

## ROSEANN KROEKER SACHS

Home address:  
454 S. Fileys Road  
Dillsburg, PA 17019  
(717)-432-3880

Work Address:  
Department of Chemistry and Biochemistry  
P.O. Box 3049  
Messiah College  
1 College Avenue  
Grantham, PA 17027  
(717)-796-1800, ext. 2043  
[rsachs@messiah.edu](mailto:rsachs@messiah.edu)

### EDUCATION

Ph.D., August 1993      University of Minnesota, Minneapolis, Minnesota  
Major: Organic Chemistry  
Advisor: Professor Steven R. Kass  
Thesis: The Diaziriny Anion: A Gas Phase, Condensed Phase,  
and Theoretical Approach to the Question of Antiaromaticity

B.A., May 1986      Bethel College, St. Paul, Minnesota  
Majors: Chemistry, Music-Piano Performance  
Graduation Honors: Summa Cum Laude

### HONORS AND AWARDS

University of Minnesota:      Doctoral Dissertation Fellowship (September 1991 - August 1992)  
Chemistry Departmental Fellowship (July 1990 - June 1991)

Bethel College:      American Institute of Chemists Student Research and  
Recognition Foundation Award  
Barbara Burton Memorial Chemistry Scholarship

### EMPLOYMENT

MESSIAH COLLEGE, Grantham, Pennsylvania  
Professor of Chemistry, (September 2003 – present)  
Chair, Department of Chemistry and Biochemistry, (September 2003 – present)  
Demonstrated leadership in the teaching and learning of chemistry:

- Effective teacher and mentor in Organic Chemistry I and II courses
- Redesigned Organic Chemistry Laboratory experience
- Developed and taught Advanced Organic Chemistry course
- Trained and mentored 3 undergraduate research students

Advocate for excellence in the Department of Chemistry and Biochemistry

- Initiated review and revision of curriculum
- Chaired search committee for Analytical Chemist
- Facilitating the purchase of modern instrumentation for our laboratories
- Insisting on safe storage of all chemicals
- Initiated development of computerized inventory of all chemicals and supplies
- Working to build a community of Chemistry and Biochemistry scholars

COLORADO COLLEGE, Colorado Springs, Colorado  
Associate Professor of Chemistry, (June 1999 – present)  
Assistant Professor of Chemistry, (September 1993 – May 1999)

Demonstrated leadership in the chemistry curriculum:

- Effective teacher and mentor to students in five different chemistry courses
- Initiated reform of organic chemistry laboratory curriculum
- Developed new courses in advanced organic chemistry
- Initiated chemistry student research seminars
- Administrated departmental computational laboratory

Established vigorous undergraduate research program:

- Trained and mentored 21 undergraduate research students
- Synthesized and studied properties of unique carbocations by low temperature NMR and computational methods. More recently my students have also been preparing proteins for spectroscopic analysis.
- Participated in collaboration with G. Barney Ellison from the University of Colorado in the synthesis of theoretically interesting small molecules

Contributed to College administrative structure

- Participated in both appointed and elected committees including Teaching Resource Committee, Campus Campaign Committee, Women's Concerns Committee, Compensation Committee, Natural Sciences Executive Committee, Research and Development Committee and Search Committees for administrative and faculty positions
- Evaluated files for promotion and tenure, and proposals for all-college research resources and sabbaticals
- Pressed for more administrative recognition of faculty-student research collaborations

UNIVERSITY OF MINNESOTA, St. Paul, MN

Visiting Research Associate, (June 1999 – December 2000, June - July 2002)

- Developed methodology for selectively labeling specific amino acids in a photosynthetic protein for use in subsequent spectroscopic analysis
- Utilized light-minus-dark difference FTIR spectroscopy to probe the changes in protein structure during light driven water oxidation
- Leadership role in both in the application of organic chemistry to the problems at hand, and in the training of new students in the proper understanding and performance of experiments

UNIVERSITY OF MINNESOTA, Minneapolis, Minnesota

Research Assistant in Chemistry, (June 1989 - August 1993)

- Made first experimental observation of an "antiaromatic" diazirinyl anion, using a flowing afterglow device and mass spectrometry. Also observed and characterized simple cyclopropenyl anions in the gas phase.
- Computational analysis of all molecules using GAMESS and Gaussian

UPSHER-SMITH LABORATORIES, Minneapolis, Minnesota

Quality Control Supervisor, (November 1987 - September 1988)

- Coordinated quality control activities in support of production and research and development.
- Maintained laboratory equipment and performed chemical testing.

