

CURRICULUM VITAE

C. MICHAEL GREENLIEF

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Education:

B.S. in Chemistry with Honors, Emporia State University, Emporia, KS (1983)
Ph.D. in Chemistry, University of Texas at Austin (1987)
Postdoctoral Research Associate, IBM T. J. Watson Research Center (1987–1989)

Professional History:

Faculty member, Interdisciplinary Neuroscience Program, University of Missouri (2018 – present)
Director, Department of Chemistry Mass Spectrometry Facility, University of Missouri (1997–present)
Program Director (rotator), Division of Chemistry, National Science Foundation (2023–2025)
Director, MU NMR Facility, University of Missouri (2007–2025)
Director, Charles W. Gehrke Proteomics Center, University of Missouri (2001–2023)
Office of Research Faculty Fellow, University of Missouri (2004–2008)
Associate Professor, Department of Chemistry, University of Missouri (1994–present)
Assistant Professor, Department of Chemistry, University of Missouri (1989–1994)
Postdoctoral Research Associate, International Business Machines (1987–1989)
Research Assistant, University of Texas at Austin (1983–1987)
Visiting Summer Researcher, Sandia National Laboratories (1986)
Teaching Assistant, University of Texas at Austin (1985)
Laboratory Assistant, Emporia State University (1979–1983)

Technical Specialties:

Biological mass spectrometry, quantitative proteomics, separation of complex mixtures, directed metabolite analysis.

Membership in Professional Societies:

American Association for the Advancement of Sciences
American Chemical Society
University of Missouri Local Section; Division of Analytical Chemistry; Division of Colloid and Surface Chemistry, Division of Physical Chemistry
American Society for Mass Spectrometry
Sigma Xi
Society for the Advancement of Chicanos and Native Americans in Science
Society for Neuroscience

Awards and Honors:

Fuldner Faculty Fellow, University of Missouri-Columbia (2020, 2021)

E. Ann Nalley Midwest Award for Volunteer Service (2016, American Chemical Society)
MU Teaching Development Leave (Fall 2003)
MU Faculty Research Leave (1998-99)
Big 12 Faculty Fellowship (1997)
MU–Provost’s Outstanding Junior Faculty Teaching Award (1994)
NSF–Young Investigator Award (1993)
IBM Research Division Award (1992)
Outstanding Recent Alumni Award, Emporia State University (1991)
Materials Research Society Graduate Student Award (1986)
American Vacuum Society National Student Scholarship (1986)
Robert A. Welch Pre-Doctoral Fellowship (1986)
American Vacuum Society Scholarship Recipient, New Mexico Chapter (1985, 1986)
Outstanding Student in Analytical Chemistry, Emporia State University (1983)
Outstanding Senior Chemistry Major, Emporia State University (1982–1983)
Woodruff Scholar, Emporia State University (1979–1982)

Teaching Activities (Formal Courses – both old [prior to Fall, 2004] and new course numbers are referenced here):

*(*Courses which are no longer offered or in which the content has been altered significantly)*

Chem 1100 (Atoms and Molecules) – Winter 2005
Chem 12* (General Chemistry 2) – Winter 1993
Chem 1320 [Chem 32*] (First Semester General Chemistry) – Winter 1994; Fall 1994; Winter 1995; Fall 2000; Winter 2001, Spring 2015
Chem 3200 [Chem 221*] (Quantitative Methods of Analysis) – Winter 2002; Fall 2004; Fall 2005; Fall 2011
Chem 223* (Quantitative Chemical Analysis) – Winter 1996; Fall 1997
Chem 231* (Physical Chemistry I) – Fall 1990
Chem 300 (Problems in Chemistry) – Winter 1996; Fall 2002
Chem 301* (Topics in Chemistry: Computers for Chemists) – Fall 1991; Fall 1992
Chem 301* (Topics in Chemistry: Instrumental Analysis) – Fall 2001
Chem 331* (Intermediate Physical Chemistry I) – Fall 1990
Chem 333* (Intermediate Physical Chemistry II) – Winter 1990; Winter 1991; Winter 1992
Chem 3330 [Chem 233*] (Physical Chemistry II) – Winter 1990; Winter 1991; Winter 1992; Spring 2017
Chem 3700 [Chem 270*] (Undergraduate Seminar in Chemistry; writing intensive course) – Winter 1997; Winter 1998; Winter 2000; Winter 2003; Winter 2007
Chem 401* (Topics: Surface Analysis and Characterization) – Fall 1993
Chem 401* (Topics: Mass Spectrometry) – Fall 1995; Fall 2001
Chem 430* (Advanced Physical Chemistry) – Fall 1999
Chem 4200 [Chem 312] (Instrumental Methods of Analysis) – Fall 2001; Fall 2002; Fall 2004; Fall 2009; Fall 2016; Fall 2017
Chem 4340* [Chem 3340*, Chem 234*] (Physical Chemistry Laboratory) – Winter 2004; Winter 2005; Winter 2006; Spring 2007; Spring 2008; Spring 2009; Spring 2010; Spring 2011; Spring 2013; Spring 2014; Spring 2016; Spring 2018; Spring 2019; Spring 2020; Spring 2021; Spring 2022; Spring 2023
Chem 7200 (Instrumental Methods of Analysis) – Fall 2004; Fall 2009; Fall 2016; Fall 2017

