Michael Axel Nichols

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Education

Ph.D. Physical Organic Chemistry, **Duke University**, Durham, NC, 1990
B.S., Chemistry, American Chemical Society Certified, *Summa Cum Laude*, **Clarion University of Pennsylvania**, Clarion, PA, 1986

Teaching Experience

John Carroll University, University Heights, OH, Assistant Professor, 1994-2000; Associate Professor, 2000-present.
Courses taught: General Chemistry Lecture, Chemical Principles (Honors General Chemistry) Lecture and Lab, Organic Chemistry Lecture and Lab, Theoretical Organic Chemistry, Organic Spectroscopy, Environmental Chemistry (non-majors) Lecture and Lab, Chemistry and Society (non-majors) Lab, Problem Solving: Math and Science (Woodrow Wilson Program).

Ohio University, Athens, OH, Visiting Assistant Professor, 1993-94
Courses taught: General Organic Lecture and Laboratory, Introduction to Organic and Biochemistry.

Kansas State University, Manhattan, KS, Temporary Assistant Professor, 1992-93
Courses taught: General Organic, Organic Chemistry Lecture and Lab, General Chemistry, Advanced Organic Laboratory.

Research Experience

Brown University, Providence, RI, Department of Chemistry, Post-Doctoral Associate 1990-1992
Research Advisor: Professor Paul G. Williard
Research involved the use of single crystal x-ray crystallography and heteronuclear NMR to study solid-state and solution structures of organoalkali compounds.

Duke University, Durham, NC, Department of Chemistry, Research Associate, 1986-1990
Thesis Advisor: Professor Edward M. Arnett (Emeritus)
Ph.D. Thesis Title: "Thermochemistry and Solution Structures of Organolithium Compounds in Non-Polar Solvents"
Thesis research involved use of heteronuclear NMR, colligative property methods, and solution calorimetry to determine solution structures and the reactivity of organolithium compounds.

Publications (* indicates undergraduate author)

Michael A. Nichols and Mark J. Waner, *"Kinetic and Mechanistic Studies of the Deuterium Exchange in Classical Keto-Enol Tautomeric Equilibrium Reactions", Journal of Chemical Education* **2010**, *87(9)*, 952-55.

Michael A. Nichols, Christina M. Leposa*, Allen D. Hunter, Matthias Zeller, *"Crystal Structures of Hexameric and Dimeric Complexes of Lithioisobutyrophenone", Journal of Chemical Crystallography,* **2007**, *37(12)*, 825-829.

Michael A. Nichols, Rachel M. Sobinsky*, Allen D. Hunter, Matthias Zeller, *"Crystal Structure of an n-Butyllithium · 1,2-Dipiperidinoethane Dimer Complex"*, *Journal of Chemical Crystallography* **2007**, *37(6)*, 433-438.

Delia Waldmuller, Barbara J. Kotsatos*, Michael A. Nichols, and Paul G. Williard, *"Synthesis of [^{15}N,^{15}N']-N,N,N',N'-TMEDA and Its Use in Solvation Studies of [^{6}Li]-n-Butyllithium," Journal of the American Chemical Society* **1997**, *119*, 5479-5480.

Michael A. Nichols, Delia Waldmuller, and Paul G. Williard*, "^{6}Li and ^{15}N NMR Studies of Mixed Alkali Metal Cation Hexamethyldisilazide Bases"*, *Journal of the American Chemical Society* **1994**, *116*, 1153-1154.

J. William Suggs, Michael J. Dube and Michael A. Nichols, "*Synthesis and Structure of a Product, Formed During DNA Nicking with a Cyclometalated Nuclease, Consisting of an Adenine Bridging 2 Palladium(II) Complexes", Journal of the Chemical Society – Chemical Communications* **1993,** 307-309.

Michael A. Nichols and Paul G. Williard, *"Solid-State Structures of n-Butyllithium Complexes with TMEDA, THF, and DME", Journal of the American Chemical Society* **1993**, *114*, 1568-1572.

Lloyd M. Jackman, Denise Cizmeciyan, Paul G. Williard, and Michael A. Nichols*, "Hexameric Lithium Phenolate. Crystal Structures and ^{7}Li Quadrupole Coupling in Solid and Solution Phases," Journal of the American Chemical Society* **1993**, *115*, 6262-6267.

Paul G. Williard and Michael A. Nichols, *"Structural Characterization of Mixed Alkali Metal Bis(trimethylsilyl)amide (HMDS) Bases", Journal of the American Chemical Society* **1991**, *113*, 9671-9673.

Michael A. Nichols, Andrew T. McPhail, Edward M. Arnett, *"Chelation of 2-Substituted-1-lithoxide --- Structural and Energetic Factors of Relevance to Synthetic Organic Chemistry"*, *Journal of the American Chemical Society* **1991**, *113*, 6222-6233.

Edward M. Arnett, Michael A. Nichols, and Andrew T. McPhail, "*Structural and Energetic Evidence for O-Li-N Chelation in a Model for Asymmetric Induction", Journal of the American Chemical Society* **1990**, *112*, 7059-7060.

Edward M. Arnett, Franklin J. Fisher, Michael A. Nichols and Anthony A. Ribiero*, "Structure-Energy Relations for the Aldol Reactions," Journal of the American Chemical Society* **1990**, *112*, 801-808.

