

Charles A. Smith, Ph.D.

2023

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Our Lady of the Lake University
Department of Chemistry
San Antonio, Texas 78207
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PROFESSIONAL OBJECTIVE

Educate others in chemistry and science while continually expanding my own knowledge and expertise.

EDUCATION

Doctor of Philosophy, Physical Chemistry, August 4, 1995
Iowa State University, Ames, Iowa. Advisor: Walter S. Struve, Ph.D.
Dissertation: "Excited State Proton Transfer in 9-Aminoacridine Carboxamides in Water and in DNA"
GPA: 3.75/4.00

Bachelor of Arts, June 1989
University of Minnesota at Morris, Morris, MN
Major: Chemistry Minors: Mathematics and Physics
GPA: 3.59/4.00

PROFESSIONAL EXPERIENCE

Assistant Professor, Our Lady of the Lake University, San Antonio, Texas, 1998 to 2002

Associate Professor, Our Lady of the Lake University, San Antonio, Texas, 2002 to 2007

Full Professor, Our Lady of the Lake University, San Antonio, Texas, 2007 to present

Courses taught: Physical, Instrumental Analysis, Analytical, and General Chemistry along with introductory science courses for non science majors. I have developed an Instrumental course with over 24 laboratory activities that involve analyses of the environment or commercial products. For this course and others I have also developed discovery classroom and laboratory activities that often utilize supplies from local electronics and hardware stores. Six of my laboratory and classroom activities have been published in the Journal of Chemical Education. Realizing the importance and student impact of undergraduate research, my summer research students have given forty-one well-received research poster presentations at regional and national meetings of the American Chemical Society.

Chemistry Program Chair, Our Lady of the Lake University, San Antonio, TX, 2003 to 2008

General responsibilities include scheduling, accreditation documentation, program planning, create/monitor departmental webpage, general program administrative/representative duties

NASA Faculty Fellow, NASA Langley Research Center, Hampton, VA, summers 2002 and 2003

As a faculty fellow I spent two summers in Dr. Robert Rogowski's research group in the Nondestructive Evaluations Sciences branch. During the first summer we worked on developing a fiber optic chemical sensing system that can be integrated into their already existing fiber optic strain sensing system. The second summer was spent continuing the chemical sensor work and delving into photonic crystal field theory and its applications in the field of chemical sensing.

Assistant Professor, Friends University, Wichita, Kansas, August 1995 to 1998

Courses taught included Physical Chemistry, Analytical Chemistry, General Physics, introductory science/astronomy courses, and non traditional student evening science courses.

Kaplan Instructor, MCAT exam preparation, Wichita, Kansas, 1997

Intern, Koch Refining Company, Analytical Services, Wichita, Kansas, summer 1996

Responsibilities included method verification and performance of analyses to industrial specifications on acids and sulfur compounds.

Temporary Instructor, Iowa State University, Department of Chemistry, 1993 to 1995

Responsibilities included teaching general chemistry courses geared toward engineers with with over 270 students and supervision of approximately 7 teaching assistants.

Research Assistant, Iowa State University, Department of Chemistry, 1989 to 1995

As a graduate student I prepared monolayers consisting of long chain silanes and dye molecules and used spectroscopic techniques to monitor energy transfer processes. Computer programs were written for determination of kinetic fluorescence parameters such as lifetime and rate constants as a function of pH for different kinetic models.

Safety Officer, Iowa State University-Ames Laboratory, 1990 to 1995

Graduate Teaching Assistant, Iowa State University, 1991-1992

Research Internship, University of Iowa, Department of Chemistry, summer 1988

In Dr. Arnold's laboratory we constructed electrochemical sensors in search for improved methods of electrochemical phosphate detection using ion selective membranes.