Chem 8087 (Seminar in Chemistry) – Spring 2018
Chem 8230 (Separations and Chromatography) – Fall 2021
Chem 8240 (Mass Spectrometry) – Fall 2015; Fall 2018; Fall 2020; Fall 2022
Chem 8250 (Analytical Spectroscopy) – Fall 2007; Fall 2008; Fall 2010
Chem 8270 [Chem 425*] (Advanced Analytical Chemistry) – Fall 1991; Winter 2005; Fall 2006; Spring 2010; Fall 2012; Fall 2013; Fall 2014
Biol Eng 8370 (Materials Characterization Techniques) – Guest Lecturer, Fall 2014; Fall 2015; Fall 2016; Fall 2017; Fall 2108; Fall 2019

Teaching Activities (Informal Courses and Development of Materials):

Chem 2950 [Chem 150*] (Undergraduate Research) – Winter 1993; Fall 1993; Winter 1998; Fall 1998; Fall 2012; Spring 2013; Summer 2013; Fall 2013, Spring 2014; Fall 2014; Spring 2015; Summer 2016; Fall 2016; Spring 2017; Spring 2021; Fall 2021; Spring 2022; Fall 2022; Spring 2023
Chem 4950 [Chem 250*] (Senior Research in Chemistry) – Fall 1994; Winter 1995; Fall 1997; Winter 1998; Fall 2002; Winter 2003; Fall 2016; Spring 2017, Spring 2018; Spring 2022; Fall 2022; Spring 2023
Chem 490 (Graduate Research in Chemistry) – 1990 through Summer 2004
Chem 8090 (Dissertation Research in Chemistry) – Fall 2004 to present
Chem 9090 (Post-Candidacy Dissertation Research) – Fall 2004 to present

Development and extensive revision of Physical Chemistry Laboratory – Fall 2003
Development of a new mass spectrometry experiment including building of the high vacuum system for Instrumental Methods of Analysis Laboratory – Spring 2010
Design, development, and construction of an all-metal, high vacuum system for the Knudsen Effusion experiment in Physical Chemistry Laboratory – Spring 2010
Computer interface and automation of Heats of Combustion experiment for Physical Chemistry Laboratory – Spring 2013
Redesign and construction of combined mass spectrometry/Knudsen effusion equipment for Instrumental Analysis and Physical Chemistry laboratory courses – Summer 2013
Design and development of a new gel electrophoresis lab for Instrumental Analysis – Fall 2016
Design and development of a new protein/peptide-based mass spectrometry experiment for Instrumental Methods of Analysis – Fall 2016
Design and development of a new solution calorimetry experiment for Physical Chemistry Laboratory – Spring 2018
Online Course Design Basics Workshop (Course completed Spring 2020)
Online Teaching Certification Seminar: Excellence in Online Teaching (Course completed Fall 2020)

Mentor for undergraduate students in the McNair Scholars and EXPRESS programs (1999 – present)
Mentor for Hanzhi Wu, visiting scholar from Hong Kong Baptist University (November 2012 – May 2013)
Mentor for undergraduate students in the Arts and Science Discovery Fellows Program (2015 – 2017)

Mentor for undergraduates in the Arts and Science Undergraduate Research Mentorship Program (2017)

Mentor for undergraduate research students in my research labs, more than 50 students to date.

Mentor for two high school research students in my research labs.

Dissertations and Theses directed:

D. A. Klug, MS (1992); W. Du, MS (1994); L. Chen, MS (1995); P. Prayongpan, MS (2001); D. Stripe, MS (2001); Y. Yuan, MS (2002); X. Li, MS (2004); H. Adusumilli, MS (2007); J. Liu, MS (2012); D. Ahire, MS. (2019)

L.A. Keeling, Ph.D. (1995); J. Chen, Ph.D. (1996); L.M. Nelen, Ph.D. (2000); J.R. Beck, Ph.D. (2001); S.W. Lee, Ph.D. (2001); N.D. Leigh, Ph.D. (2001); P. Prayongpan, Ph.D. (2004); L. Wan, Ph.D. (2007); Y. Li, Ph.D. (2015); J. Wang, Ph.D. (2016); M. Johnson, Ph.D. (2016); B. Yang, Ph.D. (2019); M.K. Appenteng, Ph.D. (2021); X. Li, Ph.D. (2021); X. Wei, Ph.D. (2022); C. Ray, Ph.D. (2022); N. Perera, Ph.D. (2024); K. Nyarko (2024)

