological Survey, Water Resources Division, 4821 Quail Crest Place, Lawrence, KS 66049; (785)832-3559; ethurman@usgs.gov.

Membranes for Drinking Water Treatment.

- S.K. Hong, Civil and Environmental Engineering Dept., University of Central Florida, P.O. Box 162450, Orlando, FL 32816-2450; (407)823-5783; Fax (407)823-3315; shong@mail.udf.edu.

Mercury in the Environment: Assessing and Managing the Multimedia Risks.

- W.G. Stelz, USEPA/ORD/NCER, 1200 Penn Ave. 8722R, Washington, DC 20460; stelz.william@epa.gov.
- Thomas Atkeson, Florida DEP, 2600 Blair Stone Road, MS 6540, Tallahassee, FL 32399; Thomas.Atkeson@DEP.STATE.FL.US.
- A.M. Ford, 1050 Edgewater Lane, Gulf Breeze, FL 32561; fordam@ispchannel.com.

New Analytical Techniques for Dissolved Organic Carbon.

- C. Rostad, U. S. Geological Survey, Building 95, P.O. Box 25046, MS 408, Denver Federal Center, Denver, CO 80225-0046; (303)236-3971; Fax (303)236-3934; cerostad@usgs.gov.

The Science and Policy of Topical Antimicrobial Agents.

- 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.

Advances in SO_x and NO_x Control in Refinery and Chemical Plant Processes.

(Cosponsored with the Division of Petroleum Chemistry)

- T.G. Roberie, Grace Davison, 7500 Grace Dr., Columbia, MD 21044; (410)531-4279; Fax (410)531-4101; Terry.G.Roberie@grace.com.

BOSTON, MA, AUGUST 18-22, 2002

"**Short**" abstracts of presentations are required. These abstracts must be submitted to the ACS Online Abstract Submittal System (OASys). For information and submittal go to www.acs.org/meetings/abstract/abinfo.html. The deadline for submittal is April 1, 2002. "**Extended**" abstracts of presentations are required by the Environmental Division. Extended abstracts must be submitted for the paper to be considered for presentation at the national meeting. The Extended Abstract Instructions are available at: <http://gemini.tnitech.edu/~mjw5030/acspage.html>. Either an electronic copy may be e-mailed as an attachment to the respective symposium organizer OR an original plus 2 copies of extended abstract may be sent to respective symposium organizers. Extended abstracts must be received by April 8, 2002. All general papers will be presented in the Division's poster session.

General Papers.

- T. Mill (see above)

Biogeochemistry of Organic Contaminants in Aquatic Ecosystems: In Honor of Dr. James G. Quinn.

- T.L. Wade, Geochemical and Environmental Research Group, Texas A&M University, 833 Graham Road, College Station, TX 77845; (979)862-2323 ext 134; Fax (979)862-2361; terry@gerg.tamu.edu.
- J.W. Farrington, Clark Laboratory Room 223, MS #31, Woodshole Oceanographic Institution, 360 Woods Hole Road, Woods Hole, MA 02543-1541; (508)289-2200; Fax (508)457-2188; jfarrington@whoi.edu.

Deactivation (Neutralization or Detoxification) and Safe Disposal of Germicides and Pesticides.

- P. Zhu, Biocides Research, Advanced Sterilization Products, 33 Technology Drive, Irvine, CA 92618; (949)789-3848; Fax (949)450-6850; pzhu1@aspus.inj.com.

Environmental Chemistry Awards.

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

Environmental Analytical Chemistry in the Laboratory. (Cosponsored with the Division of Chemical Education)

- J.C. Schaumloffel, Department of Chemistry and Biochemistry, University of Massachusetts-Dartmouth, 285 Old Westport Road, North Dartmouth, MA 02747; (978)665-3419; Fax (978)665-3478; jschaumloffel@umassd.edu.

**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 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 Division, 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, todd.anderson@tiehh.ttu.edu.**

Distinguished Service Award Winners

1957	W.D. Collins A.N. Buswell Edward Bartow A.S. Behrman R.C. Bardwell	1973	James P. Lodge, Jr. S. Charles Caruso
1958	F.W. Mohlman W.D. Hatfield	1974	Henry C. Bramer Benjamin F. Willey Louis F. Wirth, Jr.
1959	J.R. Baylis D.K. French	1975	Francis L. Estes
1960	C.S. Howard O.M. Smith	1977	Alvin P. Black John J. Dwyer J. Carrell Morris
1961	William Steriker Fred Lindsey	1978	Robert A. Baker Aaron A. Rosen
1962	Hovhanness Heukelekian L.D. Betz	1979	Frank M. Middleton C. Ellen Gonter
1963	William Allan Moore William L. Lamar	1984	Nina I. McClelland Donald F. Adams John I. Tealsey
1965	Louis F. Warrick Clair S. Boruff	1985	Lawrence H. Keith Leslie B. Laird Roger A. Minear
1967	S. Ken Love Richard D. Hoak	1986	Robert L. Jolley
1968	John J. Maguire H. Gladys Swope	1987	Herbert E. Allen
1969	Hilding B. Gustafson Henry C. Marks	1988	J. Donald Johnson
1970	George Hatch A.A. Berk	1989	Gordon E. Bellen
1971	J. Fred Wilkes T.E. Larson	1990	Irwin H. (Mel) Suffet V. Dean Adams
1972	Robert Ingols Calvin Calmon	1992	Richard G. Zepp
		1998	Alan W. Elzerman
		1999	Jurgen Exner

Edward Bartow Award

1952	H. C. Marks
1953	F. J. Ludzack
1954	E. B. Tooper
1955	Frank M. Middleton
1956	John J. Maguire
1957	W. Allen Moore
1959	Aaron A. Rosen
1963	Robert S. Ingols
1964	Walter Chamot
1966	L.C. Terriere
1967	Henry G. Schwartz, Jr.
1969	Harry P. Kramer

Fraser Johnstone Award

1966	Andrew E. O'Keeffe
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ACS Award for Creative Advances in Environmental Science and Technology
(Sponsored by Air Products and Chemicals, Inc.)

