

Walter J. Bowyer

Department of Chemistry
Hobart and William Smith Colleges
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Education

Ph.D. Analytical Chemistry	University of Vermont	5/1985
M.S. Biology	University of Virginia	1/1986
B.S. Ecology	Johnson State College	5/1980

Teaching Experience

Hobart and William Smith Colleges
Phillip J. and Margaret N. Moorad Endowed Professorship (7/2015-present).
Full Professor, 7/98-present.
Associate Professor, 7/93-7/98.
Assistant Professor, 7/88-7/93.
Department Chair, 6/95-6/98; 6/2003-6/2007.

Courses Taught

Chem 110 Molecules that Matter
Chem 120 Chemical Reactivity
Chem 210 Quantitative Chemical Analysis
Chem 220 Physical Chemistry I
Chem 240 Organic Chemistry I
Chem 241 Organic Chemistry II
Chem 260 Environmental Chemistry
Chem 308 Chemistry of Art
Chem 437 Instrumental Methods
Chem 460 Senior Seminar
GnEd 140 Ways of Knowing
Fsem 101 New Science Meets Old Art
Fsem 173 Origins of Human Culture
Bids 202 Environmental Studies: The Natural Science Perspective
Bids 210 The Curious Cook
Bids 220 Ancient Mysteries/Modern Solutions
Bids 232 Diversity and Adaptation (term abroad)
Env 110 Topics in Environmental Science: Global Climate Change
Env 250 Human Impact on South American Environments (term abroad)
Chem 340 Water Chemistry and Coral Reef Ecology (term abroad)
Rom 213 Life in Ancient Rome: Technology, Art, Food (term abroad)

Rom 214 Ancient Mysteries/Modern Solutions in Italy (term abroad)

Research Experience

Hobart and William Smith Colleges, 7/1988-present: Kinetic studies of Grignard reagent formation. Inductively coupled plasma emission spectroscopy. Archaeological chemistry. Prehistoric art. Electroanalytical chemistry. Kinetics and diffusion.

University of California, Santa Cruz, 2-3/2011: Review of literature on IMA intermediates. With Prof. Bakthan Singaram.

University of Virginia, 1-3/2002, 2-3/2008: Fluorescence spectroscopy in polymer films. With Prof. James Demas.

Argonne National Laboratory West, summer, 1998: Analysis of prehistoric wood by HPLC, X-ray fluorescence, and neutron activation analysis. With Dr. Kevin Carney.

Oregon State University, sabbatic, 1995: Fluorescent and visible spectroscopic in vivo imaging of leaves. With Prof. Larry Daley.

Northern Arizona University, sabbatic, 1994: Analysis of prehistoric pottery by plasma spectroscopy. With Prof. R. Foust.

University of South Dakota, 7/1993: Fluorescent imaging of oxygen reduction. With Prof. Royce Engstrom.

University of Delaware, postdoctoral fellowship, 1986-88: Kinetics and thermodynamics of electron transfer and associated conformation changes. With Prof. Dennis Evans.

University of Bordeaux, postdoctoral fellowship, 1985-86: Electrochemical studies of organometallic complexes. Synthesis of asymmetric amino acids. With Prof. Didier Astruc.

University of Vermont, doctoral research, 1981-85: Mechanistic electrochemistry. Organometallic synthesis and characterization. Kinetics of electron transfer and thermodynamics of structural changes of organometallic complexes. With Prof. Bill Geiger.

External Grants Funded

Wyckoff Foundation, 2014, \$8,000.

J.B. Snow Foundation, 2013, \$5,000.

NSF-RUI Research Grant, 2010-13, \$187,700.

NSF-RUI Research Grant, 2007-10, \$170,500.

Special Grant, Camille and Henry Dreyfus Foundation, with David Craig and Richard Rosenberg, 1998, \$15,000.

NSF-ILI, Gas Chromatograph-Mass Spectrometer, with David Craig, 1997, \$21,285.

Merck/AAAS Undergraduate Science Research Program, with Joel Kerlan, 1997-99, \$60,000.

NSF-RUI Research Grant, 1994-1997, \$101,000.

Petroleum Research Fund Research Grant, 1994-1996, \$25,000.