Chemist, (July 1986 - November 1987)

- Performed routine testing on incoming raw materials, in-process and finished products.
- Assisted in methods development for the testing of new products.

## **PROFESSIONAL SOCIETIES**

American Chemical Society (1987 - present); Organic Division (1990 - present); Division of Chemical Education (2001 – present); Division of Biological Chemistry (2001 – present); Colorado Section (1993-2003), Southeastern Pennsylvania Section (2003 – present)

Sigma Xi Scientific Research Society (2003 – present)

Council of Undergraduate Research (1993 - present)

## **PROFESSIONAL ACTIVITIES**

ChemLinks Coalition: Making Chemical Connections, (1994-1999) NSF Systemic Change in the Undergraduate Chemistry Curriculum. Participant and module author.

Journal of Chemical Education, (1995-present) Reviewer of papers

The Chemical Educator, (1996-present) Reviewer of papers

Journal of the American Chemical Society, (1999-present) Reviewer of papers

## **PUBLICATIONS**

Roseann K. Sachs, Kelly Halverson, Bridgette A. Barry. “.Specific Isotopic Labeling and Photooxidation-linked Structural Changes in the Manganese-stabilizing Subunit of Photosystem II.” *Journal of Biological Chemistry* **278(45)**, 44222-44229 (2003).

Sunyoung Kim, Jason Patzlaff, Thomas Krick, Idelisa Ayala, Roseann K. Sachs, and Bridgette Barry. “Isotope-based Discrimination Between the Infrared Modes of Plastosemiquinone Anion Radicals and Neutral Tyrosyl Radicals in Photosystem II,” *Journal of Physical Chemistry B* **104(41)**, 9720-9727 (2000).

Sachs, Roseann Kroeker and Kass, Steven R., "3-Carbomethoxycyclopropen-3-yl Anion. Formation and Characterization of an Antiaromatic Ion," *J. Am. Chem. Soc.* **116**, 783 (1994).

Sachs, Roseann Kroeker and Kass, Steven, R. "Ab Initio Calculations on the Diaziriny Anion. A Better Understanding of Antiaromaticity Obtained," *MSI Research Bulletin* , **7(3)**, (1991).

Kroeker, R.L.; Bachrach, S.M. and Kass S.R., "Ab initio Calculations on the Diaziriny Anion. A Nonaromatic Species," *J. Org. Chem.*, **56**, 4062 (1991).

Kroeker, R.L. and Kass, S.R., "Diaziriny Anion: A Cyclic Four  $\pi$ -Electron System," *J. Am. Chem. Soc.* **112**, 9024 (1990).

Roesselet, K.; Doan, K.E.; Johnson, S.D.; Nicholls, P.; Miessler, G.L.; Kroeker, R. and Wheeler, S.H., "Synthesis and Structural Characterization of Molybdenum Dimers Bridged by the Dithiolene Ligand  $S_2C_2(CF_3)_2$ ," *Organometallics*, **6**, 480 (1987).

## **PEER REVIEWED PRESENTATIONS**

(\*denotes an undergraduate collaborator)

- "FT-IR Investigation of the Manganese Stabilizing Protein of Photosystem II" by Roseann K. Sachs, Kelly Halverson and Bridgette Barry, presented at the 47<sup>th</sup> Annual Biophysical Society Meeting, San Antonio, TX, March 1-5, 2003.
- "FT-IR Investigation of the Aspartic and Glutamic Acid Residues in the Manganese Stabilizing Protein of Photosystem II" by Roseann K. Sachs, Kelly M. Halverson, Bridgette A. Barry, presented at the 28<sup>th</sup> Midwest Photosynthesis Meeting, Turkey Run State Park, Marshall, Indiana, October 27-29, 2002.
- "FT-IR Investigation of the Aspartic and Glutamic Acid Residues in the Manganese Stabilizing Protein of Photosystem II" by Roseann K. Sachs, Kelly M. Halverson, Bridgette A. Barry, presented at the Rocky Mountain Regional American Chemical Society Meeting, Albuquerque, NM, October 12 - 15, 2002.
- "Enhanced <sup>13</sup>C Labeling in the Manganese Stabilizing Protein of Photosystem II" by Violet Roskens\* and Roseann K. Sachs, presented at the PEW Undergraduate Research Symposium in the Physical Sciences and Mathematics, University of Chicago, Chicago, IL, November 9-11, 2001.
- "Spectroscopic Investigations of Photosynthetic Water Oxidation" by Kelly M. Halverson, Roseann K. Sachs, Yuming Zhou and Bridgette A. Barry, presented at the 27<sup>th</sup> Midwest Photosynthesis Meeting, Turkey Run State Park, Marshall, Indiana, October 28-30, 2001.
- " $\mu$ -Hydrido Bridging in the Cyclooctyl Ring System," by Jennifer Leonard\* and Roseann K. Sachs, presented at the PEW Undergraduate Research Symposium in Mathematics and the Physical Sciences, Washington University, St. Louis, MO, November 13-15, 1998
- "Synthesis of 1-Acetylcyclooctanol and 1-p-Trifluoromethylphenylcyclooctanol as Precursors to Unique  $\mu$ -Hydrido Bridged Cations," by Sally D. Rupert\*,\* and Roseann K. Sachs, presented at the 211th ACS National Meeting, New Orleans, Louisiana, March 24-28, 1996.
- "Generation and Characterization of a Stable Cyclopropenyl Anion," by R.K. Sachs, and S.R. Kass, presented at the 205th ACS National Meeting, Denver, Colorado, March 28-April 2, 1993.
- "Antiaromaticity in Small 4 $\pi$ -Electron Anions in the Gas Phase," by R.K. Sachs, and S.R. Kass, presented at the 203rd ACS National Meeting, San Francisco, California, April 5-10, 1992.