1980	James J. Morgan	1992	Glen E. Gordon
1981	Philip W. West	1993	John H. Seinfeld
1982	Jack G. Calvert	1994	Steven J. Eisenreich
1983	F. Sherwood Rowland	1995	Donna L. Bedard
1984	Julian Hecklen	1996	Donald H. Stedman
1985	Arthur Fontijn	1997	Charles E. Kolb
1986	Eugene E. Kenaga	1998	Mario J. Molina
1987	Joseph C. Arcos	1999	Terry F. Bidleman
1988	A. Welford Castleman, Jr.		James F. Pankow
1989	James G. Anderson	2000	R.K.M. Jayanty
1990	David M. Golden	2001	Michael R. Hoffmann
1991	Ronald A. Hites		

ACS Award for Pollution Control
(Sponsored by Monsanto Company)

1973	A.J. Haagen-Smit
1974	H.S. Johnston
1975	Aubrey P. Altshuller
1976	Thurston E. Larson
1977	Werner Stumm

Certificate of Merit

1952	A.W. Busch Lillian A. Russell E.W. Mood R.C. Kroner	1962	James J. Morgan Roger N. Saragent Otie J. Sproul
1953	W.N. Hearon A. Eugene Bowers L.J. Schmauch Frank E. Clark	1963	Max Blumer Ronald S. Joyce Irwin A. Rabin Murrell L. Salytsky Joseph Shapiro Ronald M. Siverstein Walter J. Weber, Jr.
1954	R.E. Anderson Earl Robert Gerhard Willard F. Libby	1964	Hugh Eisenhauer George P. Fitzgerald R.B. Grieves Louis Hemphill L.L. Wikstrom
1955	H.A. Barker Raymond A. Kolbeson Orville Wyss	1965	Solloff E. Bishop Glenn E. Johnson Don C. Lindsten Samuel H. Sharman Robert G. Spicher
1956	Clayton F. Callis	1966	Harvey W. Boyle Roy V. Comeaux Robert A. Erb John W. Hamaker
1957	R.H. Burttschell Emillio Savinelli A. Lovis Medin J. Kenneth Brown		
1962	Richard L. Davie Thomas F. Demmitt Norman Michael		

Certificate of Merit (continued)

1966	James J. Hickey Ulo Kligemagt Gordon C. Ortman Peter H. Westigard R.W. Zwich	1986	Jennifer E. Stern James E. Woodrow
1967	F.C. Goodrich F. Helfferich F.J. Pocock J.P. Quirk J. William Sugar	1987	Patrick H. Davies Gary A. Epling Jennifer Field William Fish T. Mark Florence James Graineger Steven B. Hawthorne Geneva M. Omann Ralph J. Portier Angel L. Rivera John E. Rogers Thomas H. Row
1968	Mark W. Tenney		
1971	L.L.C. Sorensen P.L. Levins		
1973	Barbara J. Slatt	1988	W.H. Benson W. Fish Colleen Tashiro Amy P. Toole
1975	Linda A. Deans		
1977	Rose Ann Cochran David M. Haile Robert W. Looyenga	1990	Gerald T. Coyle Sayed Z. El-Sayed David J. Miller Robert F. Mouradian T.R. Schwartz Helena Solo
1980	Stuart W. Krasner		
1981	Purnendu K. Dasgupta Jeral L. Schnoor	1991	Wayne F. Chan Dennis L. Corwin Tchonon Coulibaly Joseph E. Gadowski Margarita Gutierrez-Ruiz Werner R. Haag Adam S. Harris Linda S. Lee
1986	Marcia F. Collins Douglas Craft Werner R. Haag Robert J. Kieber Joseph J. Pignatello Richard J. Pruell		

Certificate of Merit (continued)

1991	Mark A. Nanny Patricia Snyder Penny Stackhouse Debra H. Thomas Patricia Tveite	1995	Kathleen E. Brummel Susan E. Burns Suresh Chandran Yolanda Fintschenko Robert N. Lerch Waihung Lo Thomas F. Perrone Joan D. Sulzberg David D. Weis Jennifer Wilkie
1992	Stephen E. Cabaniss Deborah J. Fox Susan A. Hatlevig Suzanne M. McClung Maragret S. Mills Daniel D. Riemer Frank E. Scully, Jr. Martin St. Clair M.M. Taylor Christine L. Tiller Lee J. Yoo	1996	Allen W. Apblett John C. Bart Kathleen E. Brummel Amy E. Childress Seungkwan Hong Tiehong Huang Jeanne A. Itak Kimberly L. Jones Herman O. Krabbenhoft Amy E. Witter
1993	Jeff Collett, Jr. Kent W. Schmidt Staci Lynn Simonich Rengao Song Paul Westerhoff	1997	William A. Arnold Sandip Chattopadhyay Jennifer F. Clark Manvendra K. Dubey David A. Jeffrey Perry L. McCarty
1994	Thomas P. Franz Richard W. Gullick William P. Hamilton Ewa Lipczynska-Kochany Gary M. Litton Jimena P. Lopez Janice D. Makos Anuradha Ramaswami Thomas M. Young	1998	William Hagar Edward Heyse Frank E. Huggins Richard W. Hurst Robert J. Lagomarsino Eugene J. LeBoeuf Richard J. Murphy
1995	Lisa Axe Damia Barcelo		

Certificate of Merit (continued)