Pittsburgh Spectroscopy Society Professional Grant, 1992, \$509.

NSF-ILI, Inductively Coupled Plasma Spectrometer, with Brooks McKinney and Michael Wing, 1992, \$28,350.

Research Corporation, College Science Grant, 1991-93, \$18,997.

Pittsburgh Spectroscopy Society, equipment, 1990, \$1975.

Research Corporation, College Science Grant, 1989-1991, \$12,850.

Publications (Student co-authors in bold)

38. **Bezbatchenko, K.E.; Musa, M.A.; Robinson, T.J.; Mylod, G.;** Bowyer, W.J. "Solvent effects on heterogeneous rate constants for indium mediated allylations. In preparation for *J. Phys. Chem. A*.

37. **Hill, A.N.; Delaney, K.M.; Sullivan, T.R. Mylod, G.; Kiesow, K.H.;** Bowyer, W.J. "Heterogeneous rate constants for indium mediated allylations: cinnamyl chloride in ethanol/water mixtures." *J. Phys. Chem. A* 2013, 117, 8826–8835.

36. **Olson, I.A.; Bacon, W.A.; Baez Sosa, Y.Y.; Delaney, K.M.; Forte, S.A.; Guglielmo, M.A.; Hill, A.N.; Kiesow, K.H.; Langenbacher, R.E.; Xun, Y.; Young, R.O.;** Bowyer, W.J. "Measurement of heterogeneous reaction rates: three strategies for controlling mass transport and their application to indium mediated allylations." *J. Phys. Chem. A* 2011, 115, 11001-11007.

35. Bowyer, W.J.; Singaram, B.; **Sessler, A.M.** "Mechanism of indium-mediated allylation: a review of the evidence for the structure of organoindium intermediates." *Tetrahedron*. 2011, 67, 7449-7460.

34. **Olson, I.A.; Sessler, A.M.; Connell, J.L.; Giordano, E.; Baez Sosa, Y.; Zavaleta, S.W.;** Bowyer, W.J. "Measurement of heterogeneous reaction rates during Indium-mediated allylation." *J. Phys. Chem. A* 2009, 113, 2801-2808.
33. Bowyer, W.J.; Xu, W.; Demas, J.N. "Determining proton diffusion in polymer films by lifetimes of luminescent complexes measured in the frequency domain." *Anal. Chem.* 2009, 81(1), 378-384.
32. Bowyer, W.J. "Morocco: an opportunity for rock art researchers." (Book Review) *Rock Art Research* 2006, 23(1), 129-30.
31. Bowyer, W.J.; **Beckingham, B.A.** "Kinetics and mechanism of the formation of organometallic compounds from organic halides at metal surfaces." Proceedings - Electrochemical Society 2004, 2004-10, 33-36.
30. Bowyer, W.J.; Xu, W.; Demas, J.N. "Determining oxygen diffusion coefficients in polymer films by lifetimes of luminescent complexes measured in the frequency domain." *Anal. Chem.* 2004, 76(15), 4374-4378.
29. Bowyer, W.J. "Diversity, environment, and adaptation: reflections on California's archaeology." (Book Review) *Rock Art Research* 2003, 20(2), 177-178.
28. Bowyer, W.J. "The challenges of studying earliest art." *Rock Art Research* 2003, 20(2), 104-105.
27. Bowyer, W.J. "On defining prehistoric 'art'." *La Pintura* 2002, 29(2), 8.
26. **Beals, B.J.; Bello, Zainab I.; Cuddihy, K.P.; Healy, E.M.; Koon-Church, S.E.; Owens, J.M.; Teerlinck, C.E.;** Bowyer, W.J. "Absolute kinetic rate constants and activation energies for the formation of Grignard reagents." *J. Phys. Chem. A* 2002, 106, 498-503.
25. Bowyer, W.J.; Ning, L.; Daley, L.S.; Strobel, G.A.; Edwards, G.E.; Callis, J.B. "In vivo fluorescent imaging for detection of damage to leaves by fungal phytotoxins." *Spectroscopy* 1998, 13(11), 36-44.
24. Bowyer, W.J. "Grignard Reagents." In *Encyclopedia of Chemistry*; Lagowski, J.J., Ed.; Volume 3; Macmillan Reference USA, Simon & Schuster Macmillan: New York, 1997; pp. 698-702.
23. Bowyer, W.J.; Kaydos, J.A. "A novel format for seminar during the senior year of the college chemistry curriculum." *J. Chem. Ed.* 1997, 74, 184-185.
22. **Kneisel, E.A.; Ciszkowski, N.A.;** Bowyer, W.J.; Walker, F.S.; Huntsberger, T.G.; Foust, R.D. "Identifying clay sources of prehistoric pottery using atomic spectroscopy." *Microchem. J.* 1997, 56, 40-46.