Edward M. Arnett, Franklin J. Fisher, Michael A. Nichols and Anthony A. Ribiero, "*Thermochemistry of a Structurally Defined Aldol Reaction*", *Journal of the American Chemical Society* **1989**, *111*, 748-749.

Acknowledged Contributions to Other Publications

"Geologic Composition Influences Distribution of Microbiotic Crusts in the Mojave and Colorado Deserts at the Regional Scale", Pietrasiak, N.; Johansen, J.R.; Drenovsky, R.E. *Soil Biology and Biochemistry,* **2011**, *43*, 967-974.

"A Diatom Phosphorous Inference Model for 30 Freshwater Lakes in NE Ohio and NW Pennsylvania", Kyle Scotese, M.S. Thesis, Cleveland State University, **2008***.*

"NMR Studies of Structure and Reorganization Dynamics of an [Li-6]-Allylic Lithium Compound Complexed to [N-14,N-15]-N,N,N',N'-tetramethylethylenediamine: Inversion and Ligand Lithium Exchange", *Journal of the American Chemical Society, Fraenkel, G.; Liu, H.* **2004**, *126*, 5202-5206.

"Cyprinid Fishes as Samplers of Benthic Diatom Communities in Freshwater Streams of Varying Water Quality", Canadian Journal of Fisheries and Aquatic Sciences, Rosati, TR, Johansen, JR, Coburn, MM **2003**, *60*, 117-125.

Reports, Data and Commentary Provided to Government, Public Agencies, and Media

Commentary: In *"NASA Flies Over Lake Erie to Scan for Dangerous Algae Blooms"*, *Popular Science Online*, by Sara Nowak – Provided commentary on the causes of algal bloom and the algal bloom that caused an emergency situation in Toledo, OH, September 2014, can be found at: http://www.popsci.com/article/science/nasa-flies-over-lake-erie-scan-dangerous-algae-blooms

Commentary: *Expert Explains Toxic Algal Bloom* (Fox 8 News, WJW, Cleveland, OH) – provided commentary on the causes of algal bloom and the algal bloom that caused an emergency situation in Toledo, OH, August 2014.

Consumer Investigation: *What's in the Sand?* (19 Action News, WOIO, Cleveland, OH) – Analyzed collected beach samples for bacteria, provided results and did an on-air interview, June 2014.

"Monitoring the Nine Mile Creek Wetlands' Ability to Remediate Stormwater Runoff", Katherine Welch* and Michael A. Nichols, Report Provided to Cuyahoga Soil and Water Conservation District and City of South Euclid, Ohio, May 2012*.*

Consumer Investigation: *What's In Your Water? (NewsChannel5 Tests Bottled, Tap Water) NewsChannel5* – WEWS – Cleveland, OH, Analyzed several brands of bottled water and Cleveland tap water and provided results and did an on-air interview, Nov 2009.

A description of the research/service environmental projects of M.A. Nichols can be found in "John

Carroll University: Economic Impact on Northeast Ohio", Taylor, J.; Austrian, Z.; Yamoah, A., available at: http://www.jcu.edu/economicstudy/JCU_impact_full_report.pdf, 2007, pages 50-54.

"Shaker to Spend $18,000 on Green Lake: JCU Prof Finds Ammonia Source, Questions Treatment", Sun Press Newspaper, Apr. 19, 2007, pp. 1, 12.

"Analyzing the Water Quality of Water Entering the Langerdale Retention Basin in South Euclid, OH: Pre-Construction Data", data was provided to the Cuyahoga Soil and Water Conversation District in support of obtaining funding for converting the retention basin to a constructed wetland, Spring 2007.

Report of the Water Chemistry of the Major Inflows and Outflow of Green Lake, Summers 2005/2006", to be provided to the City of Shaker Heights, OH and the Doan Brook Watershed Partnership.
"Watershed Wellness Update", Shaker Life Magazine, Shaker Heights, OH, May/June 2006, pp. 34-37.

"Euclid Creek Volunteer Monitoring Underway", Euclid Creek Watershed Update, July/August, 2006, p. 2.

"Biological Agent Being Tested on Shaker Lakes for Aquatic Plant Control", Ohio Shorelines, Fall 2005, pp. 1, 7.

"Hot Show Prompts Camp to Add Some Killer Science: JCU's Forensics Program is a Hit with Young Fans of CSI", The Plain Dealer, July 3, 2005, Metro B4.

Director's Notes, Brook Notes: A Publication of the Doan Brook Watershed Partnership, Jan. 2005, p. 2.

"Report on the Effectiveness of Bioaugmentation Treatment of Green and Marshall Lakes Using Live Liquid Micro Organisms (LLMO)" provided to the City of Shaker Heights, OH and the Doan Brook Watershed Partnership for research conducted during Summer 2004 and 2005.

Data collected in the Euclid Creek Watershed provided to Ohio Environmental Protection Agency, for preparation of the Euclid Creek Watershed TMDL, Jan. 2005, available at: http://www.epa.state.oh.us/dsw/tmdl/EuclidCreekTMDL.html and for use in the evaluation of Section 401 Water Quality Certification to First Interstate Properties, LTD., Legacy Village Project, Lyndhurst, OH, 2002.