1998 James J. Pagano
 Lisa L. Phegley
 Tammy P. Taylor
 Jon Michael Williams
 Marek A. Wojtowicz

Graduate Student Award Winners for 2001
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Name	Advisor	Graduate Program
Dionysios Dionysiou	Makram Suidan	University of Cincinnati
Ed Scollon	George Cobb	Texas Tech University
Anne-Marie Compton	Richard Foust	University of Northern Arizona
Mike McCormick	Peter Adriaens	University of Michigan
Derek Peak	Donald Sparks	University of Delaware
Alexandra Stenson	William Cooper	Florida State University
Mazyar Zeinali	Alba Torrents	University of Maryland
Jim Chen	Menachem Elimelech	Yale University
Amy Dahl	Jean-Francois Gaillard	Northwestern University
Ryan James	Ron Hites	Indiana University
Ted Klupinski	Yu-Ping Chin	Ohio State University
Jill Kostel	Kimberly Gray	Northwestern University
T. Michael Keinath	Walter Weber	University of Michigan
James Nurmi	Paul Tratnyek	Oregon Graduate Institute
Jason Lynch	Joseph Delfino	University of Florida
Kim Hageman	Jennifer Field	Oregon State University
Aaron Peck	Keri Hornbuckle	University of Iowa
Thomas Jabusch	Deborah Swackhamer	University of Minnesota
James Morris	Paul Davidovits	Boston College
Karlin Danielsen	Kim Hayes	University of Michigan
Juel Gibbons	Joel Burken	University of Missouri-Rolla

Graduate Student Award Winners

1986	Marijan Ahel Joseph T. Angley Stephen E. Cabaniss Patricia V. Cline Allen P. Davis Richard T. DeCesar Frank M. Dunnivant Thomas D. Gauthier Kimberly A. Gray Stephen R. Harper George D. Harris Hans Jannasch James N. Jensen Deborah J. McKechnie James R. Mihelcic Daniel L. Norwood Mary E. Pitts Chittaranjan Ray Charles V. Shorten Thomas J. Simpkin James E. Szecsody Mark A. Tumeo	1987	Mark Milke J. William Munger Meredith Newman Stephen G. Pedersen Mukund Ramamurthi Ann E. Sheffield Susan Stripp Paul G. Tratnyek Wanjia Zhang
		1988	Tekeshi Arakai Joel Eric Baker Gaboury Benoit Greg Butters Yu-Ping Chin Gary P. Curis Edward Franzblau Kenneth Michael Hart Diane M. Hermann Joon-Wun Kang Anil Kumar Brent L. Lewis Winston T. Luke Tom McDonald Terese M. Olson Debra R. Reinhart James R. Rhea Kevin G. Robinson Lucinda B. Sonnenberg John Storey Peter D. Tsakanikas
1987	Morton A. Barlaz Barbara A. Bates John Borrazzo Andrea M. Dietrich Talbert N. Eisenberg Julia E. Fulghum Nancy J. Hayden George B. Jarvis Judy S. LaKind Cheryl Matthias Janet A. Mayernik John F. McCarthy Lyn M. McIlroy		
		1989	Lisa M. Alvarez Todd A. Anderson Debra A. Backhus Kathy Boswell

Graduate Student Award Winners (continued)

1989	Suda Bunduwongse Menachem Elimelech Mohamad R. Farvardin Gary M. Hutter Seungdo Kim Leslie S. Laudon Caroline B. Purdy Janice P. Stowell Christine L. Tiller	1991	Hak Sung Lee George Murgel Mark A. Nanny Brian E. Rood John Sagebiel Mark Schlaufman David L. Sedlak Melinda A. Trizinsky
1990	William M. Davis Keith E. Dennett Matthew B. Gerhardt Kathryn Hunchak-Kariouk Joe Jersak James Jersey Man-Chi Lo Steve Machemar Karal Mesuere Sandra K. Miles A. Lynn Roberts Joseph G. Schnable Youshang Zang Yuewei Zhu	1992	Amy Lunn Bryce Susan E. Burns Margaret C. Carter Barbara R. Coughlin Shinoka Fujita Keri C. Hornbuckle Sally Jo Palmer Susan E. Powers Schawn Shottler Chichwen Shao Rengao Song Richard Sutton Anthony J. Tesoriero Kathryn K. Levenberg Ticho Dharanija Vasudevan Qingxi Wang Charles Shiu Wong Yuping Xu
1991	Diane Achman David A. Edwards Thomas P. Franz, Jr. Kevin H. Gardner Yuyang Gong Anne M. Hoylman Mark Jacobs Ramesh Lyer Lynn E. Katz	1993	Barbara Anderson Nada Assaf-Anid Joseph Chung Mamadou S. Diallo Anne Falke Lai Gui

Graduate Student Award Winners (continued)

1993	Corey Knoop Ellen Louise Kruger Suen-Zone (Jack) Lee Leah J. Matheson Angus E. McGrath Kurtis G. Paterson B. Douglas Reeves Carolyn J. Sampson Sukalyan Sengupta Jiamin Wan Jeyong Yoon	1995	Lisa M. Borbridge Amy Childress Britt E. Erickson Seungkwan Hong Michael J. Howdeshall Suilou Huang Margaret Hunter Emmanuel Iyiegbuniwe Timothy L. Johnson Kimberly L. Jones Franz-Günter Kari Alok Kumar Jian Li Wentai Luo Edward O'Loughlin Christopher M. Reddy Sujoy Roy Jennifer Sasaki Bo Shi Jean M. Smolen Maryann Suero Ying Xie
1994	Zafar Adeel Muhammad Ashraf Ali Cort Anastasio Lisa Axe Jon David Chorover Harry R. Beller Kirk E. Dean Baolin Deng Susan Grube Donaldson Jason Derek Geddes Gregory W. Harrington Edward Heyse John F. Kenneke Shi-Ping Lia Yarrow Nelson Roger Pearson Staci L. Simonich Bryan M. Smith Jeffrey C. Wallace Liza P. Wilson Jingfend Wu	1996	Brett Brunk Joel Burken Colin Chen Neal Durant Cynthia Evanko Alessandro Franchi Tohren Kibbey Daniel Schmelling Annette Trowbridge John J. Waypa Jennifer Wilkie Wells Wei-Shih Wu

Graduate Student Award Winners (continued)