- 20,21. Ning, L.; Chozinski, A.M.; Azarenko, A.; Daley, L.S.; Bowyer, W.J.; Buban, T.; Edwards, G.E.; Strobel, G.A.; Callis, J.B. "Five novel applications of imaging visible and short near infrared spectrophotometry and fluorometry in the plant sciences. Part 1. Photographic and histological applications." *Spectroscopy* 1996, 11(9), 44-49. "Part 2. Non-invasive in vivo applications." *Spectroscopy* 1996, 12(1), 37-46.
19. Bowyer, W.J.; Xie, J.; Engstrom R.C. "Fluorescence imaging of the heterogeneous reduction of oxygen." *Anal. Chem.* 1996, 68, 2005-9.
- 17,18. Ning, L.; Daley, L.S.; Bowyer, W.J.; Piepmeier, E.H.; Strobel, G.A.; Callis, J.B. "Spectroscopic imaging of water in living plant tissues. Part I: Rayleigh corrections and significance for Beer's law-based in situ quantification." *Spectroscopy* 1996, 11(3), 34-44. "Part II: Challenges, uses, and advantages of in vivo absorbance methods for the analysis of biological materials." *Spectroscopy* 1996, 11(4), 68-74.
16. **Teerlinck, C.E.;** Bowyer, W.J. "Reactivity of magnesium surfaces during the formation of Grignard reagents." *J. Org. Chem.* 1996, 61, 1059-1064.
15. **Clark, M.E.; Ingram, J.L., Blakely, E.E.;** Bowyer, W.J. "Effects of cell design on electrochemical measurements in submicroliter volumes." *J. Electroanal. Chem.* 1995, 385, 157-162.
14. **Ingram, J.L.;** Bowyer, W.J.; Fong, J. "Frequency dependent capacitance of microelectrodes and arrays." *J. Electroanal. Chem.* 1994, 365, 79-86.
13. **Koon, S.E.; Oyler, C.E.;** Hill, J.H.M.; Bowyer, W.J. "Visualization of the areal distribution of the reactivity of magnesium surfaces in the formation of Grignard reagents." *J. Org. Chem.* 1993, 58, 3225-3226.
12. **Hrehocik, M.E.; Lundgren, J.S.;** Bowyer, W.J. "Anodic stripping voltammetry analysis of selenium: comparison of electrode geometries." *Electroanalysis* 1993, 5, 289-294.
11. **Feinberg, J.S.;** Bowyer, W.J. "Heavy metal determination and speciation: anodic stripping voltammetry employing microelectrodes." *Microchem. J.* 1993, 47, 72-78.
10. Bowyer, W.J.; **Clark, M.E.; Ingram, J.L.** "Electrochemical measurements in submicroliter volumes." *Anal. Chem.* 1992, 64, 459-462.
9. **Odell, D.M.;** Bowyer, W.J. "Fabrication of band microelectrode arrays from metal foil and heat sealing Tefzel film." *Anal. Chem.* 1990, 62, 1619-1623.
8. Lacoste, M.; Rabaa, H.; Astruc, D.; LeBeuze, A.; Saillard, J.Y.; Precigoux, G.; Courseille, C.; Ardoin, N.; Bowyer, W.J. "Complexation of polyaromatics by CpFe⁺ and

Cp*Fe⁺ and electronic structures of the monoreduced complexes." *Organometallics* 1989, 8, 2233-2242.

7. Bowyer, W.J.; Engelman, E.E.; Evans, D.H. "Kinetic studies by cyclic voltammetry at low temperatures using microelectrodes." *J. Electroanal. Chem.* 1989, 262, 67-82.