Current graduate students:

P. Bruner, Ph.D. (expected 12/2025); S. Mensah (expected 06/2026); G. White (expected 5/2028)

Service to the Department of Chemistry:

Undergraduate Committee (1989–1990)

Meetings with prospective chemistry majors and their parents (2001–present)

Graduate Recruiting Committee (1990–1994)

Author of Analytical Division Brochure (1992)

Author of Departmental Brochure (1992)

Various graduate student recruiting visits to other campuses (1989–present)

Graduate Committee (1994–1997, 2000–2007)

Long Range Planning Committee (1990–1992)

Faculty Advisor for the Chemistry Graduate Student Association (1990–2000)

Catalyst Society Committee (1992–1995)

Leaders/Development Committee (1996–2004)

L.B. Thomas Chemistry Scholar's Program Committee (1993–present, committee chair 1995)

Chair Advisory Committee (1994–1999)

Inorganic faculty search committee (1995)

Computing committee (1995–1999, 2009–present), committee chair (1998–1999); Faculty advisor for departmental website and departmental software management (2009–present); development oversight of new departmental website (2014–2015); oversight of departmental website, including transition to Drupal 8 in 2021 with upgrades to the site (2015–present)

Fourth year review committee for Asst. Professor John Kauffman (1995)

Analytical faculty search committee, committee chair (1995–1996, 2001–2002)

Mass spectroscopist search committee, committee chair (1995–1996, 2003)

Houchins Professor search committee (1996–1997)

Promotion and tenure review committee for Asst. Professor Silvia Jurisson (1996)
Personnel Committee (1997–2000, 2007–2009, 2012–2015, 2017–2020), committee chair
(1998–2000, 2008–2009, 2014–2015, 2019–2020)
Instrument Committee (1998–1999)
Director, Mass Spectrometry Facility (1997–present)
Third year tenure review committee for Asst. Professor Shon Pulley (1998)
Third year tenure review committee for Asst. Professor Donald Riederer (1999)
Third year tenure review committee for Asst. Professor Gary Baker (2014)
Third year tenure review committee for Asst. Professor Mark Lee, committee chair (2015)
Third year tenure review committee for Asst. Professor Sheila Baker (2019)
Promotion and tenure review committee for Asst. Professor Sheryl Tucker (2001)
Promotion and tenure review committee for Assoc. Professor Carol Deakyne, committee
chair (2002)
Tenure review committee for Assoc. Professor John Brockman (2020)
Bioanalytical faculty search committee, committee chair (2001–2002, 2004–2005)
Faculty search committee, committee chair (2006–2007)
Webmaster for department website (2006–2007)
Faculty Responsibility Committee (2008)
Oversight of shared departmental research/teaching instrumentation (2008–2016, 2018–
present)
Physical Chemistry faculty search committee, committee chair (2017–18)
Medicinal Chemistry faculty search committee (2018–19)

Service to the College of Arts and Science:

Faculty search committee in the Department of Physics and Astronomy (1991, 1999)
Chemistry department chair search committee (1993–1994)
Special Task Force on the AB degree in Computer Science (1995–1996)
Physical and Biological Sciences Cluster Review Panel (1995–1997), committee chair (1997)
Review Committee of the Chemistry Chair (1996–1997, 1999)
Ad Hoc Committee to recommend a candidate for the Herman Schlundt Distinguished
Professorship in Chemistry (1998)
Division of Biological Sciences Faculty Search Committee (2009)
College Diversity, Equity, and Inclusion Committee (2016–2022), Committee Chair (2018–
2022)
Transitional Committee to merge the Diversity, Equity, and Inclusion Committee and the
Diversity Requirement Curriculum Committee (Spring 2023, Committee Chair)
Faculty Advisory Committee, Engineering and Applied Science Building, 2023

Service to the University and the Columbia campus:

MU Research Reactor Evaluation Group on Neutron Reflectometry (1991–1992)
Scholars' Day participant (1992)
University system review panel for the NSF Presidential Faculty Fellows Program, panel
chair (1993)
Site Review Team at UMKC for the UM Research Board (1994)
Provost Committee for Teaching Awards (1995, 1996)
MU Research Council (1995–1998)