Undergraduate Chemistry Teaching Assistant, University of Minnesota at Morris, 1986-1989

FUNDED GRANTS/AWARDS since 1999

- Gloyna Award for Excellence in Innovative Teaching with Technology, Our Lady of the Lake University, May 15, 2010
- \$60,000 Welch Foundation Departmental Grant, funds used to support undergraduate research activities, 2007 through 2010
- \$60,000 Welch Foundation Departmental Grant, funds used to support undergraduate research activities, 2004 through 2007
- \$20,000 Moody Professorship, funds used to support undergraduate research, 2003
- ~\$12,000 funds provided by the Hearst Foundation have been used to support undergraduate research experiences and travel expenses to ACS meetings, 1999 through current
- \$10,000 professional collaboration with USDA researcher Dr. Robert Stipanovic Southern Plains Agricultural Research Center, College Station, TX, 2002 through 2007
- Research fellow, NASA Langley Research Center, mentored by Dr. Robert Rogowski, fiber optic chemical sensing and FOSS network, summer 2002
- Research fellow, NASA Langley Research Center, mentored by Dr. Robert Rogowski, photonic fiber optic chemical sensing techniques, summer 2003
- Center for Workshops in the Chemical Sciences (CWCS) "Theoretical and Computational Chemistry" Salt Lake City, Utah May 15-20, 2005
- Service Learning Faculty Fellow, OLLU, summer 2004

ANALYTICAL INSTRUMENTATION EXPERIENCE includes

At OLLU we can not afford manufacturer service contracts nor manufacturer onsite repair visits. Since I am the Instrumental Analysis instructor and my students also use the instrumentation intensively for undergraduate research purposes, I have been maintaining and repairing the below instrumentation since arriving at OLLU. All the instruments receive intense usage by undergraduates and breakdowns/problems arise. I have become quite proficient at trouble shooting and performing both minor and major repairs on each of the instruments listed below:

GCMS, GCFID, HPLC, FTNMR, and the following additional research grade spectrophotometers: flame AA, UV/Vis, FTIR, and a spectrofluorimeter

ANALYTICAL INSTRUMENTATION (MAINTENANCE) WORKSHOPS include

- "GC Tips & Tricks Tour" Agilent Technologies, Austin, Texas, June 2, 2009
- "GC & LC Repair, Maintenance..." Agilent Technologies, Austin, Texas, Feb 23, 2004
- "Gas Chromatography," Agilent Technologies, Houston, Texas, May 2, 2002
- "Agilent 1100 Series Liquid Chromatograph Troubleshooting & Maintenance," Course No. H4058A, Houston, Texas, May 1, 2001
- Course No. H4043A-19, Atlanta Georgia, May 6-10, 1999
- Course No. H5929A-14, Atlanta Georgia, Nov. 23-26, 1999
- ACS Short Course: "Electronics for Laboratory Instrumentation: Making the Right Connections," San Francisco, CA, April 10-12, 1997

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

- American Chemical Society, 1994 to present
- National Science Teachers Association, 2008 to present

PUBLICATIONS since 1999

- Diaz, L.; Smith, C.A. Investigating the Photoelectric Effect Using LED's and a Modular Spectroscope. *J. Chem. Educ.* **2005**, 82, 906.
- Smith, A.A.; Smith, C.A. *J. Chem. Educ.* **2005** 82, 560A.
- Smith, C.A. Checkerboard Chromatography. *J. Chem. Educ.* **2004**, 81, 384A.
- Smith, C.A.; Villaescusa, F.W. Simulating Chromatographic Separations in the Classroom. *J. Chem. Educ.* **2003**, 80, 1023.
- Munguia, T.; Smith, C.A. Measurement of the Surface Tension of Various Liquids Using Inexpensive Capillary Tubing and Observations of Laser Diffraction Patterns. *J. Chem. Educ.* **2001**, 78, 343.
- Avalos, M.P.; Smith, C.A. A Classroom Demonstration of Rayleigh Light Scattering in Optically Active and Inactive Systems. *J. Chem. Educ.* **1999**, 76, 1230.