6. Bowyer, W.J.; Merkert, J.W.; Geiger, W.E.; Rheingold, A.L. "Redox-induced hapticity changes: effect of substituents on arene bending in a series of rhodium complexes." *Organometallics* 1989, 8, 191-198.

5. Bowyer, W.J.; Evans, D.H. "Electrochemical reduction of vicinal dinitro compounds." *J. Org. Chem.* 1988, 53, 5324-5329.

4. Bowyer, W.J.; Evans, D.H. "Electron transfer reactions and associated conformational changes. Electrochemical reductions of trans-1,2-diiodocyclohexane." *J. Electroanal. Chem.* 1988, 240, 227-237.

3. Bowyer, W.J.; Geiger, W.E. "Analysis of a quasireversible two-electron cyclic voltammetric wave for an organometallic Ir(III)/Ir(I) couple at platinum and mercury electrodes." *J. Electroanal. Chem.* 1988, 239, 253-271.

2. Bowyer, W.J.; Geiger, W.E. "Electrochemically induced changes in hapticity in mixed sandwich compounds of Rh and Ir." *J. Amer. Chem. Soc.* 1985, 107, 5657-5663.

1. Bowyer, W.J.; Geiger, W.E.; Boekelheide, V. "An electrochemical study of the reduction of mono- and bis-(iron) cyclophane complexes." *Organometallics* 1984, 3, 1079-1086.

Papers Presented at National Meetings

"Conversion of goethite to hematite: the first artificial pigment?" PittCon on Analytical Chemistry, Philadelphia, March 2019. With **S. VanHoesen, J. Picuri, and S. Shyam.**

"Histological Analysis for Evidence of Endocrine Disruption in Blacknose Dace (*Rhinichthys atratulus*) in the Seneca Lake Watershed." NYC American Fisheries Society, Cooperstown, February 2018. With **S. Garcia, N. Nguyen, P. Murphy,** and Susan Cushman.

"Detection of Endocrine Disruptors Using Male Blacknose Dace" PittCon on Analytical Chemistry, Chicago, March 2017. Presented by **E.C. Knipper, S.H. Smilen.** With **N.E. Andrzejczyk,** S. Cushman.

"Using microscopy to measure rates of heterogeneous reactions." PittCon on Analytical Chemistry, Atlanta, March 2016. With **G. Mylod.**

“Effects of macromolecular crowding on diffusion and enzyme kinetics.” PittCon on Analytical Chemistry, New Orleans, March 2015. Presented by **D. Hargreaves, M. Mahajan, E. McLaughlin, A. Wilcox**. With K. Slade.

“Teaching at the Interface of Chemistry and Art: Two Novel Courses.” Gordon Conference, Sunday River, ME, July 2014.

“Measuring heterogeneous rate constants and energy of activation with photomicroscopy.” PittCon on Analytical Chemistry, New Orleans, March 2014. Presented **K. Bezbatchenko**. With **M. Musa, T. Robinson, G. Mylod**.

“Measuring heterogeneous rate constants and energy of activation with photomicroscopy.” PittCon on Analytical Chemistry, Chicago, March 2014. Presented by **K. Bezbatchenko, M. Musa, T. Robinson, G. Mylod**.

“Kitchen as laboratory: two courses at very different levels.” American Chemical Society, 245th Meeting, New Orleans, April 2013. With J. Miller and C. Forbes.

“Solvent effects on the kinetics of Indium Mediated Allylations.” American Chemical Society, 245th Meeting, New Orleans, April 2013. Presented by **A.Hill**.

“Measurement of heterogeneous rate constants using photomicroscopy.” 32nd Conference of the Federation of Analytical Chemistry and Spectroscopy Societies, Kansas City, October 2012. With **K. Delaney, G. Mylod, T. Sullivan, A. Hill**.

“Measurements of heterogeneous rate constants for reaction of cinnamyl chloride with indium.” American Chemical Society, 244th Meeting, Philadelphia, August 2012. Presented by **K. Delaney, G. Mylod, T. Sullivan, A. Hill**.

“Rate measurements of kinetically controlled indium mediated allylations.” PittCon on Analytical Chemistry, Orlando, March 2012. Presented by **K.M. Delaney** and **A.N.Hill**. With **K. Kiesow** and **Y. Xun**.