Selection Committee for Nominations to the Searle Scholars' Program (1995)
Chemical Engineering Faculty Search Committee (1996–1997)
Office of Research PRIME Fund Committee (2000–2004)
Office of Research *Ad Hoc* Review Committee for the NSF-MRI program (2000, 2001, 2011, 2017)
Director, Charles W. Gehrke Proteomics Center (2008–2023, Co-Director 2001–2008); The Center has over \$3.2M in instrumentation and an annual operating budget of ~\$420K/year.
Office of Research Faculty Fellow (2004–2008)
Review of MU Research Core Facilities Committee, committee chair (2005–2007)
Director of the Center for Arts and Humanities, Search Committee (2005)
Graduate Program Review Committee member for the Mechanical and Aerospace Engineering Department (2006–2007)
Program Committee for the Missouri Nanoalliance Meeting at MU (2006)
Director, MU NMR Facility (2007–present) – The Facility has over \$4.0M in instrumentation and an annual operating budget of ~\$275K/year.
Hispanic and Latin American Faculty/Staff Association (1999–present), Historian (2003), Vice President (2004–2006), President (2007–2008), Faculty Representative (2009–2010)
MU Research Advisory Committee (2009–2013)
Judge, Spring 2010–2017, 2023 Research and Creative Achievements Forum
Faculty mentor, Mizzou Advance Program (2010)
Led workshop on NSF Broader Impacts for the MU Grant Writers Network (2010)
Mock review panel member for the Office of Research Grant Writing Institute (2011)
Office of Undergraduate Research program review committee (2013)
Organized and led a workshop on Metabolomics for MU Life Sciences Week (2013)
Life Sciences Undergraduate Research Opportunity Program Review Committee (2013–2017, 2019–2020)
Office of Research *Ad Hoc* Review Committee for the NSF-NRT program (2017–2019)
Organized and led a workshop on Proteomics for MU Life Sciences Week (2018)
Office of Research *Ad Hoc* Committee on Major Instrument Proposal Planning (2021)
Graduate School NSF-GRFP Reviewer Panel Workshop (2022)
Office of Research NSF-MRI Proposal Internal Reviewer (2022, 2024)

Professional Service:

American Chemical Society

University of Missouri Local Section: Secretary/Treasurer (1992–93); Treasurer for the 1993 Midwest Regional Meeting; Local Section Representative to the Midwest Region Board (1997 – present); Program Chair for the 2003 Midwest Regional Meeting; General Chair for the 2014 Midwest Regional Meeting; General Chair for the 2025 Midwest Regional Meeting
Member of Midwest Region Board of Directors (1997–present): Board secretary 2006, 2011, 2016; Chair-elect 2007, 2012, 2017; Chair 2008, 2013, 2018; Awards Committee 2009–2015, 2017–2018, 2021
Member, National Committee on Minority Affairs (2020–2027)
Member, ACS Scholars Committee (2020–2024)

Member, Regional Meetings Training Committee (2025)
Reviewer, ACS Bridge Program (2020)
Advisor, American Chemical Society Student Affiliates (1993–1995)
Co-organized a symposium for the 2010 Midwest Regional Meeting of the American Chemical Society entitled “Converging of Experiment & Theory in Chemical Research”
Co-organized a symposium for the 1998 Midwest Regional Meeting of the American Chemical Society entitled “Surface Science: What can we learn from model systems?”
Co-organized and chaired a session on Surface Science at the 1997 Midwest Regional Meeting of the American Chemical Society
Co-organized and chaired a session on Surface Science at the 1996 Midwest Regional Meeting of the American Chemical Society
Session moderator for the Symposium on Surface and Colloid Chemistry of Advanced Materials at the 207th National Meeting of the American Chemical Society, San Diego, CA (1994)
Session Chair for the Molecular Processes at Surfaces Symposium at the National Meeting of the American Chemical Society (1991)
Session Chair for the Symposium on Silicon Hydride Chemistry and Silicon Chemical Vapor Deposition at the National Meeting of the American Chemical Society (1991)
Moderator for the Kendall Award Symposium I at the 199th National Meeting of the American Chemical Society, Boston, MA (1990)
American Society for Mass Spectrometry, member
Society for the Advancement of Chicanos and Native Americans in Science
Program Committee (2007-2020, Chair – Chemistry section 2009)
Society for Neuroscience, member
American Vacuum Society
Session Chair for the Surface Science Division at the 45th National Meeting of the American Vacuum Society for the session entitled “Photochemistry and Deposition.” (1998)
Nominated for the Executive Committee of the Surface Science Division (1998)
U.S. Army Materiel Command, Rapid Production System for High Affinity Reagents
Recognizing Protein Biomarkers – SBIR Phase I and Phase II review panel (2007)
National Science Foundation
Review panelist (1991, 2003, 2007, 2012–2017, 2019–2020)
BIO Advisory Panel (2015, 2018, 2019, 2023)
National Institutes of Health
ZRG1 BCMB-D Mass Spectrometry Shared Instruments Study Section (2009)
Special Emphasis Panel/Scientific Review Group 2014/01 ZRG1 BCMB-D (30) I – Shared Instrumentation Program (2013)
Special Emphasis Panel/Scientific Review Group 2015/05 ZAT1 SM (35) P – Centers for Advancing Natural Products Innovation and Technology Program (2014)
National Defense Education Program, SMART Fellowship Program review panel (2010, 2011)
National Defense Science and Engineering Graduate Fellowship Program review panel (2012)