Master of Science Theses Directed

"Syntheses of [^{15}N]-Labelled EDA-Related Ligands and Their Complexes with n-Butyllithium", Michelle Tscheiner, M.S. Chemistry, thesis was never completed.

"Screening for Permethrin Pesticide in Creek Chub Fish and Doan Brook Water Samples", Rachel Nicholson, M.S. Biology, Graduated, August 2003 (Co-Advisor with Dr. Miles Coburn, Department of Biology).

"Kinetic Studies of the Deprotonation of Isobutyrophenone by Lithium Bis(trimethylsilyl)amide Using Proton NMR", Joseph L. Redley, M.S. Chemistry Completed, September 1999.

"Structural and Energetic Studies of Transmetalation Reactions Between Lithium Bis(trimethylsilyl)amide and Sodium, Potassium and Cesium Alkoxides", James E. Reddy, M.S. Chemistry Completed, 1997.

"Synthesis of [^{15}N]-Pyrollidine and Its Use in the Solvation Studies of Organolithium Compounds", Marc A. Falcone, M.S. Chemistry Completed, 1996.

Grants and Fellowships Obtained

"Development of an Advanced Organic Spectroscopy Course", John Carroll University, Summer Course Development Fellowship, $5,000, Summer 2008.

"Physical Organic Studies of Organoalkali Reagents and Their Reactions", John Carroll University, Grauel Fellowship (Leave), Fall 2004.

Major Author of the Department of Chemistry's successful *Heuer Award for Outstanding Achievement in Undergraduate Science Education* from the Council of Independent Colleges, $10,000, Spring 2002.

"Evaluation of Two Constructed Wetlands to Remediate Urban-Run Off", Michael Nichols, Summit County Soil and Water Conservation District, Twinsburg, OH, $4,900, 2001-2002.

"The Use of Trimethylsilylmethyllithium as an Initiator in Polymerization Reactions of Polystyrene", American Chemical Society POLYED Undergraduate Research Fellowship for Erin Shaneyfelt, $3,500, Summer 2002.

"Acquisition of Calorimetry Instrumentation", Michael Nichols, David P. Mascotti, and Mark Waner, National Science Foundation, MRI Program, $97,378, 2001-2003.

"REU Site in Chemistry", Michael Nichols (PI), David W. Ewing, and David P. Mascotti, National Science Foundation, $ 167,000, 2000-2002, including supplements supporting an "Ethics in Science" component, and two Research Experiences for Teachers (RET) supplements ($26,000 total) to support high school teachers in water quality related research projects (2001-2002).

"Incorporation of World-Wide-Web Resources into Introductory Chemistry Courses, Catherine Miller and Michael Nichols, JCU Faculty Instructional Grants Program, $300, AY 1998-1999.

"Determination of the Solution Structures of Lochmann-Schlosser Superbasic Reagents Using ^{6}Li, ^{15}N, and ^{13}C NMR Spectroscopy", Research Corporation Cottrell College Science Award, 1998-1999, $38,120 total support.

"Using NMR to Determine the Structures of Methylation Products of a Steroid Prepared from DHEA", Ohio Board of Regents STARS Lloyd O. Brown Undergraduate Research Assistantship for Charles Nnewihe, $2400 to student, Fall 1997.

"Syntheses and Applications of Polymer-bound Chiral Lithium Amide Bases", Ohio Board of Regents STARS Program for Charles Nnewihe, $2,400 to student, Academic year 1996-1997.

"Energetic Differences Between Transmetalation and Mixed Organoalkali Complex Formation", Ohio Supercomputer Center, Startup Grant, 10 Resource Units ($500), December 1995.

"Synthesis of [^{6}Li,^{13}C] n-Butyllithium and NMR Structure Studies of Lochmann-Schlosser Superbases", Cambridge Isotope Laboratories (CIL) Research Grant Program, $240 in supplies, August 1995.

"Solution Structures of n-Butyllithium in the Presence of N,N,N',N'-Tetramethylethylenediamine: An Application of Triple Isotopic Labeling NMR", John Carroll University Summer Research Fellowship, $3,750, Summer 1995.

"An Independent General Chemistry Laboratory Project: How Does Robin Leach's Silver Cleaning Plate Work?", Ohio Board of Regents STARS Project for Charles Nnewihe, $1,200 to student, Spring 1995.

Substantive Support Provided for Other Grants

"Project CLEAN", Western Reserve Resource Conservation and Development Council, Painesville, OH
I provided a substantial letter of support for an Ohio EPA Educational Fund grant submitted by Project CLEAN, a consortium group of institutions in Northeast Ohio sharing ideas about environmental courses/research/service learning. The grant was funded ($50,000) and will help to involve local colleges and universities in the Euclid Creek Volunteer Monitoring Program. Spring 2007.

"Purchase of Water Quality Instrumentation for the Euclid Creek Watershed Volunteer Water Quality Monitoring Program", I provided my expertise to the Cuyahoga County Soil and Water Conservation District in the preparation of this successful grant proposal to the Ohio State University Extension Office, $3,000 (approx.), Fall 2005.

"Fun with Forensic Chemistry Summer Kids Camp" I also assisted Faith Whitworth in obtaining a $2,000 grant from the Institute for Chemical Education – University of Wisconsin-Madison, for beta-testing the "Fun with Forensic Chemistry" Summer Kids Camp in Summer 2005.