“Measurement of rates of indium mediated allylation at indium spheres.” Pittsburgh Conference on Analytical Chemistry, Atlanta, March 2011. Presented by **S.A. Forte** and **C.E. Lukas**. With **R.E. Langenbacher**.

“Mechanism and kinetics of the first step of indium mediated allylations.” American Chemical Society, 239th Meeting, San Francisco, March 2010. With **S.W. Zavaleta, R.O. Young, W.A. Bacon, R.E. Langenbacher**.

“Measurement of heterogeneous reaction rate, stoichiometry, and mechanism of Indium Mediated Allylations.” Pittsburgh Conference on Analytical Chemistry, Orlando, March 2010. Presented by **W.A. Bacon, S.A. Forte**.

“Effects of the geometry of the system and solvent on rates of heterogeneous reactions.” Pittsburgh Conference on Analytical Chemistry, Orlando, March 2010. Presented by **R.O. Young, R.E. Langenbacher**.

“Measurements of heterogeneous reaction rates: indium mediated allylations.” 29th Conference of the Federation of Analytical Chemistry and Spectroscopy Societies, Louisville, October 2009. Presented by **R.E. Langenbacher**.

"Heterogeneous reaction rates of indium mediated allylation." American Chemical Society, 238th Meeting, Washington DC, August 2009. With **S.W. Zavaleta, R.O. Young, W.A. Bacon, R.E. Langenbacher**.

“Measuring rates of reaction of indium mediated allylation.” American Chemical Society, 237th Meeting, Salt Lake City, March 2009. Presented by **I.A. Olson**.

“Mechanism of indium mediated allylations and the structure of the organoindium intermediate.” American Chemical Society, 237th Meeting, Salt Lake City, March 2009. Presented by **A.M. Sessler**.

“NMR spectroscopy for indirect evidence on the unstable intermediates during reactions at indium surfaces.” Pittsburgh Conference on Analytical Chemistry, Chicago, March 2009. With **A.M. Sessler**.

“Measuring rates of reactions of organic molecules at metal surfaces using photomicrography.” Pittsburgh Conference on Analytical Chemistry, Chicago, March 2009. With **I. A. Olson**.

“Determination of cation binding capacities in wood to understand the contribution of volcanic eruptions to tree ring chemistry.” American Chemical Society, 236th Meeting, Philadelphia, August 2008. Presented by **I.A. Olson**

“Rates of reactions of allyl halides at indium surfaces: Diffusion vs. kinetic control.” American Chemical Society, 236th Meeting, Philadelphia, August 2008. With **I.A. Olson and A. M. Sessler**. Presented by **S.W. Zavaleta**.

“Stoichiometry of Reactions of Allyl Halides at Indium surfaces: Implications for the Structure of Unstable Intermediates.” American Chemical Society, 236th Meeting, Philadelphia, August 2008. Presented by **A. M. Sessler**.

“Rate of Formation and Structure of Organometallic Transients in Indium-Mediated-Allylations” Pittsburgh Conference on Analytical Chemistry, New Orleans, March 2008. With **A. M. Sessler, I. A. Olson, E. Giordano, and Y. Baez Sosa**.

“Measurement of Heterogeneous Rate Constants: Reaction of Allyl Bromide at Indium Surfaces.” 27th Conference of the Federation of Analytical Chemistry and Spectroscopy

Societies, Memphis, October 2007. With **E. Giordano, Y. Baez Sosa, A. Sessler, and I. Olson.**

“Measuring Heterogeneous Rate Constants: Reactions at Indium Surfaces.” American Chemical Society, 234th Meeting, Boston, August 2007. Presented by **E. Giordano, Y. Baez Sosa, A. Sessler, and I. Olson.**

“Measurement of Heterogeneous Rate Constants during the Reaction of Allyl Bromide at Indium Surfaces.” Pittsburgh Conference on Analytical Chemistry, Chicago, March 2007. With **J.L. Connell.** Presented by **M.A. Guglielmo .**