Educational Testing Service, Committee of Examiners for the GRE Subject Test in Chemistry (2010–2018), committee chair (2016–2018)
First International Conference on Elderberry, Columbia, MO, Organizing and Editorial Committees (June 2013) under the auspices of the International Society for Horticultural Science. Associate editor for a special volume 1061 of *Acta Horticulturae* (2015) which contains peer-reviewed papers from the conference.
Second International Conference on Elderberry, Columbia, MO, Organizing Committee (June 2025)

Manuscript Referee:

Accounts of Chemical Research; ACS Chemical Neuroscience; ACS Food Science and Technology; ACS Omega; Analyst; Analytical Chemistry; Antibiotics; Antioxidants; Applied Physics Letters; Applied Surface Science; Arabian Journal of Chemistry; Brain Behavior and Immunity; Chemical Communications; Chemical Physics Letters; Chemical Reviews; Chemistry of Materials; Chemosensors; Chemosphere; Data in Brief; European Journal of Pharmaceutical Sciences; Food and Function; Food Bioscience; Food Chemistry; Food Control; Food Research International; Food Science and Human Wellness; Forensic Sciences Research; Inflammation; International Journal of Biological Macromolecules; International Journal of Food Science and Technology, International Journal of Molecular Sciences; Journal of the American Chemical Society; Journal of Applied Physics; Journal of Chemical Physics; Journal of Chromatography A; Journal of the Electrochemical Society; Journal of Environmental Chemical Engineering; Journal of Food Process Engineering; Journal of Lipid Research; Journal of Materials Chemistry; Journal of Medicinal Chemistry; Journal of Nanoscience and Nanotechnology; Journal of Neuroimmunology; Journal of Physical Chemistry; Journal of Physical Chemistry Letters; Journal of Physics and Chemistry of Solids; Journal of Vacuum Science and Technology; Langmuir; Life Sciences; Metabolic Brain Disease; Metabolites; Molecules; Neurotoxicity Research; Organometallics; Physical Chemistry Chemical Physics; Physical Review Letters; Plants; The Plant Journal; PLoS Biology; PLoS ONE; PLoS Neglected Tropical Diseases; Proteomics; Rapid Communications in Mass Spectrometry; Review of Scientific Instruments; Scientia Horticulturae; Scientific Reports; Separations; Surface and Interface Analysis; Surface Science; Talanta; Talanta Open; Thin Solid Films

Proposal Reviewer (external to the University):

U.S. Army Materiel Command; U.S. Civilian Research and Development Foundation; The Research Corporation; National Institutes of Health; National Science Foundation; Petroleum Research Fund; Kansas NSF EPSCoR Program; Australian Research Council; The British Council – Canada; The Wellcome Trust/DBT India Alliance

External manuscript reviewer for the U.S. Geological Survey (2012)

Guest Editor, *International Journal of Molecular Sciences*, Special Issue on “Biological Systems at the Protein Level” (2019)

Guest Editor, *International Journal of Molecular Sciences*, Special Issue on “Biological Systems at the Protein Level 2.0” (2021)

Guest Editor, *International Journal of Molecular Sciences*, Special Issue on “Quantitative Mass Spectrometry of Small Molecules to Proteins” (2022–2023)

Editorial Board, *International Journal of Molecular Sciences* (2019–2021)

Topics Board Editor, *International Journal of Molecular Sciences* (2021–2023)

Editorial Board, *PLoS ONE* (2018–2023)
Editorial Board, *Molecules* (2019–present)

Funding History:

National Science Foundation, CHE-2344889, 2023-2025, \$318,103.

National Institute of Food and Agriculture – USDA, “Moving Elderberry into Mainstream Production and Processing,” Andrew Thomas, lead PD; Michael Greenlief co-PD, Greenlief is the Food Science and Health project scientific leader (budget \$239K/year in direct costs for the Food Science and Health portion), 2021–2026, \$5,345,225.

Autism Research Institute, “miRNA as a Potential Mediator in Maternal/Fetal Interaction in Neurodevelopmental Disorders,” David Beversdorf, PI; Michael Greenlief co-PI, 2023, \$50,000.

MU Materials Science and Engineering Institute, “Novel Applications of FIB-SEM ToF-SIMS for Archaeological Chemistry,” Brandi MacDonald and Michael Greenlief, co-PIs, 2022-2024, \$40,000.