## **INVITED TALKS**

- "Probing the Mechanism of Light Driven Water Oxidation in Photosystem II with Isotopic Editing and Difference Infrared Spectroscopy: by Roseann K. Sachs, presented at the Messiah College Department of Chemistry and Biochemistry Seminar Program, October 28, 2004
- "Photosynthesis: Studying the Mechanism of Life" by Roseann K. Sachs, presented at the Messiah College Interdisciplinary Fellowship, September 16, 2004

"Probing the Mechanism of Light Driven Water Oxidation in Photosystem II with Isotopic Editing and Difference Infrared Spectroscopy: by Roseann K. Sachs, presented as part of the Suter Science Seminar Series at Eastern Mennonite University, February 13, 2004.

"Probing the Mechanism of Light Driven Water Oxidation in Photosystem II with Isotopic Editing and Difference Infrared Spectroscopy" by Roseann K. Sachs, presented at the University of Colorado at Denver, February 18, 2003.

"Probing the Effect of Increasing Electron Demand on 3-Center-2-Electron Bonding in Carbocations" by Roseann K. Sachs, presented at Gustavus Adolphus College, December 6, 2002.

"Probing the Mechanism of Light Driven Water Oxidation in Photosystem II with Isotopic Editing and Difference Infrared Spectroscopy" by Roseann K. Sachs, presented for the Pikes Peak Sigma Xi Club and University of Colorado at Colorado Springs Chemistry Department, January 24, 2002.

"Probing the Mechanism of Light Driven Water Oxidation in Photosystem II with Isotopic Editing and Difference Infrared Spectroscopy" by Roseann K. Sachs, presented at Colorado College, October 19, 2001.

"A Sabbatical in the Dark: Studying Photosynthesis," by Roseann K. Sachs, presented at the All College Faculty Seminar Program, October 16, 2001.

"Probing the Effect of Increasing Electron Demand on Three-Center Two-Electron Bonding in Carbocations," by Roseann K. Sachs, presented at the Undergraduate Research Symposium, University of Nevada, Reno, August 13, 1998.

"Antiaromaticity in Small  $4\pi$ -Electron Anions in the Gas Phase," by R.K. Sachs, and S.R. Kass, presented at Grinnell College, Grinnell, Iowa, January, 1993.

"Antiaromaticity in Small  $4\pi$ -Electron Anions in the Gas Phase," by R.K. Sachs, and S.R. Kass, presented at Bethel College, St. Paul, Minnesota, April 23, 1992.

## GRANTS

Messiah College, Steinbrecher Undergraduate Summer Research Program, 2005 (\$3,500).

National Science Foundation: "POWRE: Infrared and Nuclear Magnetic Resonance Studies of the Manganese Stabilizing Protein in Photosystem II," MCB-9973324, August 1999 (\$74,922).

National Center for Supercomputing Applications at the University of Illinois, Urbana-Champaign; "Probing the Nature of Three-Center Two-Electron Bonding via Molecular Orbital Calculations," CHE980047N, August 1998 (2000 SU hours).

Research Corporation: "Linear Three-Center Two-Electron Bonding in Carbocations," CC-3893, May 1995 (\$28,500).

Colorado College: Funds for student stipends, personal research and travel, as well as research supplies for various projects over 9 years (\$22,112).