1996	Yujun Yin Thomas Young Jianzhen Yu Dongye Zhao Huan Zhu	1998	Timothy Tsukamoto Jianzhong Zheng Meifang Zhou
1997	Blakely Adair Barbara Bergen Sandip Chattopadhyay Yuan Chen Peter D'Adamo Jeff Darland Annette Dietz Susan Glassmeyer Weilin Huang Joon Min Matthew Morrison Michelle Scherer Brian Schroth Ning Sun Peter Vikesland Alex Yavich	1999	David Adamson William Arnold Hiroshi Awata William Bedsworth Robert Bruant Paul Brunciak Elizabeth Butler Martin Johnson Tarek Ladaa Brian Mader Heath Mash William Mills Tammy Taylor Eric Vrijenhoek
1998	W. Wayne Brubaker Rajat Ghosh Yann Le Gouellec Carolyn Krueger Eugene LeBoeuf Angela Lindner Brian Logue Huizhong Ma Penney Miller Annett Sullivan Denise Taylor Lisa Ann Totten	2000	Joel Bandstra Rajat Chakraborti Jeffrey Chen Brian Desharnais Paul Hartmann Sarunya Hengpraprom Mehmet Kitis Jens-Uwe Kuhn Tie Li Katrice Lippa Shaun Mendonsa C. Andrew Ramsburg Alexa Rihana Darryl Roberts Julia Rogers Reggie Spaulding

Graduate Student Award Winners (continued)

2000 Kavitha Subramaniam
 Weihong Wang
 Ted Wu
 Haojiang Zhou
 Julie Zimmerman

0 Jim Chen
 Anne-Marie Compton
 Amy Dahl
 Karlin Danielsen
 Dionysios Dionysiou
 Juel Gibbons
 Kim Hageman
 Thomas Jabusch
 Ryan James
 T. Michael Keinath
 Ted Klupinski
 Jill Kostel
 Jason Lynch
 Mike McCormick
 James Morris
 James Nurmi
 Derek Peak
 Aaron Peck
 Ed Scollon
 Alexandra Stenson
 Mazyar Zeinali

Graduate Student Paper Award Winners for 2001
Sponsored by the Division of Environmental Chemistry

"Oxidation of Organic Contaminants using a Thin-film Rotating Disk Photocatalytic Reactor (RDPR): Effect of Oxygen Concentration in the Gas Phase and Influence of Oxygen Mass Transport in the Thin Liquid Film"

Dionysios D. Dionysiou and Makram T. Suidan, Department of Civil and Environmental Engineering, University of Cincinnati

"*In situ* Anaerobic Transformation of Trichlorofluoroethene in Trichloroethene-contaminated Groundwater"

Kimberly J. Hageman, Jennifer A. Field, Jonathon D. Istok, Lewis Semprini and Timothy E. Buscheck, Department of Chemistry and Department of Environmental and Molecular Toxicology, Oregon State University

"Electrochemical Investigation of the Rate Limiting Mechanisms for Trichloroethylene and Carbon Tetrachloride Reduction at Iron Surfaces"

Tie Li and James Farrell, Department of Chemical and Environmental Engineering, University of Arizona

"Kinetics of Chromate Reduction by Carbonate Green Rust"

Aaron G.B. Williams and Michelle M. Scherer, Department of Civil and Environmental Engineering, University of Iowa

"Spectroscopic Evidence for a Cation- π Sorption Mechanism for Polycyclic Aromatic Hydrocarbon Sorption to Hydrated Surfaces of Minerals"

Dongqiang Zhu, Bruce E. Herbert, Mark A. Schlautman and Elizabeth R. Carraway, Department of Geology and Geophysics, Texas A&M University

Note: **Graduate student paper award winners are presented in bold; faculty advisors are underlined.**

Graduate Student Paper Award Winners

1987	Allen P. Davis Frank M. Dunnivant Wen H. Pan	1993	Grace M. Haggerty Wei Li Jiamin Wan
1988	G.C. Germann Janet G. Hering G.H. Peters C.V. Shorten C. Yurteri	1994	M.S. Diallo Jason Derek Geddes B.A. Homen S.T. Martin Staci L. Simonich
1989	Deb Backhus Larry B. Barber II Meredith E. Newman Stuart A. Rounds	1995	Zafier Adeel Nicola J. Peill Dharni Vasudevan Jeffrey C. Wallace
1990	Bernadine A. Bonn Jennifer A. Field A. Lynn Roberts David L. Sedlak Guoshun Zhuang	1996	S. Colin Chen Cikui Liang David L. Lord Jean M. Smolen Nelson M. Yarrow
1991	Todd A. Anderson Sarah A. Green Murray Hackett Joseph N. Ryan John M.E. Storey	1997	Ching-Hua Huang Weilin Huang Tohren C.G. Kibbey Michelle M. Scherer Diane M. Wagrowski
1992	Diane R. Achman Keri C. Hornbuckle Laura L. McConnell Simo O. Pehkonen Charles S. Wong	1998	Barabara J. Bergen John M. Lendvay Huizhong Ma Mahaligam Ravichandran Lisa A. Totten William A. Arnold Chia-Chen Chen Martin D. Johnson
1993	Nada Assaf-Anid Huiling Ding		

Graduate Student Paper Award Winners

- | | |
|------|---|
| 1999 | Ping Li
Peter Vikesland |
| 2000 | Brian Desharnais
Paul Hartmann
Brian Mader
Alexa N. Rihana
Timothy J. Strathmann |
| 2001 | Dionysios D. Dionysiou
Kimberly J. Hageman
Tie Li
Aaron G.B. Williams
Dongqiang Zhu |

Based On Division of Environmental Chemistry Symposia

Books Available From: ACS Books/Oxford University Press

Analysis of Environmental Endocrine Disruptors. Larry Keith, Larry Needham and Tammy Jones, Symposium Series 747, \$75

Aquatic Chemistry: Interfacial and Interspecies Processes. Chin Pao Huang, Charles R. O'Melia and James J. Morgan, Editors, Advances in Chemistry Series 244, \$135

Benign by Design: Alternative Synthetic Design for Pollution Prevention. Paul T. Anastas and Carol A. Farris, Editors, Symposium Series 577, \$70