Presentations by Michael Nichols and Collaborators
(Presenter in **Bold**)

"GC-MS Analyses of the Composition and Dynamic Behavior of Perfumes", ***Michael A. Nichols****, Chemistry Department Seminar Series, John Carroll University, September 2009. (Oral Presentation)*

"Kinetic and Mechanistic Studies of β-Dicarbonyls Undergoing Deuterium Exchange with CD_3OD: Classical Keto-Enol Tautomerism Revisited", ***Mark J. Waner*** *and* ***Michael A. Nichols****, Central Meeting of the American Chemical Society (CERMACS), Cleveland, OH, May 2009 and National Meeting of the American Chemical Society, Philadelphia, PA, September, 2008 (Poster Presentations), Central Meeting of the American Chemical Society (CERMACS), Covington, KY, May 2007 (Oral Presentation).*

"Synthesis, Spectroscopic Characterization and X-Ray Structure of a New Five-Coordinated Chlorocopper(II) Complex with a Fluorigenic Ligand", ***Catherine Miller,*** *Kimberly E. Kern, and Michael A. Nichols, Central Meeting of the American Chemical Society (CERMACS), Cleveland, OH, May 2009.*

(Poster Presentation)

*"Using Headspace GC-MS to Identify the Top, Middle, and Base Notes of a Perfume", Jacquelyn Daugherty and **Michael A. Nichols**, A Celebration of Scholarship! Science Poster Session, John Carroll University, March 2009. (Poster Presentation)*

*"Comparison of Authentic Designer and Designer Imposter Scents by Gas Chromatography – Mass Spectrometry and Principal Component Analysis", Amy Betschart and **Michael A. Nichols**, Central Meeting of the American Chemical Society (CERMACS), Columbus, OH, June 2008 (Poster Presentation) and Society for Applied Spectroscopy May Conference, John Carroll University, May 2008. (Oral Presentation).*

*"Analysis of the Enantiomeric Composition of Linalool in a Variety of Essential Oils Using Proton NMR and GC-MS" **Michael A. Nichols**, Central Meeting of the American Chemical Society (CERMACS), Columbus, OH, June 2008. (Oral Presentation)*

*"The Use of Camtasia Studio® and a Graphics Tablet in Recording Organic Chemistry Lectures and Their Dissemination as a Form of Asynchronous Learning" **Michael A. Nichols**, Panel Session, Celebration of Scholarship!, John Carroll University, March 2007, Central Meeting of the American Chemical Society (CERMACS), Columbus, OH, June 2008. (Oral Presentations)*

*"Analysis of Hydrogen Peroxide-Fe(II)-Mediated Linoleic Acid Peroxidation Products by GC-MS: Development of a Biochemistry Lab Experiment", **Michael A. Nichols** and Devin C. Hale, Central Meeting of the American Chemical Society (CERMACS), Columbus, OH, June 2008. (Poster Presentation)*

*"Isolation and Identification of the Components Found in the Spice Coriander", **Michael A. Nichols** and Gloria Gyimah, American Chemical Society Central Regional Meeting, Covington, KY, May 2007 (Poster Presentation)*

*"Mechanistic and Synthetic Studies of Polystyrene Polymerization Using a Sterically Hindered Alkyl Lithium Initiator", **Michael A. Nichols** and Olga Masliantchouk, American Chemical Society Central Regional Meeting, Covington, KY, May 2007 (Oral Presentation)*

*"An Overview of the Euclid Creek Watershed Volunteer Water Quality Monitoring Program", **Michael A. Nichols**, A Celebration of Scholarship! Science Poster Session, John Carroll University, March 2007. (Poster Presentation)*

*"Preparation of Ultra-Low Molecular Weight Polystyrene: Mechanistic and Structural Studies", **Michael A. Nichols**, A Celebration of Scholarship! Grauel Fellowship Panel Session, John Carroll University, March 2007. (Oral Presentation)*

*"Chemical and Microbiological Studies of the Effectiveness of Bioaugmentation to Prevent Algal Growth in Two Urban Lakes in the Doan Brook Watershed (OH), **Michael A. Nichols**, Adrienne Clark, and Keith Jones, American Chemical Society Central Regional Meeting, Midland, MI, May 2006. (Poster Presentation)*

*"Kinetic and Mechanistic Studies of the Deprotonation of Isobutyrophenone Using a Sterically-Hindered Lithium Amide Base", **Michael A. Nichols** and Christina Leposa, American Chemical Society Central Regional Meeting, Midland, MI, May 2006. (Oral Presentation)*

*"Chemical & Microbiological Studies of the Effectiveness of Bioaugmentation to Prevent Algal Growth in Two Shaker Heights Lakes in the Doan Brook Watershed", **Michael A. Nichols**, Keith Jones and Martin Reese, Celebration of Scholarship Science Poster Session, John Carroll University, Spring 2005 and **Keith Jones**, Michael Nichols, and Martin Reese, Ohio Lake Management Society 10th Annual Ohio Limnology Conference and 20th Annual OLMS Symposium, Mt. Sterling, OH, March 2005. (Poster and Oral Presentation)*