ORAL PRESENTATIONS since 1999

- Smith, C.A. *Successful creation of a fun and competitively friendly atmosphere in the general chemistry laboratory*” Lilly Conference on College & University Teaching; Pomona, CA, March 11 & 12, **2011**.
- Smith, C.A. *Interactive Chromatography in the Classroom*; 2009 NSTA National Conference, New Orleans, LA March 22, **2009**.
- Smith, C.A. *Personal Experiences in Chemical Education*; Indiana University Purdue University at Indianapolis (IUPUI), Indianapolis, IN, February 13, **2008**.
- Smith, C.A. *Personal Experiences in Chemical Education*; University of Texas at San Antonio (UTSA), San Antonio, TX, February 19, **2008**.
- Smith, C.A. *The Use of C4 in the Undergraduate Chemistry Laboratory at IUPUI*; Indiana University Purdue University at Indianapolis (IUPUI), Indianapolis, IN, April 11, **2008**.
- Smith, C.A. *Introduction to the First Law of Thermodynamics*; Park University, St. Louis, MO, December 17, **2007**.
- Smith, C.A. *Classroom and Laboratory Activities from Radio Shack, Home Depot and a Few Things from Fisher Scientific*; 39th Western Regional ACS Meeting, Sacramento, CA October 28, **2004**.
- Smith, C.A. *Classroom Chromatography Workshop*; 18th Biennial Conference on Chemical Education, Iowa State University, Ames, IA, July 20, **2004**.
- Smith, C.A. *Hands-On Physical Chemistry: Activities from Home Depot, Radio Shack, and a Few Things from Fisher Scientific*; Moody Professor Series, OLLU, San Antonio, TX, Feb. 18, **2004**.
- Smith, C.A. *From Bragg Gratings to Butterfly Wings: Two Summers with NASA*; Moody Professor Series, University of the Incarnate Word, San Antonio, TX, March 12, **2004**.
- Smith, C.A. *Photonic Crystal Theory*; 2003 NASA NFFP Research Presentation, Langley Research Center, Hampton, VA August 1, **2003**.
- Smith, C.A. *Progress in the Construction of Photonic Crystal Optical Fiber*; 55th SE ACS Regional Meeting, Atlanta, GA November 16, **2003**.
- Smith, C.A. *Fiber Optic Sensor System*; 2002 NASA NFFP Research Presentation Competition, Langley Research Center, Hampton, VA August 6, **2002**.
- Smith, C.A. *A "Make 'n Take" Session: Demonstration Apparatus for Viewing Rayleigh Light Scattering in Optically Active and Inactive Systems*; Southwest Regional ACS Meeting, San Antonio, TX, Oct. 19-20, **2001**.

POSTER PRESENTATIONS since 1999

- C.A. Smith, *Introduction of C4: a strategy for science laboratory instruction*, 240th National ACS Meeting, Boston, MA August 22, **2010**.
- C.A. Smith, *Stirling engine construction using standard hardware store components*, 238th National ACS Meeting, Washington D.C. August 16, **2009**.
- C.A. Smith, *Guided inquiry laboratory activity: volume percent of carbon dioxide in auto exhaust*, 236th National ACS Meeting, Philadelphia, PA August 17, **2008**.
- C.A. Smith, *Tribulations and Jubilations Initiating a Chemistry Club*, 234th National ACS Meeting, Boston, MA August 20, **2007**.
- Smith, C.A. *Construction of an Inexpensive Vortex Tube and its Use in Physical Chemistry Courses*; 32nd National ACS Meeting, San Francisco, CA September 10, **2006**.
- Smith, C.A. *Synthetic Opal Synthesis and Characterization in the Physical Chemistry Laboratory*; 230th National ACS Meeting, Washington D.C. August 28, **2005**.
- Smith, C.A. *Classroom Simulation of Chromatographic Separations*; 225th National Meeting of the American Chemical Society, New Orleans, LA March 23, **2003**.

- Smith, C.A. *A Simple Gas Viscometer for the Physical Chemistry Laboratory*; 223rd ACS National Meeting, Orlando, FL, April 7-11, **2002**.
- Smith, C.A. *Lasers in the Undergraduate Physical Chemistry Curriculum*; Joint ACS 55th Southwest and 15th Rocky Mountain Regional Meeting of the ACS, El Paso, TX Oct. 21-23, **1999**.

UNDERGRADUATE RESEARCH PRESENTED BY DR. SMITH'S STUDENTS AT REGIONAL AND NATIONAL MEETINGS OF THE AMERICAN CHEMICAL SOCIETY since 2000