“Novel Technique for the Measurement of Heterogeneous Rate Constants: Reaction of Allyl Bromide at Indium Surfaces.” Council on Undergraduate Research Poster Session on Capitol Hill, Washington D.C. April 2006. Presented by **J.L. Connell.**

“Understanding the Chemical History Recorded within the Rings of Trees.” Pittsburgh Conference on Analytical Chemistry, Orlando, March 2006. Presented by **Y.L. Cheng and C.C. Graber.**

“Novel Technique for the Measurement of Heterogeneous Rate Constants: Reaction of Allyl Bromide at Indium Surfaces.” Pittsburgh Conference on Analytical Chemistry, Orlando, March 2006. With **J.L. Connell and B.A. Beckingham.**

“Analysis of tree rings by ion chromatography for chemical evidence of volcanic activity.” Pittsburgh Conference on Analytical Chemistry, Orlando, March 2005. With **Y.L. Cheng and C.C. Graber.**

“Analysis of tree rings by ion chromatography and ICP spectroscopy.” Pittsburgh Conference on Analytical Chemistry, Chicago, March 2004. With **R.D. Echols and B.A. Beckingham.**

"Determination of diffusion coefficients of oxygen in polymer-based fluorescent sensors." Pittsburgh Conference on Analytical Chemistry, Orlando, March 2003. With Xu, W. and Demas, J.N.

"Chemical analysis of tree rings to detect volcanic eruptions." Pittsburgh Conference on Analytical Chemistry, New Orleans, March 2002. With **S.C. Jones and E.A. Oakes.**

"Electrochemistry as a tool for studying the mechanism and thermodynamics of Grignard reagent formation." 27th Conference of the Federation of Analytical Chemistry and Spectroscopy Societies, Nashville, September 2000. With **Z.I. Bello, T.M. Varalli, and E.X. Vivas.**

"Efficiency of a venturi scrubber for removing air pollutants during the sintering of geological carbonates." American Chemical Society, 216th Meeting, San Francisco, March 2000. Presented by **E.X. Vivas.**

"Morphology of magnesium surfaces during Grignard reagent formation." American Chemical Society, 216th Meeting, San Francisco, March 2000. Presented by **Z.I. Bello**.

"Elemental analysis of prehistoric pottery to establish trade relationships between Hohokam villages in the American Southwest." Second Annual Undergraduate Research Poster Session on Capitol Hill, Washington D.C., April 1998. Presented by **L.B. Cotton**.

"Elemental analysis of ancient juniper wood as an indicator of volcanic activity." American Chemical Society, 214th Meeting, Las Vegas, September 1997. With **L.M. Gilbert**.

"The use of platinum to catalyze the initiation of Grignard reagent formation." American Chemical Society, 213th Meeting, San Francisco, April 1997. With **C.E. Teerlinck**. Presented by **S.C. Tashkovski**.

"Absolute rate constants and activation energies for the formation of Grignard reagents." American Chemical Society, 213th Meeting, San Francisco, April 1997. With **J.M. Owens, S.E. Koon, and C.E. Teerlinck**. Presented by **B.J. Beals**.

"Measurement of rates and activation energies of corrosion by photomicrography of metal surfaces." 23rd Conference of the Federation of Analytical Chemistry and Spectroscopy Societies, Kansas City, October, 1996. With **J.M. Owens and B.J. Beals**.

"In Vivo imaging fluorescence spectroscopy for detection of damage to leaves by fungal phytotoxins." Pittsburgh Conference on Analytical Chemistry, Chicago, March 1996. With L. Ning, L.S. Daley, G.A. Strobel, G.E. Edwards, J.B. Callis.

"Identifying clay sources for prehistoric pottery by atomic spectroscopy and multivariate statistics." 22nd Conference of the Federation of Analytical Chemistry and Spectroscopy Societies, Cincinnati, October, 1995. Presented by **E.A. Kneisel**. With T.G. Huntsberger, F.S. Walker, and R.D. Foust.

"Measurement of localized rates of corrosion on magnesium surfaces by photomicrography." Pittsburgh Conference on Analytical Chemistry, New Orleans, March 1995. With **C.E. Oylar and S.E. Koon**.

"Elemental analysis of clays and prehistoric pottery sherds by atomic spectroscopy." Pittsburgh Conference on Analytical Chemistry, New Orleans, March 1995. With F.S. Walker, T.G. Huntsberger, and R.D. Foust.