*"What, Chemicals in the Water?: An Overview of Water Quality Testing and Applications", **Michael A. Nichols**, Keynote Address: Cleveland Regional Council of Science Teachers (CRCST), Fall Conference, October 2004, John Carroll University. (Oral Presentation)*

*"Determining the Effectiveness of Two Constructed Wetlands for Urban-Runoff Water Remediation", **Michael A. Nichols**, Jamie Cannon and Dave Ritter, Woodlake Environmental Field Station 2002 Annual Conference, Cuyahoga Valley National Park, October, 2002 and at the Society for Applied Spectroscopy Annual May Meeting, John Carroll University, May 2002. (Oral Presentations)*

*"What, Chemicals in the Water?: An Overview of Environmental Chemistry/Biology Projects at John Carroll University", **Michael A. Nichols,** Department of Chemistry, Clarion University of Pennsylvania, October, 2002. (Oral Presentation)*

*"An Overview of the Summer Chemistry Research Program", **Michael A. Nichols**, Celebration of Scholarship Poster Session, John Carroll University, March, 2002. (Poster Presentation)*

*"Chemical and Microbiological Studies of an Urban Stream (Euclid Creek) Before, During, and After a "Storm Event", **Michael Nichols**, Rebecca Taylor and Destiny Nemeth, 45th Annual May Conference of the Cleveland Section of the Society for Applied Spectroscopy, May, 2001, John Carroll University. (Oral Presentation)*

*"Determination of Organoalkali Solution Structures Using Heteronuclear NMR", **Michael A. Nichols**, Department of Chemistry, Youngstown State University, Youngstown, OH, April 2000. (Oral Presentation)*

*"Kinetic Studies of Ketone Deprotonation Reactions Using ^{1}H, ^{6}Li, ^{15}N NMR", **Michael A. Nichols** and Joseph Redley, 42nd Annual May Conference of the Society for Applied Spectroscopy, John Carroll University, May 1998. (Oral Presentation)*

*"Solid-State X-ray Crystallographic and Heteronuclear NMR Solution Structure Studies of n-Butyllithium • TMEDA Complexes", **Michael A. Nichols**, Goodyear Tire and Rubber Company, Akron, OH, November 1997. (Oral Presentation)*

*"The Use of [^{15}N]-Labeled Amines in the Solvation Studies of Organolithium Compounds", **Michael A. Nichols**, Marc A. Falcone, Barbara Kotsatos, 29th Central Regional Meeting of the American Chemical*

*Society, Midland, MI, May 1997; **Michael A. Nichols**, 10th Annual NMR User's Meeting, University of Akron, Akron, OH,, August 1997. (Oral Presentations)*

*"The Use of Isotopically-Labeled Organoalkali Compounds in Solution Structure Studies", **Michael A. Nichols**, Department of Chemistry, Clarion University of Pennsylvania, Clarion, PA, November 1996. (Oral Presentation)*

*"Transmetallation Reactions Between Sodium, Potassium, and Cesium Alkoxides and Lithium Amides", **Michael A. Nichols**, James E. Reddy, 28th Central Regional Meeting of the American Chemical Society, Dayton, OH, June 1996. (Oral Presentation)*

*"^{6}Li, ^{13}C, and ^{15}N NMR Structural Studies of n-Butyllithium Complexes", **Michael A. Nichols**, 8th Annual NMR Users Conference , University of Akron, Akron, OH, August 1995. (Oral Presentation)*

*"Applications of Heteronuclear NMR to Determination of the Solution Structures of Organoalkali Compounds", **Michael A. Nichols**, Meeting of the Society for Applied Spectroscopy, Independence, OH, August 1995. (Oral Presentation)*

Presentations at Workshops

"Introductory Chemical Water Analyses", Michael A. Nichols, This was a Level 1 QDC (Qualified Data Collection) training session for Project CLEAN. Brecksville Reservation of Cleveland Metroparks. Fall 2007.

*"Working with NSF Fastlane and How a Funded Undergraduate Research Program Can Transform a Department", **Michael A. Nichols**, given at the Grant Basics for Faculty At JCU Workshop, John Carroll University, February, 2006.*

*"Fingerprint Analysis: Hands-On Activities for Middle and High School Students", **Michael A. Nichols**, given at the Second Annual Teachers' Symposium at the Cleveland Museum of Natural History, Cleveland, OH, February, 2006.*

Graduate and Undergraduate Research Student Presentations
(Past 6 years)

***Dina Hanna**, Helen Murphy, Cyrilla Wideman, and Michael Nichols, "Development of a Non-Toxic and Inexpensive Gel Electrophoresis Methodology Utilizing Flour Samples", Celebration of Scholarship, Poster Session, John Carroll University, April 2015 and Eastern Colleges Science Conference, Niagara University, April 2015.*

***Cassie Pacer** and Michael Nichols, "Studies of the Thermodynamics of the Keto-Enol Equilibria of a Series of Beta-Dicarbonyl Compounds", Celebration of Scholarship, Poster Session, John Carroll University, April 2014.*

***Jacqueline Woods** and Michael Nichols, "Contaminant Effects of the Kinetics and Thermodynamics of*

the Keto Enol Reaction of Acetylacetone and Ethyl Acetoacetate", Celebration of Scholarship, Poster Session, John Carroll University, April 2014