1. Rivera, A.; Smith, C.A. *Benzene production in commercial beverages*; 240th National ACS Meeting, Boston, August 22, **2010**.
2. Garza, A.; Smith, C.A. *Contaminant analysis of fish oil*; 240th National ACS Meeting, Boston, August 22, **2010**.
3. Garza, S.; Smith, C.A. *Analysis of microplastics in Corpus Christi's marine environment*; 240th National ACS Meeting, Boston, August 22, **2010**.
4. Ayala, J.; Smith, C.A. *Chemical analysis of electronic cigarette smoke*; 240th National ACS Meeting, Boston, August 22, **2010**.
5. Herrera, M.; Smith, C.A. *Mapping mercury concentrations in soils near a coal burning power plant*; 238th National ACS Meeting, Washington D.C. August 17, **2009**.
6. Rivera, A.; Smith, C.A. *Detection of nicotine in human hair*; 238th National ACS Meeting, Washington D.C. August 17, **2009**.
7. Martinez, A.; Smith, C.A. *Non mercury heavy metal analyses in vicinity of local coal and cement plants*; 238th National ACS Meeting, Washington D.C. August 17, **2009**.
8. Salas, J.; Smith, C.A. *Search for mercury near a coal burning power plant*; 236th National ACS Meeting, Philadelphia, PA August 18, **2008**.
9. McNamara, K.; Smith, C.A. *Migration of styrene from foam cups*; 236th National ACS Meeting, Philadelphia, PA August 18, **2008**.
10. Garcia, M.; Smith, C.A. *Benzene production in the presence of vitamin C and a common preservative*; 236th National ACS Meeting, Philadelphia, PA August 18, **2008**.
11. Zuniga, L.; Smith, C.A. *Search for a cadmium point source using stripping voltammetry*; 234th National ACS Meeting, Boston, August 20, **2007**.
12. Davila, E.; Smith, C.A. *"CDtrodes" vs. traditional gold film electrodes in determination of a soil pollutant*; 234th National ACS Meeting, Boston, August 20, **2007**.
13. Vallejo, B.; Smith, C.A. *Novel determination of hydrophobic pollutants in surface waters*; 234th National ACS Meeting, Boston, August 20, **2007**.
14. Ramirez, D.; Smith, C.A. *Investigations into Diffusion of Common Drugs in Human Hair*; 232nd National ACS Meeting, San Francisco, September 11, **2006**.
15. Martinez, A.; Smith, C.A. *Investigations into Alternatives to SPME for Purposes of Pheromone Detection*; 232nd National ACS Meeting, San Francisco, September 11, **2006**.
16. Alvarez, F.; Smith, C.A. *Development of a Fiber Optic Based Hydrogen Sensing System*; 232nd National ACS Meeting, San Francisco, September 11, **2006**.
17. Gutierrez, L.; Smith, C.A. *Construction and Experimentation of a 'Home-Depot' Ranque-Hilsch Vortex Tube*; 232nd National ACS Meeting, San Francisco, September 11, **2006**.
18. Walther, E.; Smith, C.A. *Method Development of a Sensitive and Inexpensive Lead Sensing Wipe*; 232nd National ACS Meeting, San Francisco, September 11, **2006**.
19. Ramirez, D.; Smith, C.A. *Investigations into Diffusion of Common Drugs in Human Hair*; 62nd Southwest Regional ACS Meeting, Houston, October 22, **2006**.
20. Martinez, A.; Smith, C.A. *Investigations into Alternatives to SPME for Purposes of Pheromone Detection*; 62nd Southwest Regional ACS Meeting, Houston, October 22, **2006**.
21. Alvarez, F.; Smith, C.A. *Development of a Fiber Optic Based Hydrogen Sensing System*; 62nd Southwest Regional ACS Meeting, Houston, October 22, **2006**.
22. Gutierrez, L.; Smith, C.A. *Construction and Experimentation of a 'Home-Depot' Ranque-Hilsch Vortex Tube*; 62nd Southwest Regional ACS Meeting, Houston, October 22, **2006**.
23. Walther, E.; Smith, C.A. *Method Development of a Sensitive and Inexpensive Lead Sensing Wipe*; 62nd Southwest Regional ACS Meeting, Houston, October 22, **2006**.
24. Favela, M.; Smith, C.A. *Method Development to Determine Common Pharmaceutical Agents in Wastewater*; 230th National ACS Meeting, Washington D.C. August 29, **2005**.