Bioremediation Through Rhizosphere Technology. Todd A. Anderson and Joel R. Coats, Editors, ACS Symposium Series 563, \$70

Designing Safer Chemicals: Green Chemistry for Pollution Prevention. Stephen C. DeVito and Roger L. Garrett, Editors, Symposium Series 640, \$95

Electromagnetic Fields: Biological Interactions and Mechanisms. Martin Blank, Editor, Advances in Chemistry Series 250, \$145

Environmental Biomonitoring: Exposure Assessment and Specimen Banking. K.S. Subramanian and G.V. Ivengar, Editors, Symposium Series 654, \$110

Environmental Chemistry of Lakes and Reservoirs. Lawrence A. Baker, Advances in Chemistry Series 237, \$165

Environmental Epidemiology. William M. Draper, Editor, Advances in Chemistry Series 241, \$90 (hardcover), \$60

Environmental Immunochemical Methods: Perspectives and Applications. Jeanette M. Van Emon, Clare L. Gerlach and Jeffrey C. Johnson, Editors, Symposium Series 646, \$115

Innovative Subsurface Remediation: Field Testing of Physical, Chemical and Characterization Technologies. Mark L. Brusseau, David A. Sabatini, John S. Gierke and Michael D. Annable, Editors, Symposium Series 725, \$115

Green Chemistry: Designing Chemistry for the Environment. Paul T. Anastas and Tracy C. Williamson, Symposium Series 626, \$95

Groundwater Residue Sampling Design. Ralph G. Nash and Anne R. Leslie. ACS Symposium Series 465, \$110

Halon Replacements: Technology and Science. Andrzej W. Mistolek and Wing Tsung, Symposium Series 611, \$120

Herbicide Metabolites in Surface Water and Groundwater. Michael T. Meyer and M. Thurman, Symposium Series 630, \$115

Immunochemical Technology for Environmental Applications. Diana S. Aga and E. Michael Thurman, Editors, Symposium Series 657, \$130

Molecular Markers in Environmental Geochemistry. R.P. Eganhouse, Editor, Symposium Series 671, \$135

Nuclear Magnetic Resonance Spectroscopy in Environmental Chemistry. Mark A. Nanny, Roger A. Minear and Jerry A. Leenheer, Editors, \$70

Persistent, Bioaccumulative and Toxic Chemicals I: Fate & Exposure. Robert Lipnick, Editor, Symposium Series 772, \$135

Persistent, Bioaccumulative and Toxic Chemicals II: Assessment & New Chemicals. Robert Lipnick, Editor, Symposium Series 646, \$135

Phytoremediation of Soil and Water Contaminants. Ellen L. Kruger, Todd A. Anderson and Joel R. Coats, Editors, Symposium Series 664, \$120

Plastics, Rubber and Paper Recycling: A Pragmatic Perspective. Charles P. Rader, Editor, Symposium Series 609, \$130

Pollution Prevention in Industrial Processes. Joseph J. Breen and Michael J. Dellarco, ACS Symposium Series 508, \$95

Radiation and Public Perception. Jack P. Young and Rosalyn S. Yalow, Editors, Advances in Chemistry Series 243, \$80 (hardcover), \$40 (paper)

Surfactant-Enhanced Subsurface Remediation: Emerging Technologies. David A. Sabatini, Robert C. Knox and Jeffrey H. Harwell, Symposium Series 594, \$105

Water Disinfection and Natural Organic Matter: Characterization and Control. Roger A. Minear and Gary Amy, Editors, Symposium Series 649, \$115

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41(2)	222, Fall, 2001 Chicago, IL	Analysis of Environmental Phenomena at Molecular Scales; Remedation of Water and Soil Contaminated with Gasoline Oxygenates: <i>In Situ</i> and <i>ex situ</i> Treatment Technologies; Chemical Transformations of Mercury in Aquatic Systems; Emerging Issues in the Great Lakes; Elegant Analytical Chemistry Applied to Environmental Problems: A Practical Symposium; Environmental Chemistry Awards; Themes in Potable Water Chemistry; General Papers	15.00 CD
41(1)	221, Spring, 2001 San Diego, CA	Field Analytical Chemistry: Techniques, Technologies, and Applications; Sustainable Chemistry in the New Millenium; Advances in Remediation of Heavy Metals in the Environment; Biogeochemistry of Environmentally Important Elements; Elegant Analytical Chemistry Applied to Environmental Problems: A Practical Symposium; Environmental Trends; ACS Award for Creative Advances in Environmental Science and Technology: Honoring Dr. Michael R. Hoffman (Sponsored by <i>Air Products and Chemicals, Inc.</i>); Innovative Strategies for the Remediation of Chlorinated Solvents and DNAPLs in the Subsurface; Tropospheric Chemistry; General Papers	15.00 CD

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40(2)	220, Fall, 2000 Washington, DC	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; Membrane Separation Processes in Aquatic Systems; Chemical-Biological Interactions in Contaminant Fate; 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; General Papers	45.00 print 15.00 CD
40(1)	219, Spring, 2000 San Francisco, CA	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 <i>Air Products and Chemicals, Inc.</i>); 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
39(2)	218, Fall, 1999 New Orleans, LA	Perchlorate in the Environment; Analytical Challenges for Assessing Environmental Exposures to Children; Environmental Chemistry Awards; Environmental Issues on the Gulf Coast; Chiral Chemistry in the Environment; Waste: Remediation and Related Issues; Computer Software for Environmental Chemistry Education; General Papers	15.00 CD
39(1)	217, Spring, 1999 Anaheim, CA	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 <i>Air Products and Chemicals, Inc.</i>); ACS Award for Creative Advances in Environmental Science & Technology: Honoring Terry F. Bidleman (Sponsored by <i>Air Products and Chemicals, Inc.</i>); Green Chemistry in Academia, Industry and Government; Green Chemistry Education; Recent Advances in Environmental Chemical Sensors and Biosensors; General Papers	25.00 print 15.00 CD