*"The Use of GC-MS and PCA to Classify and Identify Different Types of Gourmet Cinnamons", **Meghan May** and Michael Nichols, Celebration of Scholarship!, John Carroll University, March 2011. (Poster Presentation).*

*"Solvent and Concentration Effects on the Thermodynamics of the Keto-Enol Equilibrium of Ethyl Acetoacetate and Acetylacetone", **Grace Mahfouz**, Mark Waner and Michael Nichols, Celebration of Scholarship!, John Carroll University, March 2011 and OFIC Poster Session, State Capital Building, Columbus, OH, April 2011. (Poster Presentations).*

*"Preparing Short Chains of Polystyrene Polymer with Low Molecular Weight", **Grace Mahfouz** and Michael Nichols, Celebration of Scholarship!, John Carroll University, March 2010. (Poster Presentation).*

*"Synthesis and Use of the Ligand PQAM in Copper Analysis", **Meghan Brown** and Michael A. Nichols, Celebration of Scholarship!, John Carroll University, March 2010 and March 2011. (Poster Presentation); American Chemical Society, Meeting-in-Miniature, Ursuline College, March 2011. (Oral Presentation).*

*"Analysis of Hydrogen Peroxide-Fe2+- Mediated Linoleic Acid Peroxidation Products Using GC-MS", **Danielle Maholtz** and Michael Nichols Celebration of Scholarship!, John Carroll University, March 2010 and March 2011. (Poster Presentation). American Chemical Society, Meeting-in-Miniature, Ursuline College, March 2011. (Oral Presentation).*

*"Kinetic and Mechanistic Studies of the Deuterium Exchange in Classical Keto-Enol Tautomeric Equilibrium Reactions", **Cassie Giorgio** and Michael Nichols, Celebration of Scholarship!, John Carroll University, March 2010. (Poster Presentation).*

*"Kinetic and Mechanistic Studies of the Deuterium Exchange in Classical Keto-Enol Tautomeric Equilibrium Reactions", **Nick Toney** and Michael Nichols, Celebration of Scholarship!, John Carroll University, March 2010. (Poster Presentation).*

Additional Non-Presented Undergraduate Research Student Projects and Current Participating Students (Past 6 Years)

"Studies of the Thermodynamics of the Keto-Enol Equilibria of a Series of Beta-Dicarbonyl Compounds Using NMR and Molecular Modelling", Natalie Osiecki and Natasha Taleff, Spring Spring 2015 – present.

Analysis of the Composition and Enantiomeric Composition of Linalool and Linalool Acetate in Lavender, Spike Lavender and Lavandin Essential Oils Using GC-MS", Natalie May, Spring 2015 – present.

"^{6}Li and ^{15}N NMR Studies of the Deprotonation Reaction of a Ketone with a Sterically-Hindered Amide Base", Sarah Sternbach, Spring 2015 – present.

"^{6}Li and ^{15}N NMR and X-ray Crystallographic Studies of LiHMDS and the Ligand BME", Austin Haines, AY 2014-2015 – present.

"Effects of Buffer, pH, and Antioxidants on the Oxidation of Linoleic Acid: Development of an Advanced Biochemistry Laboratory Experiment", Kate Shpaner, AY 2014-2015

Alex Boehm – "Attempts to Purify and Determine the Solid-State and Solution Structures of a Complex Lithium Amide Base", Alex Boehm, AY 2013-2014.

"GC-MS and PCA Analysis of Gourmet Cinnamon Spices", Nicki Bohrer, AY 2013-2014.

"Effects of Buffer, pH, and Antioxidants on the Oxidation of Linoleic Acid: Development of an Advanced Biochemistry Laboratory Experiment", Joel Baker, AY 2012-2013.

"Attempts to Develop a Toxicity Screening Protocol for 2,4-Decadienal, HNE and ONE using Yeast Cells", Amanda Alzayad, Fall 2011.

"Does Titanium Dioxide Promote the Free Radical Oxidation of Linoleic Acid Under UV Irradiation?", Tyler Maxwell, AY 2011-2012.

"Synthesis and Oxidation of 3-Z-Nonenal; A Reactive Intermediate in Linoleic Acid Oxidation?", Ryan Cox, AY 2011-2012.

"Attempts to Develop a Screening Method for Gluten-Containing Flours using HATR-IR", Lauren Brock, AY 2011-2012.

"Preparation of EDA-Derived Ligands"; Brad Hauser, Spring 2009.

Professional Consulting

Owner, MA Nichols Chemical and Educational Consulting LLC, established 2010. Company website: http://www.mancecllc.com.

Provided various pro-bono organic and analytical analyses for a number of companies and government agencies including PAVCO, Inc., Quality Borate, the City of Shaker Heights, the Cuyahoga Soil and Water Conservation District, and the Cuyahoga Planning Commission.

Textbook, Article and Grant Reviews

Refereed an article submitted to the African Journal of Agricultural Research, June 2011. The paper dealt with the use of essential oils in repelling insects.

Served as reviewer for two grant proposals from the American Chemical Society Petroleum Research Fund Program, 2000, 2006.

"Experiments in Chemistry: Featuring MeasureNet®", 1st Edition by Atwood, Stanton and Zhu, Thomson Higher Education Learning, 2003.

