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Education

1993 Ph.D. Inorganic Chemistry, State University of New York at Buffalo, Buffalo, New York
1988 B.S. Chemistry, State University of New York at Buffalo, Buffalo, New York

Professional Experiences

Apr. 2015- present Deputy Division Director
Division of Chemistry (CHE), National Science Foundation, Arlington, VA

Jan. 2015- Apr. 2015 Acting Deputy Division Director
Division of Chemistry (CHE), National Science Foundation, Arlington, VA

Aug. 2014 – Jan. 2015 Acting Deputy Division Director
Division of Materials Research (DMR), National Science Foundation, Arlington, VA

Dec. 2013 – Mar. 2014 Acting Budget Director
Directorate of Mathematical and Physical Sciences, National Science Foundation, Arlington, VA

July 2012 – present Program Director and Team Lead - Chemical Synthesis Program
Division of Chemistry, National Science Foundation, Arlington, VA

Sept. 2010 – July 2012 Program Manager for the Fuels from Sunlight Energy Innovation Hub and Energy Frontier Research Centers (EFRCs) Programs

Chemical Sciences, Geosciences, and Biosciences Division, Office of Science, U. S. Department of Energy, Germantown, MD;

July 2009-Sept. 2010 *Program Director and Team Lead - Chemical Catalysis Program
Program Director - Chemical Structure, Dynamics and Mechanism
Program*

Aug. 2007-June 2009 *Program Director (permanent federal position) - Inorganic,
Bioinorganic and Organometallic Chemistry Program*

Aug. 2005-Aug. 2007 *Program Director (Visiting Scientist, Engineer, and Educator
Program), Inorganic, Bioinorganic and Organometallic Chemistry
Program*

Chemistry Division, National Science Foundation, Arlington, VA

Sept. 2006-Sept. 2010 *Visiting Scientist*
Naval Research Laboratory, Surface Chemistry Division (Code 6170), Washington, DC

Aug. 2006- Aug. 2009 *Full Professor of Chemistry*
Aug. 2001- Aug. 2006 *Associate Professor of Chemistry with Tenure*
Aug. 1995- Sept. 2001 *Assistant Professor of Chemistry*
Chemistry Department, Villanova University, Villanova, PA

Sept. 2005-Aug. 2006 *Adjunct Professor of Education*
Arcadia University, Glenside, PA

Aug. 2002-Aug. 2003 *Visiting Faculty*
Department of Chemistry, University of North Carolina at Chapel Hill, Chapel Hill, NC

Sept. 1999-Aug. 2000 *Visiting Faculty*
Radcliffe Institute of Advanced Studies, Harvard University, Cambridge, MA

Sept. 1999-Aug. 2000 *Visiting Scientist*
Department of Chemistry, Northeastern University, Boston, MA

Nov. 1993-Aug. 1995 *National Research Council Postdoctoral Fellow*
Surface Chemistry Division (Code 6170), Naval Research Laboratory, Washington, DC

Honors and Awards

- 2013 NSF Division of Chemistry 2013 Special Recognition for Outstanding Leadership in the Development and Management of Two Joint Solicitations with EPA
- 2011 U.S. DOE Monetary Award for Superior Job Performance – in recognition of my performance during the rating period for 2011
- 2011 U.S. DOE Special Act or Service Award: In recognition of outstanding effort in the preparation and conduct of the Energy Frontier Research Center Summit and Forum and for leading SC/BES representation on the DOE Hub Working Group (monetary award)
- 2009 NSF Director's Award for Collaborative Integration: SOLAR Program Management Team (monetary award)
- 2008 Keynote Speaker for the State University of New York at Buffalo Ronald E. McNair Conference (The McNair Program is designed to prepare students from underrepresented

- segments of society for doctoral studies through involvement in research and other scholarly activities.)
- 2003 External Advisory Board, National Science Foundation - Sustainable Technology Center for Environmentally Responsible Solvents and Processes (CERSP), University of North Carolina at Chapel Hill
 - 2000 Listed in "Who's Who Among America's Teachers"
 - 1999-2000 Mary Ingraham Bunting Biomedical Research Fellowship awarded by The Radcliffe Institute of Advanced Studies, Harvard University
 - 1996 Inducted into the Exxon-Sponsored Project Kaleidoscope (PKAL) Faculty for the 21st Century
 - 1996 Inducted into Sigma Xi: The Scientific Research Society; Villanova Chapter
 - 1996 Selected as one of the "Top 10 Professors of 1996" by Villanova student vote
 - 1993-1995 National Research Council / Naval Research Laboratory Postdoctoral Fellowship
 - 1991 Sloan Travel Award, given by the Association for Women in Science
 - 1990 Excellence in Teaching Award, given by the State University of New York at Buffalo Student Association

