

Ryan Zahn Hinrichs

Department of Chemistry
Drew University
36 Madison Ave.
Madison, NJ 07940

phone: (973)408.3853
fax: (973)408.xxxx
email: rhinrich@drew.edu

Education:

Cornell University, Ph.D. in Physical Chemistry, Aug. 2001.

Advisor: H. Floyd Davis, Ph.D.

Thesis: *Competition between C-C and C-H Bond Activation in Model Hydrocarbons by Early Second Row Neutral Transition Metal Atoms*. Crossed molecular beams studies.

Cornell University, M.S. in Physical Chemistry, Jan. 1999.

Moravian College, B.S. in Chemistry with Honors, *Summa Cum Laude*, May 1996.

Teaching Experience:

2007 – present. Assistant Professor of Chemistry, Drew University, Madison, NJ.

Teaching responsibilities: Physical Chemistry.

2002 – 2007. Professor of Chemistry, Sarah Lawrence College, Bronxville, NY.

Taught year-long General Chemistry course (3 hr. seminar, 3 hr. lab); incorporated several instruments into labs including AA, UV-Vis and IR spectrometers, HyperChem, GC, and bomb calorimeter; supervise the independent experimental projects for approximately 16 students each year.

Taught Physical Chemistry I: Quantum Mechanics (3 hr. class, 1 semester); supervised independent projects in chemiluminescence, fluorescence and BET adsorption theory.

Developed and taught several non-major seminar courses, including Atmospheric Chemistry, Global Warming, and Inventing Photography: A Chemical History; supervised independent projects for students in these courses.

Designed and taught interdisciplinary lecture course Origins; co-taught course with mathematician, physicist, biologist, and computer scientist.

Developed and taught first-year studies colloquium Chemical Revolutions; met weekly with advisees for first-year to advise students in academic studies and curricular planning.

2001 – 2002. Guest Faculty in Chemistry, Gonzaga University, Spokane, WA.

Taught two sections of General Chemistry (Fall semester) and Organic Chemistry (Spring semester); each section 3 hr. class, 3 hr. lab.

Fall 1997. Lecture Teaching Assistant, Cornell University, Ithaca, NY.

Introductory Physical Chemistry: Taught two recitation sections and graded exams for semester course; taught five lectures during semester due to professor's absence.

- Spring 1998,* Laboratory Teaching Assistant, Cornell University, Ithaca, NY.
- 1996 – 1997.* Honors Experimental Chemistry (Analytical and Physical Chemistry Lab). Supervised one laboratory section (6 hr. per week) in chemical microscopy, spectroscopy, gas chromatography, calorimetry, and kinetics.
- 1998–2000.* U.S. Department of Education Graduate Fellowship, Cornell University. Microworld teacher partnership: Team taught microscope science lab to 5th grade students at South Seneca Elementary School. Presented chemistry demos at Elizabeth Anne Clune Montessori School (1st/2nd grade) and Dewitt Elementary School (6th/8th grade classes).

Research Experience:

- 2007 – present.* Independent Research, Drew University, Madison, NJ.
- 2002 – 2007.* Independent Research, Sarah Lawrence College, Bronxville, NY. Conducted research with undergraduates on atmospherically relevant heterogeneous reactions between gaseous pollutants and mineral surfaces. Funding as PI: National Science Foundation, “RUI: Spectroscopic studies on the heterogeneous chemistry of model mineral aerosol compounds.” *Oct. 2004–Sept. 2007* (\$282,104). Funding as PI: OceanOptics Educational Grant, “UV-absorption by ozone and the actinic cutoff.” Cost-sharing grant to purchase UV-Visible spectrometer *May 2004* (\$2,710). Mentored four undergraduate research assistants: Robert J. Garrard (*2004–2005*); Megan M. Angelini (*2005–present*); Sarah J. Rosen (*2006*); Richard W. Hempel (*2006–present*). Student Presentation: Megan Angelini, “Heterogeneous reactions on clay minerals,” SLC Science Seminar, *Dec. 2005*. Student Presentation: Robert Garrard, “The impact of mineral aerosols on the troposphere: formation of nitrous acid,” SLC Science Seminar, *Sept. 2004*. Collaboration: “EXAFS analysis of atmospheric carbonate aerosol components,” with Prof. Scott Calvin (Dept. of Physics, Sarah Lawrence).
- 1996 - 2001.* Graduate Research Assistant, Cornell University, Ithaca, NY. Advisor: Prof. H. Floyd Davis. Investigated reaction dynamics of prototype organometallic reactions in the gas phase using the crossed molecular beams technique with 157 nm ionization product detection. Extensive experience with lasers and vacuum equipment. Communicated results to scientific community through publications and conferences.

1994 - 1996. Undergraduate Research Assistant, Moravian College, Bethlehem, PA.
Advisor: Prof. O. Carl Salter. Performed computational studies of the N_3H_3 potential energy surface using Gaussian (two summers). Senior Honors Project: Light absorption properties of light emitting diodes. Presented results of both projects at National Council on Undergraduate Research (NCUR) conferences.