USDA – MDA Specialty Crop Block Grant, “Development of Elderberry Flowers as a Viable Specialty Crop,” Andrew Thomas and Michael Greenlief co-PIs, 2018 – 2020, \$22,460

National Science Foundation, “MRI: Acquisition of a High-Resolution Mass Spectrometer/UPLC System,” Michael Greenlief, lead PI with 4 other co-PIs, 2017–2019, \$476,424

USDA – MDA Specialty Crop Block Grant, “Determining and Mitigating the Potential Occurrence of Cyanide in Elderberries,” Andrew Thomas and Michael Greenlief co-PIs, 2016–2018, \$29,775

Mizzou Advantage, “Effect of Elderberry Juice on Cognition & Inflammation in Patients with Mild Cognitive Impairment,” David Beversdorf, lead PI, co-I with 5 others, (Proteomics budget: \$15,000), 2014–2018, \$50,000

Chancellor’s Excellence Fund. “Upgrading MU’s NMR Infrastructure,” M. Greenlief, J. Hazelbauer, and M. McIntosh, co-PIs, 2013-2014, \$750,000

University of Missouri Research Board, “Surface Studies of Carbon Dioxide Reduction,” lead PI with T.R. Marrero co-I, 2012–2014, \$33,000

Battelle Energy Alliance – DOE, “A Research Program for Fission Product/Dust Transport and Adsorption/Desorption in HTGRs,” S. Loyalka, lead PI, co-I with 7 others, 2011–2015, \$1,157,367

National Institutes of Health – Dietary Supplement Research Centers: Botanicals (P50), “MU Center for Botanical Interaction Studies,” Dennis Lubahn, lead PI; co-I with 20 others, Greenlief was the Interactions Core scientific leader (Core budget was \$110K/year in direct costs), 2010–2016, \$7,567,253

State of Missouri Life Sciences Trust Fund, “Development of Quantitative Proteomics-Building Missouri’s Research Capacity,” John Walker, Scott Peck, Jay Thelen, Brian Mooney, and Michael Greenlief were contributors to this part of the proposal. Marc Linit is the lead PI on the \$3.3M overall proposal, 2008–2010, the proteomics budget was ~ \$800,000

University of Missouri-Columbia/Monsanto Major Projects Grants, “Proteomics of Symbiotic Development,” Co-PI with Gary Stacy, David Emerich, Toni Kazic, and Jay Thelen, 2002–2004, \$236,603

Monsanto Company, “Development of Proteomics Center and Plant Biology Research Projects,” Doug Randall and John Walker co-PIs, Stephen Alexander, Tom Quinn, and Michael Greenlief co-I, 2001–2008, \$5,000,000

University of Missouri Research Board, “Mass Spectrometry of Reactive Intermediates,” 2001, \$20,500

University of Missouri, “2000 Life Sciences Mission Enhancement Proposal: Proteomics,” Co-author, 2002–2005, \$1,567,000

Department of Energy, “Operation of the MUCAT Undulator Beamline at the Advanced Photon Source,” (administered through Iowa State University/Ames Laboratory) A. I. Goldman–lead PI, Co-PI with Haskell Taub and Paul Miceli at MU, in addition to 16 other scientists at 9 other universities, 2000–2002, \$460,000

University of Missouri–Columbia Research Council, “Acquisition of a PC–based data system for a mass spectrometer,” 1999–2000, \$4,000

Department of Energy, “Operation of the MUCAT Undulator Beamline at the Advanced Photon Source,” (administered through Iowa State University/Ames Laboratory) A. I. Goldman–lead PI, Co-PI with Haskell Taub and Paul Miceli at MU, in addition to 16 other scientists at 9 other universities, 1998–2000, \$450,000

Research Leave, University of Missouri–Columbia Research Council, “Cycloaddition Reactions at Semiconductor Interfaces–Research Leave Support,” 1998–1999, \$2,260

University of Missouri Research Board, “Upgrade of Chemistry Department Mass Spectrometry Facilities,” 1997–1998, \$16,667

Big 12 Faculty Fellowship Program, 1997, \$2,500

Visiting Industrial Scholar Program, Oak Ridge Associated Universities, 1997, \$600

Department of Energy, “Midwest Universities Collaborative Access Team (μ CAT) Beamlines on the Advanced Photon Source,” Co-PI with Haskell Taub and Paul Miceli at MU, in addition to 15 other scientists at 7 other mid-western universities, 1995–1998, \$2,800,000

Monsanto Company, Instrumentation Award, 1995, \$154,000

International Business Machines, Instrumentation Award, 1995, \$60,000

Department of Energy, “Planning and Design of Beamlines at the Advanced Photon Source,” Co-PI with Haskell Taub and Paul Miceli at MU, in addition to 15 other scientists at 7 other mid-western universities (administered through Iowa State University), 1994–1995, \$187,000

National Science Foundation, “Development of an *In-Situ* Growth and Analysis Chamber for X-ray Scattering Experiments at the Advanced Photon Source,” Co-PI with Haskell Taub, Paul Miceli, and Edward Conrad (Georgia Institute of Technology), 1995–2001, \$287,300

University of Missouri Research Board, “Photon and Electron Induced Chemistry at the Gas/Semiconductor Interface, 1994–1995, \$44,700

National Science Foundation, Young Investigator Award Program, 1993–1998, \$312,500

National Science Foundation, “Surface Chemistry of Germanium Organometallics,” 1991–1994, \$224,500

American Chemical Society–Petroleum Research Fund, Type G Grant, 1991–1993, \$18,000

University of Missouri–Columbia Research Council, Summer Research Fellowship, 1990

Publications – citations: 5226, H-index: 38, i10-index: 80 (Google Scholar, September 2025)

* undergraduate student

116. Kate Nyarko, Stephen Mensah, and C. Michael Greenlief, “Profiling the peptide composition of a biological fluid by MALDI-TOF MS,” manuscript in preparation.