25. Orona, F.; Smith, C.A. *Surface Air Analyses Above an Underground Chemical Contamination Plume*; 230th National ACS Meeting, Washington D.C. August 29, **2005**.
26. Flores, M.; Smith, C.A. *Cinnamon Oil vs. DEET, and the Winning Mosquito Repellent is...*; 230th National ACS Meeting, Washington D.C. August 29, **2005**.
27. Rubio, V.; Gutierrez, X.; Stipanovic, R.; Smith, C.A. *Gossypol Enantiomeric Ratio Determination in Wild Species of Gossypium Cotton Plants*; 230th National ACS Meeting, Washington D.C. August 29, **2005**.
28. Barajas, A.; Smith, C.A. *Size Distribution of Synthesized Monodispersed Silica Spheres via Field Flow Fractionation*; 39th Western Regional ACS Meeting, Sacramento, CA, October 28, **2004**.
29. Munoz, J.; Smith, C.A. *Chemical Analyses of Tap Water from Residential Homes Located Over a Recognized Chemical Contamination Plume in San Antonio, Texas*; 39th Western Regional ACS Meeting, Sacramento, CA, October 28, **2004**.
30. Gutierrez, X.; Smith, C.A. *Development of a Method for Chloroform Determination in Swimming Pools*; 39th Western Regional ACS Meeting, Sacramento, CA, October 28, **2004**.
31. Garcia, C.; Smith, C.A. *Analysis of Fluorescent Components in the Cuticle of Various Scorpion Species*; 39th Western Regional ACS Meeting, Sacramento, CA, October 28, **2004**.
32. Diaz, L.; Smith, C.A. *Determination of Planck's Constant using LEDs*; 225th ACS National Meeting, New Orleans, LA, March 23-27, **2003**.
33. Urbina, A.; Smith, C.A. *Quantitative Diffuse Reflectance IR Analyses of Various Commercial Solids*; 225th ACS National Meeting, New Orleans, LA, March 23-27, **2003**.
34. Pacheco, M.; Stipanovic, R.; Smith, C.A. *Isolation, purification, and identification of biologically active naphthoquinones from heartwood of *Thespesia populnea**; 225th ACS National Meeting, New Orleans, LA, March 23-27, **2003**.
35. Urbina, A.; Smith, C.A. *Isolation and Identification of Fluorescent Compounds in Scorpions*; 55th SE Regional ACS Meeting, Atlanta, GA, November 16-19, **2003**.
36. Martinez, N.; Stipanovic, R.; Smith, C.A. *Identification of biologically active naphthoquinones from heartwood of *Thespesia populnea**; 55th SE Regional ACS Meeting, Atlanta, GA, November 16-19, **2003**.
37. Pinon, T.; Smith, C.A. *The Detection and Repair of Defects in Polycarbonate*; 55th SE Regional ACS Meeting, Atlanta, GA, November 16-19, **2003**.
38. Salas, J.; Smith, C.A. *The Bacterial Growth Inhibition Properties of Red Wine*; Southwest Regional ACS Meeting, San Antonio, TX, Oct. 19, **2001**.
39. Martinez, A.; Smith, C.A. *Synthesis of Organosilanes and Placement onto Glass Beads*; Southwest Regional ACS Meeting, San Antonio, TX, Oct. 19, **2001**.
40. Gres, M.; Smith, C.A. *Monitoring the Decomposition Process in Diet Coke*; Southwest Regional ACS Meeting, San Antonio, TX, Oct. 19, **2001**.
41. Sanchez, D.; Smith, C.A. *HPLC Analysis of Catecholamine Extracts from the Banana (*Musa x paradisiaca*) Peel*; Southwest Regional ACS Meeting, San Antonio, TX, Oct. 19, **2001**.
42. Rossi, D.; Smith, C.A. *Comparison of Nicotine Levels in Different Brands of Tobacco Products*; 52nd Southeast/56th Southwest Combined ACS Regional Meeting, New Orleans, LA, Dec. 6-8, **2000**.
43. Garcia, G.; Smith, C.A. *Chemical Comparison of Copycat and Name Brand Perfumes Using GCMS*; 52nd Southeast/56th Southwest Combined ACS Regional Meeting, New Orleans, LA, Dec. 6-8, **2000**.

44. Moreno, M.; Smith, C.A. *Differences in the Defensive Secretions of Male and Female "Daddy Longlegs" Leioleptus Townsendi Using GCMS*; 52nd Southeast/56th Southwest Combined ACS Regional Meeting, New Orleans, LA, Dec. 6-8, **2000**.
45. Ramsay, V.; Smith, C.A. *GCMS Analyses of VOC's from Various Fruits*; 52nd Southeast/56th Southwest Combined ACS Regional Meeting, New Orleans, LA, Dec. 6-8, **2000**.