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38(1)	215, Spring, 1998 Dallas, TX	Waste Treatment Processes; Environmental Applications of Geographic Information Systems (GIS); ACS Award for Creative Advances in Environmental Science and Technology in Honor of Mario J. Molina (Sponsored by <i>Air Products and Chemicals, Inc.</i>); The Presidential Green Chemistry Challenge; Tributyltin Compounds in the Aquatic Environment; General Papers	20.00
37(2)	214, Fall, 1997 Las Vegas, NV	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, CA	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 (Sponsored by <i>Air Products and Chemicals, Inc.</i>); Degradation of Chemicals with Significant Environmental Impact; Environmental Fate and Effects of Gasoline Oxygenates; General Papers	20.00
36(2)	212, Fall, 1996 Orlando, FL	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, LA	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 (Sponsored by <i>Air Products and Chemicals, Inc.</i>); Petroleum Contamination in the Environment: Assessment and Remediation; General Papers	20.00

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35(2)	210, Fall, 1995 Chicago, IL	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, CA	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 (<i>A Memorial to Kenneth G. Hancock</i>); 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 Depleting Compounds; Environmental Risk Decision Making: Values, Perceptions and Ethics; General Papers	12.00
34(1)	207, Spring, 1994 San Diego, CA	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: Emerging 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, IL	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, CO	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, DC	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, CA	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

SYMPOSIA, SPECIAL TOPICS AND ORGANIZERS

GENERAL PAPERS

THEODORE MILL has conducted basic and applied research at SRI on environmental reactions of organic compounds for about thirty years. Recent studies include oxidation of aminodinitrotoluenes, aqueous and thin film photolysis of dinitramide ion and photoreactions of aqueous natural organic material. He has also studied oxidation pathways in hydrocarbons, lipid membranes and asphalt. In addition, Dr. Mill has studied photooxidation and hydrolysis reactions in surface waters to develop test guidelines and predictive models for environmental fate of synthetic organic compounds. He has published about 85 papers in these areas of chemistry. Dr. Mill received his Ph. D. at the University of Washington (Seattle) and came to SRI in 1960 after a postdoc year at Yale and three years at the Du Pont Experimental Station. He is a member of AAAS, ACS, AGU and SETAC and served as chair of the Santa Clara Valley ACS section in the mid 70's. He currently serves as alternate councilor to the division.

ANALYSIS OF ENVIRONMENTAL PHENOMENA AT MOLECULAR SCALES

During the past decade, a number of new techniques have become sufficiently developed to apply to the study of environmental phenomena at molecular scales. Examples include: atomic force microscopy (AFM) and other high-resolution microscopy techniques; X-ray absorption spectroscopy using high-energy synchrotron radiation sources; other spectroscopic techniques such as nuclear magnetic resonance (NMR) and electron spin resonance (ESR) techniques, surface plasmon spectroscopy, surface FTIR, surface Raman spectroscopy, modern mass spectrometry that includes both "soft" and "hard" ionization techniques involving time-of-flight-secondary ion mass spectrometry (TOFSIMS), Fourier transform ion cyclotron resonance mass spectrometry, gas chromatography-mass spectrometry, pyrolysis-gas chromatography-mass spectrometry and *ab initio* molecular modeling. The purpose of this session will be to demonstrate how these new molecular-level techniques are transforming our understanding of a variety of environmental problems such as pollutant-mineral-natural organic matter bonding, enhanced chemical catalysis and destruction, and colloid/biocolloid adhesion and transport.

BRUCE E. LOGAN is the Stan and Flora Kappe Professor of Environmental Engineering at The Pennsylvania State University. Dr. Logan's areas of expertise are in environmental transport processes, bacterial adhesion, biofilms, colloid transport and bioremediation. He is the author or co-author of over 100 refereed publications and a textbook on environmental transport processes. He received his Ph.D. in 1986 from the University of California, Berkeley. He has received awards that include the AEESP

Research Frontiers Award, USANC Founders Award, and the inaugural WEF Biosolids Task Force award; in 1993 he was a Fulbright Scholar at the University of Constance (Germany). He is a past president of the Association of Environmental Engineering & Science Professors (AEESP). Prior to joining the faculty at Penn State, he was on the faculty at the University of Arizona in the departments of Chemical and Environmental Engineering, and Civil Engineering and Engineering Mechanics from 1986 to 1997.

PATRICK G. HATCHER is a Vice President and Senior Corporate Fellow at WPI, a non-profit institute affiliated with Virginia Tech in Blacksburg, VA. He is the author of 170 books and technical articles on toxic chemicals and environmental pollution. A Ph.D. chemist, he is past Chairman of the Division of Environmental Chemistry, current editor of the Division's newsletter, and also its Web Master. He has helped to organize three symposia on endocrine disrupting chemicals at national meetings and published a 1200 page book on properties of these chemicals with John Wiley Publishers. He began his career at the U.S. EPA Research Laboratory in Athens, GA, and also worked for 21 years at Radian International prior to joining WPI.

KIMBERLY A. GRAY is an Associate Professor in the Department of Civil Engineering at Northwestern University. She also has a joint appointment in the Department of Chemical Engineering and is a member of the Center of Catalysis and Surface Science and the Institute of Policy Research. She received a B.S. in Biology from Northwestern University in 1978, her Ph.D. from the Johns Hopkins University in 1988, and worked as a research engineer for the Lyonnaise des Eaux in Paris, France, for 2 years before joining the faculty at the University of Notre Dame in 1989. In 1995 she joined the faculty at Northwestern University. Dr. Gray's areas of expertise are environmental chemistry and physicochemical processes in natural and engineered systems. She was a 1991 recipient of the NSF Presidential Young Investigator Award for her work in environmental analytical chemistry, photo- and radiation chemistry, and ecotoxicology. She is the author of over 50 scientific articles and reports, is the Associate Director of the NSF Environmental Molecular Science Institute for Environmental Catalysis at NU and was the 1998-99 president of the Association of Environmental Engineering and Science Professors.