115. Marcus Jackson, Shanyan Chen, Wenyan Yu, Heather R. Siedhoff, Tamanna Mony, Runting Li, Pei Liu, Thao Nguyen, C. Michael Greenlief, Ann C. McKee, Gregory Cole, Sally Frautschy, Jiankun Cui, and Zezong Gu “eXplainable AI-Assisted Phenomics in Human CTE and AD: A Mouse Model of Tauopathy Identifies Plausible Molecular Predictors of Chronic Neuropsychiatric Sequelae and AD-Related Dementia Progression Following Repetitive Mild TBI,” manuscript in preparation for *Nature Communications*.
114. Amanda Dwikarina, Novianus Efrat, Shu-Yu Hsu, Mohamed Bayati, Anuradha Roy, Khanh-Van Ho, Zhentian Lei, Lloyd Sumner, C. Michael Greenlief, Andrew L. Thomas, Wendy Applequist, Andrew Townesmith and Chung-Ho Lin, “Characterization of Bioactive Compounds in Juice from 21 American Elderberry Cultivars Through Metabolomics,” *Journal of Agricultural and Food Chemistry*, submitted (09/2025).
113. Taeseon Woo, Nick I. Ahmed, Michael K. Appenteng, Candice King, Runting Li, Kevin L. Fritsche, Grace Y. Sun, Jiankun Cui, Matthew J. Will, Sara V. Maurer, Hanna E. Stevens, David Q. Beversdorf, and C. Michael Greenlief, “Effect of Maternal dietary DHA and prenatal stress mouse model on autistic-like behaviors, lipid peroxidation activity, and GABA expression in offspring pups,” *International Journal of Molecular Sciences*, **26**, 6730 (2025), doi.org/10.3390/ijms26146730.
112. Madison Musich, Ashley F. Curtis, Bradley J. Ferguson, David Drysdale, Andrew L. Thomas, C. Michael Greenlief, Joel I. Shenker, and David Q. Beversdorf, “Preliminary Effects of American Elderberry Juice on Cognitive Functioning in Mild Cognitive Impairment Patients: A Secondary Analysis of Cognitive Composite Scores in a Randomized Clinical Trial,” *Antioxidants*, **14**, 131 (2025), doi.org/10.3390/antiox14020131.
111. Kate Nyarko, Stephen Mensah, and C. Michael Greenlief, “Examining Polyphenols and Sugars for Authenticating Honey on the U.S. Market: A comprehensive Review,” *Molecules*, **29**, 4940 (2024), doi.org/10.3390/molecules29204940.
110. Marcus Jackson, Shanyan Chen, Pei Liu, Martin Langenderfer, Chao Li, Heather R. Siedhoff, Ashley Balderrama, Runting Li, Catherine E. Johnson, C. Michael Greenlief, Ibolja Cernak, Ralph G. DePalma, Jiankun Cui, Zezong Gu, “Quantitative Proteomic Profiling in Mouse Brain Subregions of Open-Field Low-intensity Blast Models Reveals Position-Dependent Blast Effects,” *Shock Waves* **34**, 381-398 (2024), doi.org/10.1007/s00193-024-01169-2.
109. Andrew L. Thomas, George E. Rottinghaus, Matheus Dela Libera Tres, Patrick L. Byers, John D. Avery, Jr., Martin Kaps, Igolf Gruen, Akash Mazumder, Diann M. Thomas, Megan N. Westwood*, Giselle Campos*, Richard Biagioni, Mitch C. Johnson, and C. Michael Greenlief, “Soil nitrogen fertility influences growth and yield of American elderberry, but is less impactful than genotype and environment on other horticulture characteristics,” *HortScience*, **56**, 787-793 (2024), doi.org/10.21273/hortsci17772-24.

108. Ashley F. Curtis, Madison Musich, Amy N. Costa, Joshua Gonzalez, Hyeri Gonzales, Bradley J. Ferguson, Andrew L. Thomas, Xing Wei, Pei Lu, Briana Kille, C. Michael Greenlief, Joel Shenker and David Q. Beversdorf, "Feasibility and preliminary efficacy of American elderberry juice for improving cognition and inflammation in patients with mild cognitive impairment," *International Journal of Molecular Sciences*, **25**, 4352 (2024), doi.org/10.3390/ijms25084352.
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Selected Presentations (since 2022)

2025 Second International Symposium on Elderberry, Columbia, MO, June 2025, "Methods for the measurement of Elderberry, docosaheptaenoic acid, peroxidation products, and proteomics," C. Michael Greenlief.