Publications: (underline indicates undergraduate students)

- “Exploration of heterogeneous chemistry in model atmospheric particles using extended x-ray absorption fine structure analysis,” J.A. Bramante, R.Z. Hinrichs, E.C. Brown, S. Calvin, in preparation (2007).
- “Heterogeneous reactions of gaseous nitric acid and nitrogen dioxide on the clay minerals kaolinite and pyrophyllite,” M.M. Angelini, R.J. Garrard, S.J. Rosen, R.Z. Hinrichs, *J. Phys. Chem.*, **111**(17), 3326-3335 (2007).
- “Competition between C-C versus C-H activation in reactions of neutral yttrium atoms with cyclopropane and propene,” R.Z. Hinrichs, J.J. Schroden, H.F. Davis, *J. Phys. Chem. A* **107**(44), 9284-9294 (2003).
- “Competition between C-C and C-H Insertion in prototype transition metal-hydrocarbon reactions,” R.Z. Hinrichs, J.J. Schroden, H.F. Davis, *J. Am. Chem. Soc.* **125**(4), 860-861 (2003).
- “Crossed beams studies of $Mo(a^7S_3)$ and $Mo^*(a^5S_2)$ collisions with CH_4 and C_2H_6 ,” R.Z. Hinrichs, P.A. Willis, H.U. Stauffer, J.J. Schroden, H.F. Davis, *J. Chem. Phys.* **112**, 4634-4643 (2000).
- “Dynamics of H_2 and C_2H_4 elimination in the $Y + C_2H_6$ reaction,” H.U. Stauffer, R.Z. Hinrichs, J.J. Schroden, H.F. Davis, *J. Phys. Chem. A* **104**, 1107-1116 (2000).
- “Rotatable source crossed molecular beams apparatus with pulsed ultraviolet/vacuum ultraviolet photoionization detection,” P.A. Willis, H.U. Stauffer, R.Z. Hinrichs, H.F. Davis, *Rev. Sci. Instr.* **70**, 2606-2614 (1999).
- “Competing reaction pathways from $Y + C_2H_2$ collisions,” H.U. Stauffer, R.Z. Hinrichs, P.A. Willis, H.F. Davis, *J. Chem. Phys.* **111**, 4101-4112 (1999).
- “Dynamics of $Y + H_2CO$ reactions,” H.U. Stauffer, R.Z. Hinrichs, J.J. Schroden, H.F. Davis, *J. Chem. Phys.* **111**, 10758-10761 (1999).
- “Reaction dynamics of Zr and Nb with ethylene,” P.A. Willis, H.U. Stauffer, R.Z. Hinrichs, H.F. Davis, *J. Phys. Chem.* **103**, 2706-2720 (1999).
- “Crossed beams study of C-H bond activation: $Mo(^5S_2) + CH_4 \rightarrow MoCH_2 + H_2$,” P.A. Willis, H.U. Stauffer, R.Z. Hinrichs, H.F. Davis, *J. Chem. Phys.* **108**, 2665-2668 (1998).
- “Isotriazene: A surprisingly stable minimum on the N_3H_3 surface,” E.A. Salter, R.Z. Hinrichs, C. Salter, *J. Am. Chem. Soc.* **118**, 227-228 (1996).

Professional Activities:

Presentation, “Using infrared and x-ray spectroscopy to investigate chemical changes of minerals exposed to NO_2 and HNO_3 ,” Pittsburgh Conference, Feb. 2007 (Invited Speaker).

- Poster, "Heterogeneous reactions of gaseous nitric acid and nitrogen dioxide on prototype clay minerals: kaolinite and pyrophyllite," M.M. Angelini, R.Z. Hinrichs, AGU 2006 Fall Meeting, San Francisco, CA, *Dec. 2006*.
- Reviewer for National Science Foundation, Atmospheric Environment, Journal of Chemical Education, Journal of Geophysical Research.
- Participant, Hudson Valley Environmental Consortium Meeting, *2004, 2005, 2006*.
- Presentation, Center for Talented Youth College Colloquium, Stevens Institute of Technology, *2003, 2004* (Invited Speaker).
- Participant, Middle Atlantic Discovery Chemistry Project, curriculum and pedagogical development conference, *2003, 2004, 2005*.
- Presentation, "Understanding C-C Bond Activation in Model Systems." Cornell University, *Aug. 2000*.
- Presentation, "Hydrocarbon Activation by Transition Metal Atoms: Crossed Molecular Beams Studies." Moravian College, *Mar. 2000* (Invited Speaker).
- Poster, "Crossed beams studies of $\text{Mo}(a^7\text{S}_3)$ and $\text{Mo}^*(a^5\text{S}_2)$ collisions with CH_4 and C_2H_6 ," ACS 2000 Spring Meeting, San Francisco, CA, *Mar. 2000*.
- Poster, "Reaction dynamics of Zr and Nb with ethylene," Dynamics of Molecular Collisions Conference, Lake Harmony, PA, *July 1999*.

Service at Sarah Lawrence College:

- Curriculum Committee, *Sept. 2006-May 2007*.
- Organized 2006 Colloquium on Climate Change; lectures given by Elizabeth Kolbert, Cynthia Rosenzweig, and Marcellus Andrews.
- Admissions Committee, *Sept. 2005-May 2006*.
- Organized 2005-2006 Annual Science Speaker: lecture given by John Emsley.
- Committee on Student Life, *Sept. 2004-May 2005*.
- Physics Search Committee, *2004*.
- Chemical Hygiene Committee, *2004-present*.
- Science Seminar Series Coordinator and Host, *Aug. 2003-May 2006*.
- Weekly SciMath eMailing, *Aug. 2003-Dec. 2005*.
- Admitted Students' Day, *2004*.
- Family Weekend, *2003*.
- Presentation, "Ozone: a potentially dubious molecule in its absence and presence," SLC Science Seminar, *Oct. 2002*.