"Organic Chemistry", 4th Edition by Carey, McGraw-Hill Publishing, 1999.

"General Chemistry", 3rd Edition by Umland and Bellama in a comparative review to "Chemistry", 6th Edition by Chang, Brooks Cole Publishing, 1999.

"Organic Chemistry Miniscale and Microscale Laboratory Experience", 1st Edition by Schoffstall, Gladdis and Druelinger, McGraw-Hill Publishers, 1998.

"Chemistry", 1st Edition by McMurry and Fay, Prentice-Hall Publishers, 1996.

Professional Service Activities

Science Fair Activities

John Carroll University representative on the Northeastern Ohio Science and Engineering Fair (NEOSEF) Board of Directors, 2010 – present.

Have served as a science fair mentor for over 30 high and middle school students. Students usually come to JCU to use instrument / lab facilities.

Served as a Science Fair Judge at:

Northeast Ohio Science and Engineering Fair, Cleveland, OH, Spring 2001-2002, 2004-present.
St. Francis Assisi School Science Fair, Gates Mills, OH, Spring 2001-2003, 2005-2009.
Dunbar Elementary School Science Fair, Maple Heights, OH, June 2007.
John H. and Ruth W. Melvin Memorial STEM Scholar Competition, Ohio Academy of Science Meeting, Cuyahoga Community College, April 2007.
Buckeye Science Fair, Columbus, OH, Spring 2003-2004.
Ohio State Science Day, Columbus, OH, Spring 2000-2003.
Intel International Science and Engineer Fair, Cleveland, OH, May 2003.
Horizon Science Academy Science Fair, Cleveland, 2003.

Local American Chemical Society Activities

Served as a judge for ACS Meeting-in-Miniature undergraduate and graduate oral presentation awards, 2007, 2010, 2012, 2014, 2015

Served as a juror for the ACS Heller Award (for Outstanding High School Chemistry Teaching in the Cleveland Area) 2012-2015.

Participated in National Chemistry Week, leading activities at Richmond Heights Public Library for children. Fall 2014 – present.

Helped with "GAK (Grand Assembly of Kits) Day", American Chemical Society, Cleveland Section, for National Chemistry Week, Fall 2006 - present.

Served as Chair of Poster Sessions and Co-Chair for Undergraduate Poster Session, Central Regional Meeting of the American Chemical Society, Cleveland, OH, May 2009.

Served as Organic Session Chair, American Chemical Society, Cleveland Section, Meeting-In-Miniature, Notre Dame College, March 2007.

Environmental Service Activities

Qualified Data Collector, Level 2, Chemical Water Quality Assessment, OhioEPA, 2009-present.
Qualified Data Collector, Level 3, Chemical Water Quality Assessment, Ohio EPA, 2006-2008.

Served as Program co-Manager and as Quality Assurance Manager and Volunteer Trainer for the Euclid Creek Watershed Volunteer Monitoring Program, where I maintained and calibrated equipment used by volunteers for water monitoring and performed additional analyses on water samples collected by volunteers. 2005 – 2008.

Educational Workshops and Activities for Children

I helped Faith Whitworth with the "Seeds of Hope" event with the Big Brothers/Big Sisters group at JCU. I led a demonstration on molecular gastronomy and Dr. Waner and I performed various demonstrations with liquid nitrogen. Spring 2013.

Participated in JCU Chemistry Department's "Chemistry Camp for Kids" Summer Program, where I led hands-on activities in water quality testing, pin-hole photography, chemiluminescence and light-stick experiments, and performed demonstrations with liquid nitrogen, Summers 2000-2009. In Summer 2007, I developed a series of energy-related experiments and led the "Forensic Chemistry" day.

Co-led (with Faith Whitworth) hands-on activities for Shaker Library Summer Program; "Who Stole Mittens the Cat", where students age 5-7 used fingerprinting to identify a cat-napper, Summer 2009.

Served as Co-coordinator of "Fun with Forensic Chemistry Camp for Kids" Summer Program, where I attended a planning workshop at the Institute for Chemical Education at the University of Wisconsin-Madison, developed/adapted a number of hands-on activities for middle school students in the areas of fingerprinting, ballistics, blood analysis, fireworks analysis and fiber analyses, Summer 2005.

Given "Chemical Magic Shows" for Children during JCU Reunion Weekends (Summers 2004-2008); and helped make "Liquid Nitrogen Ice Cream" during Dolan Science Center Grand Opening (Fall 2003).

Participated and developed a number of hands-on activities for the Green Earth Festival, sponsored by Generation Green, John Carroll University, Spring 2007.

Performed Polymer Demonstrations and Hands-on Activities for Middle School Children at Shaker Heights Middle School (with Dr. Waner), Fall 2002 and Spring 2003-2007.

Lead Hands-on Water Quality Test Activities with Middle School Children as Part of the Euclid Creek Water Festival, Sponsored by Cuyahoga Soil and Water Conservation District, October 2002.

Other Service Activities

Served as a panelist for "How to Prepare for an Academic Search", Cleveland State University Graduate Resource Center, Cleveland State University, Spring 2015.