**REMEDICATION OF WATER AND SOIL CONTAMINATED WITH GASOLINE
OXYGENATES: *IN SITU* AND *EX SITU* TREATMENT TECHNOLOGIES
(Cospponsored with the ACS Committee for Environmental Improvement)**

The focus of this symposium is the treatment of water and soil contaminated with methyl *tert*-butyl ether (MTBE) and other gasoline oxygenates including ethyl *tert*-butyl ether (ETBE), diisopropyl ether (DIPE) and *tert*-amyl methyl ether (TAME). Other issues related to contamination by gasoline oxygenates are also presented including the occurrence of MTBE in lakes due to recreational boating activity. The symposium includes both *in situ* and *ex situ* biological and physical/chemical treatment technologies and covers fundamental aspects as well as applications of conventional

and cutting-edge technologies in field studies and industrial remediation operations.

Specific subjects of the symposium include (a) the role of benzene, toluene, ethyl benzene, and xylene (BTEX) on the degradation of MTBE and *tert*-butyl alcohol (TBA) using mixed bacterial consortium, (b) natural attenuation of MTBE under certain aerobic or anaerobic conditions, (c) *ex situ* biological degradation of MTBE using membrane bioreactor technology, (d) fundamentals on activated carbon adsorption for MTBE removal, (e) fundamentals of sorption and desorption of gasoline oxygenates in soil, (f) fundamentals, applications and economics of several industrial technologies for on-site remediation of MTBE-contaminated water and soil including air sparging, soil vapor extraction, multi-phase extraction, bioremediation, natural attenuation and *ex situ* pump and treat technologies and (g) *in situ* and *ex situ* destruction of gasoline oxygenates using advanced oxidation and other physical/chemical technologies including sonolysis, the Fenton and the Photo-Fenton's reagent, bifunctional aluminum, and TiO₂ photocatalysis.

DIONYSIOS D. DIONYSIOU is an Assistant Professor of Environmental Engineering in the Department of Civil and Environmental Engineering at the University of Cincinnati. He holds a Diploma (B.S./M.S., 1991) from the National Technical University of Athens, Greece, and a M.S. degree (1995) from Tufts University, both in Chemical Engineering. He obtained his Ph.D. in Environmental Engineering from the University of Cincinnati (2001). His research interests include advanced oxidation technologies for water treatment, drinking water treatment and purification, membrane processes, physico-chemical phenomena on particle-water interfaces, and development of innovative photocatalytic reactors. Recently funded research projects include the use of ionic liquids in environmental applications (National Science Foundation), the treatment of methyl *tert*-butyl ether (MTBE) using the Fenton's and Photo-Fenton's reagent (U.S. EPA) and TiO₂ photocatalytic destruction of organic contaminants. Dr. Dionysiou is the author or co-author of 10 refereed journal publications and he has presented his work at National and International Conferences. He has one year of industrial experience with W. R. Grace, Masonry Product Division where he performed research on investigating environmental applications of colloidal dispersions. Dr. Dionysiou received several awards during both his undergraduate and graduate studies including the National Scholarship Foundation Fellowship (NSFF) (Greece, 1986-1991), the NSFF Award for Excellent Performance (Greece, 1988-1991), the Gerondellis Foundation Award (Tufts University, 1992-1994), and, more recently, the Best Graduate Student and Best Research Paper Awards in Environmental Chemistry, ACS (2001).

MAKRAM T. SUIDAN is the Herman Schneider Professor of Environmental Engineering in the Department of Civil and Environmental Engineering at the University of Cincinnati. He obtained a B.S. in Civil Engineering from the American University of Beirut (1971), and a M.S. (1973) and Ph.D. (1975) in Environmental Engineering from the University of Illinois at Urbana-Champaign. His research interests include biological processes for the treatment of recalcitrant organic compounds, adsorption onto

activated carbon, membrane processes, and advanced oxidation technologies for water treatment. He has an active research program that encompasses these areas as well as a new program evaluating the fate and mechanisms of removal of endocrine disrupting chemicals in municipal sewage treatment. Dr. Suidan is the author or co-author of more than 180 refereed journal publications and he has presented his work extensively at National and International Conferences. His work has been recognized internationally and he received several awards including the University of Illinois Distinguished Alumnus Award (2001), the Association of Environmental Engineering Professors Distinguished Lecturer (1996) and the CH2MHILL Ph.D. thesis supervisor award (1993). Dr. Suidan is a member in several scientific societies, serves on numerous national and international committees and was editor for the Journal of Environmental Engineering 1998-2000.

CHEMICAL TRANSFORMATIONS OF MERCURY IN AQUATIC SYSTEMS

This symposium will focus on the abiotic chemical transformations that affect the fate and transport of mercury in aquatic and soil environments. During the past decade, scientists increasingly have recognized the important role these processes play in mercury cycling and bioaccumulation within food webs. For example, photolysis of methyl mercury in lakes has been shown to occur at time scales of a few days. Photoreduction of divalent mercury (to form elemental mercury Hg(0), which is volatile and can be lost to the atmosphere) has been shown to induce daily cycles in concentrations of these forms of Hg in the Everglades and many other aquatic environments. Complexation of Hg²⁺ and methyl Hg by soil and aquatic humic substances affects the bioavailability of mercury and may protect these forms from undergoing chemical transformations. Conversely, humic substances also have been shown to reduce divalent Hg abiotically. The purpose of this symposium is to bring scientists active in this research area together to review the many recent advances that have been made in this field and to assess the current state of knowledge about chemical transformations of Hg forms in soil systems and natural waters.

PAUL L. BREZONIK no biography available

PAUL R. BLOOM no biography available

ED A. NATER no biography available

EMERGING ISSUES IN THE GREAT LAKES (Cosponsored with the ACS Committee for Environmental Improvement)

This symposium will highlight emerging issues of interest in environmental chemistry faced by the Great Lakes basin.