Management and Leadership Training

- Negotiating Success: A Learning Laboratory, Executive Education, Darden School of Business, University of Virginia; Sept. 2014
- Executive Leadership Retreat, NSF Academy; Sept. 2014
- Executive Coaching, OPM's Federal Executive Institute, Charlottesville, VA; Dec. 2011-May 2012
- Leadership for a Democratic Society, OPM's Federal Executive Institute, Charlottesville, VA; Oct.-Nov. 2011
- U.S. Office of Personnel Management, Management Development Center, Team Building and Team Leadership Seminar, Denver, CO (Certificate of Completion); Aug. 2009
- Center for Creative Leadership, Women's Leadership Program, Greensville, NC, (Certificate of Completion); Feb. 2003
- United Way Young Leaders Program: Board Orientation Program, Philadelphia, PA (Certificate of Completion); Feb. 2003

Patents

- DeSimone, J.M.; Visintin, P.M.; Denison, G.M.; Bessel, C.A.; Schauer, C.K.; Gross, S. "Metal Chelation in Carbon Dioxide for CMP," U.S. Pat. Appl. Publ. 2004, US 20044175948.

Publications

- Pellengarg, T.; Dimentev, N.; Jean-Gilles, R.; Bessel, C.; Borguet, E.; Dollahon N.; Giuliano, R. "Detecting and Quantifying Oxygen Functional Groups on Graphite Nanofibers by Fluorescence Labeling of Surface Species, *Carbon*, **2010**, *48(15)*, 4256-4267.
- Weinstein, R. D.; Kopec, T. C.; Fleischer, A.S.; D'Addio, E.; Bessel, C.A. "The Experimental Exploration of Embedding Phase Change Materials with Graphite Nanofibers for the Thermal Management of Electronics," *J. Heat Transfer*, **2008**, *130(4)*, 052405.
- Weinstein, R. D.; Richards, J.; Bessel, C.A.; Faulkner, C. J.; Othman, S.; Jennings, G. K. "Characterization of Self-Assembled Monolayers from Lithium Dialkyldithiocarbamate Salts," *Langmuir*, **2007**, *23(5)*, 2887-2891.

- Dunbar, A.; Omiatek, D. M.; Thai, S. D.; Kendrex, C. E.; Grotzinger, L. L.; Boyko, W. J.; Weinstein, R.D.; Skaf, D. W.; Bessel, C.A.; Denison, G. M.; DeSimone, J. M. "Bis(acetylaceton)ethylenediimine and Dialkyldithiocarbamate Ligands for Copper Chelation in Supercritical Carbon Dioxide," *Ind. Eng. Chem. Res.*, **2006**, 45(26), 8779-8787.
- Skaf, D.W.; Kandula, S.; Harmonay, L.; Shodder, P.; Bessel, C.A.; Weinstein, R.D. "The Kinetics of the Reactions of Cu(0) and Cu₂O in Hexanes and Supercritical Carbon Dioxide by *t*-Butylperacetate and 1,1,1-Trifluoro-2,4-pentanedione," *Ind. Eng. Chem. Res.* **2006**, 45(26), 8874-8882.
- Kopec, T.C.; Weinstein, R.D.; Fleischer, A.S.; D'Addio, E.; Bessel, C.A. "Thermal Analysis of Phase Change Materials with Embedded Graphite Nan fibers for Thermal Management of Electronics," Proceedings of IMECE2006, 2006 ASME International Mechanical Engineering Congress and Exposition, November 5-10, 2006, Chicago, IL, IMECE2006-13685.
- Weinstein, R.D.; Grotzinger, L.L.; Salemo, P.; Omiatek, D.M.; Bessel, C.A. "The Solubility of Several Short-Chain Lithium Dialkyldithiocarbamates in Liquid and Supercritical Carbon Dioxide," *J. Chem. Eng. Data*, **2005**, 50(6), 2088-2093.
- Denison, G. M.; Evans, A.O.; Bessel, C. A.; Skaf, D.W.; Murray, R.W.; DeSimone, J. M. "Electrochemical Behavior of Bis(β -Diketone)Copper Complexes," *J. Electrochem. Soc.* **2005**, 152(11), B435-440.
- Visintin, P. M.; Bessel, C. A.; White, P. S.; Schauer, C. K.; DeSimone, J. M. "Oxidative Dissolution of Copper and Zinc Metal with *tert*-Butyl Peracetate and a β -Diketone Chelating Agent," *Inorg. Chem.* **2004**, 44, 316-324.
- Denison, G.M.; Jones III, C.; DeYoung, J.; Gross, S.; McClain, J.; Zannoni, L.; Hicks, E.; Wood, C.; Boggiano, M.K.; Visintin, P.; Bessel, C.A.; Schauer, C.; DeSimone, J.M. "The Use of "Dry" CO₂-based Technologies for the Enhanced Fabrication of Microelectronic Devices," *Poly. Mater. Sci. Eng.* **2004**, 90, 152.
- Billings, S. B.; Mock, M. T.; Wiacek, K.; Turner, M. B.; Kassel, S. W.; Takeuchi, K. J.; Rheingold, A.; Boyko, W. J.; Bessel, C. A. " Comparison of (Triphenylphosphine)ruthenium Complexes Containing the 2,2':6',2''-Terpyridine (trpy) and 4,4',4''-Tri-*t*-butyl-2,2':6',2''-terpyridine (trpy*) Ligand," *Inorg. Chim. Acta*, **2003**, 355, 103-115.
- Bessel, C. A.; Denison, G. A.; DeSimone, J. A.; DeYoung, J.; Gross, S.; Schauer, C.K.; Visintin, P. M., "Etchant Solutions for the Removal of Cu(0) in a Supercritical CO₂-Based "Dry" Chemical Mechanical Planarization Process for Device Fabrication," *J. Am. Chem. Soc.*, **2003**, 125, 4980-4981.
- Takeuchi, K. J.; Marschilok, A. C.; Bessel, C. A.; Dollahon, N. R. "Synthesis, Characterization and Catalytic Use of Acicular Iron Particles," *J. Catal.* **2002**, 208, 150-157.
- Bessel, C. A.; Aggarwal, P.; Marschilok, A. C.; Takeuchi, K. J. "Trans-spanning Phosphine Ligands," *Chem. Rev.*, **2001**, 101, 1031-1066. Note: This is an invited article.