Professional Affiliations

American Chemical Society (ACS), 1985 - present.
Council on Undergraduate Research (CUR), 1993 – present.
John Carroll University CUR Liaison, 2001-present.
Member, The Mapping, Monitoring, and Technical Studies Committee of The Doan Brook Watershed Partnership, Spring 2004-2009.
Member, The Euclid Creek Watershed Technical Committee, Fall 2004-2009.
Member, Euclid Creek Volunteer Monitoring Subcommittee, Spring 2005-Spring 2009.
Member, National Science Teachers Association, 2001-present.
Member, Ohio Academy of Sciences, 2000-2001.

Department and University Service

I serve or have served on the following Chemistry Department Committees:

Chemistry Department Assessment Coordinator (shared with M. Setter) – Fall 2014 – present.
Chemistry Department Rank and Tenure Committee, 2000-present.
Chemistry Department Research Committee, 2010 – present.
Chemistry Department Computer Committee, 1996-2009; Chair, 1997- 2007.
Chemistry Department Graduate Committee, 1997- 2007; Chair 1998 – 2005.
Chemistry Department Instrument Committee, 1997- 2009; Chair 2005 – 2009.
Chemistry Department Budget Committee, 2001-2002.

I serve or have served on the following University Committees:

University Integrated Core Committee, Director of Exploring the Natural World Integrated Courses, Fall 2013 – present.

Faculty Council Member, Division II, Spring 2013 – present
Ad Hoc Online Committee of Faculty Council, Spring 2014 – present.
Faculty Council Secretary, AY 2013-2014.
Faculty Representative to the University Board of Directors Advancement Committee, AY 2013-2014.

Faculty Council Committee on Academic Policies, Chair, AY 2014-2015 – present.
Provost Council, Fall 2014 – present.
Advisory Committee to the Office of Academic Advising, Fall 2014 – present.

STEM Representative to the Advisory Committee to the Office of Academic Assessment, Fall 2014 – present.
JCU Vocation Coordinating Committee Member, Fall 2012 – present.
JCU Committee on Research and Service, 2010 - 2014.
Learning Management System Selection Committee, Spring 2014.
Lucrezia Culicchia Teaching Award Selection Committee, 2012 – 2014.
Dolan Science Center Artwork Ad Hoc Committee, Summer 2003.
University Ad Hoc Celebration of Scholarship Planning Committee, Spring 2002.
Honors Committee Member, 2001-2002.
Distance Learning Committee, 1999 – 2001.
Information and Technology Planning Committee Rep., 1998 – 2000.

FSA Immersion Leader

In Spring 2010, co-led a spring break immersion experience with Dr. Catherine Miller to West Virginia. During this experience, the students and faculty learned about and observed the environmental impacts of natural gas, coal, and wind power on the local environments. We also participated in a service project involving water quality monitoring.

In Spring 2009, I co-led a spring break immersion experience with Dr. Catherine Miller to Bethlehem Farms, WV. During this experience, the students and faculty participated in sustainable living in the Catholic tradition and participated in a variety of service activities in the neighboring communities.

In Spring 2008, I co-led a spring break immersion experience with Dr. Catherine Miller to Mount Vernon, KY. During this experience, the students and faculty worked on service projects in collaboration with Appalachian Public in the Science Interest.

Involved in the maintenance, routine trouble-shooting, installation and faculty/student training of the following instrumentation: Varian Gemini and Varian Systems 300 MHz Nuclear Magnetic Resonance (NMR) Spectrometer; Varian Saturn Gas Chromatograph – Mass Spectrometer (GC/MS); Perkin-Elmer System One FT-Infrared Spectrometer; Perkin-Elmer Graphite Furnace Atomic Absorption Spectrometer; Metrohm-Peak Ion Chromatograph.

Other University Service Activities

Participating in the NetVUE-sponsored Learning Community "Building Capacity for Reflection", Fall 2014 – present.

Served as a Panelist for Joe Treaster's University of Miami Environmental Journalism Course with Dave Davies of The Plain Dealer. The topic was the history of the environmental problems and current state of the Cuyahoga River. Sept. 2012.

Reading Discussion Group – "White Like Me: Reflections on Race from a Privileged Son", Tim Wise, Soft Skull Press, 2011. I attended a small group book discussion meeting and his public presentation to the University.

Reading Discussion Group – "College (Un)Bound: The Future of Higher Education and What it Means for Students", Jeffrey Selingo, Houghton Mifflin Publishers, 2013. I attended a small group discussion meeting, the luncheon where he answered questions and his public presentation to the University.

Celebrity Dealer for Senior Week Casino Night, 2013-present.

Guest Judge for Greek Week Lip-Sync Competition, 2007.

Recognition of Professional and Service Activities

Named a *"Memorable Educator"* in *Ohio Magazine,* December 2011.

"Lucrezia Culicchia Award for Teaching Excellence", College of Arts and Sciences, John Carroll University, 2011.

"Educator of the Year", Cuyahoga Soil and Water Conservation District, September 2007.

"Mentor of the Year", Beaumont High School, May 2006.

Served on Heuer Award for Outstanding Undergraduate Science Education Selection Committee, Council of Independent Colleges, Washington, DC. Spring 2003.

"Dr. Nichols: Getting His Hands Dirty", Newletter from The Center for Service and Social Action, John Carroll University, Vol. 2, Issue 1, Dec. 2008, pp. 1, 4.