DEBORAH L. SWACKHAMER is a Professor of Environmental Chemistry in the Division of Environmental & Occupational Health, School of Public Health at the University of Minnesota. She joined the University in 1987, following postdoctoral studies at Indiana University. She has a B.A. in Chemistry from Grinnell College, and an M.S. in Water Chemistry and Ph.D. in Oceanography and Limnology from the University of Wisconsin-Madison. Her research interests include the behavior, fate and transport of persistent, organic toxic chemicals, and the process of bioaccumulation of organic chemicals in aquatic foodwebs. Her more recent research efforts include the identification and effects of environmental estrogens, and the development of chemical indicators for assessing ecological conditions in the Great Lakes. She has been a member of ACS for more than 20 years and has served on the Executive Committee of the Environmental Chemistry Division and the national Awards Committee.

KERI HORNBUCKLE is an associate professor in the Department of Civil and Environmental Engineering at the University of Iowa. She completed a Ph.D. in Environmental Engineering and Science at the University of Minnesota in 1996 and a B.A. in Chemistry from Grinnell College in 1987. Prior to joining the University of Iowa in 1998, she was an assistant professor at the State University of New York at Buffalo. Dr. Hornbuckle is a member of the International Joint Commission's Great Lakes Science Advisory Board. Her research concerns the transport of persistent organic pollutants (POPs) in natural terrestrial and aquatic systems. She is especially interested in questions of scale. She has participated in several major initiatives in the Great Lakes on these issues including the Green Bay Mass Balance Study, the Lake Michigan Mass Balance Study, and Episodic Events - Great Lakes Experiment. Most recently she has investigated the effect of large-scale storms on lake-wide cycling of POPs, the effect of climate variability on air/surface exchange, and source identification of POPs in air.

ELEGANT ANALYTICAL CHEMISTRY APPLIED TO ENVIRONMENTAL PROBLEMS — A PRACTICAL SYMPOSIUM

This symposium has been organized to provide a platform for the presentation and discussion of clever ways to overcome problems encountered when analyzing environmental samples. Participants will share practical solutions that could be immediately applied by the chemist at the bench. Topics relating to a wide variety of analytical techniques are represented. It is interesting to note that what is an extremely clever way to proceed in capillary electrophoresis may have very little interest to a mass spectroscopist — yet, there is a common thread throughout all of environmental analytical chemistry and the papers presented here will be of good general interest to all analytical and environmental chemists who pursue the quest for a cleaner environment.

VICTOR TUROSKI is a graduate of Wilkes University, Wilkes-Barre, PA and has pursued a career in analytical chemistry at Carter Wallace, the American Can Company, and Fort James. Vic is presently Analytical Manager Emeritus of the Corporate Analytical Research Laboratory at the Fort James Technical Center in

Neenah, WI. He led a technically advanced analytical group whose role was to support corporate R&D, trouble shoot manufacturing problems, and provide toxicity and safety data to the Fort James Regulatory Affairs Department. Vic has published several articles in the field of environmental chemistry and is editor of two books based on major ACS symposia: Formaldehyde - Analytical Chemistry and Toxicology and Chlorine and Chlorine Compounds in the Paper Industry. Vic has been an active member of the Environmental Division for the past twelve years. He currently serves the ACS Division of Environmental Chemistry as Program Chairperson for Environmental Analytical Chemistry and from time to time performs article peer review for *Environmental Science and Technology*.

SUSAN D. RICHARDSON is a research chemist at the U.S. Environmental Protection Agency's National Exposure Research Laboratory in Athens, GA. She received her B.S. in Chemistry and Mathematics from Georgia College in 1984 and her Ph.D in Chemistry from Emory University (in Atlanta, GA) in 1989. At the U.S. EPA, she leads a team of chemists in developing and applying multispectral analysis techniques to environmental problems. Her recent research has focused on the identification and characterization of disinfection by-products (DBPs), with special emphasis on alternative disinfectants and polar by-products. She has authored more than 20 publications and book chapters in this area. She has entered into two collaborative efforts, which when combined with her identification research, will provide the basis for evaluating public health risks for DBPs. The first is an exhaustive survey of DBP occurrence in municipal water supplies to establish the extent and levels of public exposure. The second is a collaborative effort with scientists at the U.S. EPA's National Health and Environmental Effects Research Laboratory to determine human health effects for DBPs, singly and collectively.

ENVIRONMENTAL CHEMISTRY AWARDS (Cosponsored with the ACS Committee for Younger Chemists)

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 these 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.

THEMES IN POTABLE WATER CHEMISTRY

The symposium Themes in Potable Water Chemistry covers four active areas in drinking water research: molecular processes, the measurement of organic carbon, trends in analytical chemistry, and watershed management. All of these factors play into the overall structure of understanding how high quality drinking water is produced. Molecular processes include the kinetics and mechanisms of chemical reactions. The measurement of organic carbon is important since it represents disinfection by-product precursor material and is determined before and after the removal of natural organic matter as a measure of the control of DBP formation. Analytical chemistry is crucial because one cannot gauge exposure or regulatory compliance without accurate, precise, selective, and sensitive methods. Finally, the big picture of watershed management is coming to the forefront. No longer is point source command and control the key dogma in water quality. In addition, we are focusing more on keeping things out of the raw water in the first place rather than removing them in a potable water utility plant. Our speakers hail from academia, government and industry, and should offer food for thought as well as a glimpse at the frontiers of environmental chemistry.

EDWARD T. URBANSKY is a research chemist in the EPA's National Risk Management Research Laboratory in Cincinnati, OH. His work there has focused on potable water analysis for disinfection by-products and perchlorate. Most recently, his laboratory has been responsible for overseeing a collaborative investigation into the occurrence of perchlorate in fertilizers. Author or coauthor of more than 30 publications and editor of the book, *Perchlorate in the Environment*, he also serves on the editorial board of *Journal of Environmental Management*. In addition, he serves on the Committee for Standard Methods for the Examination of Water and Wastewater. He lives in Indiana with his three dogs and serves as a guardian *ad litem* to the Seventh Judicial Circuit of Indiana.

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August 26-30, 2001

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(Cosponsored with the ACS Committee on Environmental Improvement)

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