- Meyers, C. J.; Shah, S. D.; Patel, S. C.; Sneeringer, R. M.; Bessel, C. A.; Leising, R. A.; Takeuchi, E. S. "Templated Synthesis of Carbon Materials from Zeolites (Y, Beta and ZSM-5) and a Montmorillonite Clay (K10): Physical and Electrochemical Characterization," *J. Phys. Chem., B*, **2001**, *105*, 2143-2152.
- Llanguri, R.; Morris, J. J.; Stanley, W. C.; Bell-Loncella, E. T.; Turner, M.; Boyko, W. J.; Bessel, C. A. "Electrochemical and Spectroscopic Investigations of Oxime Complexes of Bis(bipyridyl)ruthenium(II)," *Inorg. Chim. Acta*, **2001**, *315*, 53-65.
- Bessel, C. A.; Laubernds, K.; Rodriguez, N. M.; Baker, R. T. K. "Graphite Nanofibers as an Electrode for Fuel Cell Applications," *J. Phys. Chem.*, **2001**, *105(6)*, 1115-1118.
- Rolison, D. R.; Bessel, C. A. "Electrocatalysis and Charge-Transfer Reactions at Redox-Modified Zeolites," *Accts. Chem. Res.*, **2000**, *33(11)*, 737-744.
- Bell-Loncella, E. T.; Bessel, C. A. "cis-Bis(bipyridine)(dimethylglyoxime)ruthenium(II): An Electrochemical and Spectroscopic Investigation of Proton-Coupled Electron Transfer," *Inorg. Chim. Acta*, **2000**, *303*, 199-205.
- Perez, W. J.; Lake, C. H.; See, R. F.; Toomey, L. M.; Churchill, M. R.; Takeuchi, K. J.; Radano, C. P.; Boyko, W. J.; Bessel, C. A. "In situ Synthesis of Trans-Spanning Diphosphine Ligands; Crystal Structures of *trans*-[Ru(Cl)(trpy)(PPh₃)₂]PF₆ and *trans*-[Ru(Cl)(trpy)(Ph₂PPh-CH₂-O(CO)-(CH₂)₄-(CO)O-CH₂-PhPPh₂)]PF₆," *J. Chem. Soc. Dalton Trans.* **1999**, 2281-2292.
- Bessel, C. A.; Leising, R. A.; Szczepura, L. F.; Perez, W. J.; Huynh, M. H. V.; Takeuchi, K. J. "Trichloro[2,2':6'2"-terpyridine]ruthenium(III) and Phosphine Ligand Derivatives," *Inorg. Syn.* **1998**, *32*, 185-198.
- Bessel, C. A.; Rolison D. R. "Electrocatalytic Reactivity of Zeolite-Encapsulated Co(salen) with Benzyl Chloride," *J. Am. Chem. Soc.* **1997**, *1198*, 12673-12674.
- Bessel, C. A.; Rolison, D. R. "Topological Redox Isomers: The Surface Chemistry of Zeolite-Encapsulated Co(salen) and [Fe(bpy)₃]²⁺ Complexes," *J. Phys. Chem. B* **1997**, *101(7)*, 1148-1157.
- Bessel, C. A.; Rolison, D. R. "Microheterogeneous Dispersion Electrolysis with Nanoscale Electrode-Modified Zeolites," *J. Electroanal. Chem.* **1997**, *439*, 97-105.
- Senaratne, C.; Zhang, J.; Baker, M. D.; Bessel, C. A.; Rolison, D. R. "Zeolite-Modified Electrodes: Intra- versus Extrazeolite Electron Transfer," *J. Phys. Chem.* **1996**, *100(14)*, 5849-5862.
- Churchill, M. R.; See, R. F.; Bessel, C. A.; Takeuchi, K. J. "Crystal Structure of *mer,trans*-[Ru(NO₂)(trpy)(PPr₃)₂]²⁺][ClO₄⁻], A Species with Disordered PPr₃ and NO₂ Ligands," *J. Chem. Cryst.* **1996**, *26(8)*, 543-551.
- Rolison, D. R.; Bessel, C. A. "Reply to the Comment on "Zeolite-Modified Electrodes: Intra-versus Extrazeolite Electron Transfer,"" *J. Phys. Chem.* **1996**, *100(20)*, 8610-8611.