"Electrode imaging of the reduction of oxygen." Pittsburgh Conference on Analytical Chemistry, Chicago, March 1994. With R.C. Engstrom.

"Areal distribution of the reactivity of magnesium surfaces in the formation of Grignard reagents." 33rd National Organic Chemistry Symposium, Bozeman, MT, June 1993. With **S.E. Koon**. Presented by **C.E. Oyler**

"Effects of cell design for electrochemical measurements in submicroliter volumes." Pittsburgh Conference on Analytical Chemistry, Atlanta, GA, March 1993. With **M.E. Clark and E.E. Blakely**.

"Frequency dependence of the capacitance of band microelectrodes and arrays." American Chemical Society, 204th Meeting, Washington, D.C., August 1992. Presented by **J.L. Ingram**.

"Voltammetric determination of selenium: comparison of electrode geometries." American Chemical Society, 203rd Meeting, San Francisco, April 1992. With **M.E. Hrehocik and J.S. Lundgren**.

"Electrochemical measurements in submicroliter volumes." Federation of Analytical Chemists and Spectroscopy Societies; 18th National Meeting, Anaheim, October 1991. With **M.E. Clark and J.L. Ingram**.

"Application of microelectrodes and arrays to chemical analysis." International Society of Electrochemistry, 41st Meeting, Prague, August 1990. With **D.M. Odell and M.E. Hrehocik**.

"Band microelectrode arrays: application to anodic stripping voltammetry." Electrochemical Society, 177th Meeting, Montreal, May 1990. With **D.M. Odell and M.E. Hrehocik**.

"Preparation of band microelectrode arrays from Tefzel film and metal foil." American Chemical Society, 199th Meeting, Boston, April 1990 With **D.M. Odell**.

"Metal speciation: anodic stripping voltammetry using microelectrodes." International Chemical Congress of Pacific Basin Societies, Honolulu, December 1989. With **M.E. Hrehocik and J.S. Feinberg**.

"Cyclic voltammetry at low temperatures using microelectrodes and digital correction of data." Pittsburgh Conference on Analytical Chemistry, Atlanta, GA, March 1989. With D.H. Evans and E.E. Engelman.

"Mechanistic investigation of cathodic elimination reactions leading to olefins." Electrochemical Society, 172nd Meeting, Honolulu, October 1987. With D.H. Evans.

"Studies of conformational interconversion in 1,2-dibromides using cyclic voltammetry with microelectrodes." Electrochemical Society, 171st Meeting, Philadelphia, May 1987. With D.H. Evans.

Invited Seminars

Department of Chemistry, University of California, Santa Cruz, CA, February 2011

Department of Chemistry, Nazareth College, Rochester, NY, October 2010

Undergraduate Research Symposium Keynote Speaker, University of North Carolina, Charlotte, April 2002.

Department of Chemistry, University of Virginia, Charlottesville, VA, March 2002.

Department of Chemistry, Alfred State University, Alfred, NY, October 1999.

Sigma Xi Lecture, Cornell University, New York State Agricultural Experiment Station, February 1997.

Department of Chemistry, University of Iceland, Reykjavik, Iceland, June 1996.

American Chemical Society Piedmont-Carolina Section Meeting Keynote Speaker, Charlotte, NC, April 1995.

Department of Chemistry, University of North Carolina, Charlotte, NC, April 1995.

Department of Chemistry, Northern Arizona University, Flagstaff, AZ, October 1994.

Department of Chemistry, University of South Dakota, Vermillion, SD, July 1993.

Analytical Division, University of Chicago's Argonne National Laboratory West, Idaho Falls, ID, June 1993.

Department of Chemistry, San Diego State University, San Diego, CA, October 1991.

Department of Chemistry, SUNY Buffalo, Buffalo, NY, June 1991.

Industrial Research Center, Atochem N.A., Somerville, NJ, March 1991.

Department of Chemistry, Rochester Institute of Technology, Rochester, NY, March 1991.

Department of Chemistry, University of Vermont, Burlington, VT, December 1990.

Department of Chemistry, LaSalle University, Philadelphia, PA, November 1988.