- Churchill, M. R.; Lake, C. H.; Bessel, C. A.; Huynh, M. H. V.; McCourt, J.; Takeuchi, K. J. "Synthesis of *cis*-[Ru{4,4'-Bu₂bpy}₂(PPh₃)Cl⁺][ClO₄⁻] and the Crystal Structure of its Disordered Hemiacetonitrile, Hemitoluene Solvate," *J. Chem. Cryst.* **1996**, 26(4), 179-183.
- Bessel, C. A.; Rolison, D. R. "Electrochemistry of Transition Metal Complexes Encapsulated into Zeolites," *Stud. Surf. Sci. Catal.* **1995**, 98, 114-115.
- Bessel, C. A.; See, R. F.; Jameson, D. L.; Churchill, M. R.; Takeuchi, K. J. "Synthesis and Characterization of (Nitro)Ruthenium Complexes which Utilize a New Family of Terdentate Ligands based upon 2,6-Bis(pyrazol-1-yl)pyridine," *J. Chem. Soc. Dalton Trans.* **1993**, 1563-1576
- Bessel, C. A.; Margarucci, J. A.; Acquaye, J. H.; Rubino, R. S.; Crandall, J.; Jircitano, A. J.; Takeuchi, K. J. "Steric Ligand Effects of Six Bidentate Bipyridyl Ligands," *Inorg. Chem.* **1993**, 32, 5779-5784.
- Szczepura, L. F.; Muller, J. G.; Bessel, C. A.; See, R. F.; Janik, T. S.; Churchill, M. R.; Takeuchi, K. J. "Characterization of Protonated *trans*-Bis(dioxime)ruthenium Complexes: Crystal Structures of *trans*-Ru(DPGH)₂(NO)Cl, *trans*-[Ru(DMGH)(DMGH₂)(NO)Cl]Cl, and *trans*-Ru(DMGH)₂(NO)(Cl)," *Inorg. Chem.* **1992**, 31(5), 859-869.
- Bessel, C. A.; See, R. F.; Jameson, D. L.; Churchill, M. R.; Takeuchi, K. J. "Structural Considerations of Terdentate Ligands: Crystal Structures of 2,2':6',2''-Terpyridine and 2,6-Bis(pyrazol-1-yl)pyridine," *J. Chem. Soc. Dalton Trans.* **1992**, 3223-3228.
- Bessel, C. A.; See, R. F.; Jameson, D. L.; Churchill, M. R.; Takeuchi, K. J. "Synthesis, Characterization and Crystal Structure of *trans*-[2,6-Bis(3-phenylpyrazol-1-yl-κN²)pyridine-κN]chloro-bis(trimethylphosphine)ruthenium(II) Perchlorate: Evidence for Meridional Steric Crowding," *J. Chem. Soc. Dalton Trans.* **1991**, 2801-2805.
- Bessel, C. A.; Leising, R. A.; Takeuchi, K. J. "Ligand Effects on the Aerobic Oxidation of Cyclohexene Catalysed by Aqua(phosphine)ruthenium(II) Complexes," *J. Chem. Soc., Chem. Commun.* **1991**, 12, 833-835.
- Takeuchi, E. S.; Takeuchi, K. J.; Bessel, C.; Eads, E. "Thermodynamic Determinations for Lithium/Thionyl Chloride and Lithium/BrCl-Thionyl Chloride Cells as a Function of Temperature and Depth of Discharge," *J. Power Sources* **1988**, 24, 229-241.

Presentations – over 100 invited and submitted presentations, 49 with student presenters