2024 Neuroscience Meeting, Chicago, IL, November 2024, "Preliminary effects of improving specific cognitive domains with American elderberry juice in mild cognitive impairment patients," Madison Musich, Ashley F. Curtis, Bradley J. Ferguson, Andrew L. Thomas, C. Michael Greenlief, Joel I. Shenker, and D. Q. Beversdorf.

2024 Alzheimer's Association International Conference Neuroscience Next, Philadelphia, PA, July 2024, "Preliminary Results on the Effects of American Elderberry Juice on Cognition and Inflammatory Proteomics in Mild Cognitive Impairment," Madison Musich, Ashley F. Curtis, Bradley J. Ferguson, Andrew L. Thomas, C. Michael Greenlief, Joel Shenker, and David Q. Beversdorf.

2024 ASMS Conference on Mass Spectrometry and Allied Topics, Anaheim, CA, June 2024, "Method development for ferret IgG N-glycosylation profiling from serum using a timsTOF Pro2," Thao T. Nguyen, Min Hui Guan, Lei Li, Brian P. Mooney, C. Michael Greenlief, and Xiu Feng Wan.

- 2024 International Garlic Symposium, Munich Germany, April 2024, “Aged garlic extract confers molecular resilience on cognition-related networks and functional outcomes in the aging brain,” Jiankun Cui, Tamanna Mony, Marcus Jackson, Amitai Zuckerman, Ashley Balderrama, Runting Li, Thi Thao Nguyen, C. Michael Greenlief, Grace Y. Sun, Zezong Gu.
- 2024 NextGen Precisions Health's PATHWAYS Symposium, Columbia, MO, March 2024, “Profiling the Peptide Composition of a Biological Fluid by MALDI-ToF MS,” Stephen Mensah and C. Michael Greenlief
- 2023 Neuroscience Meeting, Washington, DC, November 2023, “Mice exposed to open-field low-intensity blast revealed position-dependent blast effects on molecular signatures and neurobehavioral deficits,” Marcus Jackson, Shanyan Chen, Pei Liu, Heather R. Siedhoff, Ashley Balderrama, Chao Li, Amitai Zuckerman, Martin J. Langenderfer, Catherine E. Johnson, C. Michael Greenlief, Grace Y. Sun, Ibolja Cernak, Jiankun Cui, Zezong Gu.
- 2023 Joint Midwest–Great Lakes Regional Meeting of the American Chemical Society, St. Louis, MO, October 2023, “Identifying the antimicrobial composition of honeys from Washington state,” Kate Nyarko and C. Michael Greenlief.
- 50th Annual Conference of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, New Orleans, LA September 2023, “Effects of Dietary Docosahexaenoic Acid (DHA) on Lipid Peroxidation Products in Offspring Mice Brain,” Kate Nyarko, Michael K. Appenteng, and C. Michael Greenlief.
- 50th Annual Conference of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, New Orleans, LA September 2023, “Profiling the Peptide Composition of a Biological Fluid by MALDI-ToF MS,” Stephen Mensah and C. Michael Greenlief.
- Fall 2023 National Meeting of the American Chemical Society, San Francisco, CA, August 2023, “Determination of polyphenols in American elderberry pomace for 2018 harvest year using HPLC-MS/MS,” Nihari Perera and C. Michael Greenlief.
- 2023 Military Health System Research Symposium, Kissimmee, FL, August 2023, “Mice Exposed to Open-Field Low-intensity Blast Reveals Position-Dependent Blast Effects,” Marcus Jackson, Shanyan Chen, Pei Liu, Heather R. Siedhoff, Ashley Balderrama, Martin Langenderfer, Chao Li, Runting Li, Catherine E. Johnson, C. Michael Greenlief, Ibolja Cernak, Ralph G. DePalma, Jiankun Cui, Zezong Gu.
- IFT FIRST Annual Event and Expo, Chicago, IL, July 2023, “Spray drying to produce novel phytochemical-rich ingredients from juice and pomace of American elderberry,” K. S. Ravichandran, E. S. Silva, M. Moncada, P. Perkins-Veazie, M. A. Lila, C. M. Greenlief, Andrew L. Thomas, R. T. Hoskin, and K. Krishnaswamy.

- National Neurotrauma Society 2023 Symposium, Austin, TX, June 2023, “Quantitative Profiling of Phosphoproteomes in the Brain Predicts Distinct Protein Functional Clusters Following Low-Intensity Blast with Mice in Upright-Position,” Marcus Jackson, Shanyan Chen, Pei Liu, Amitai Zuckerman, Martin Langenderfer, Chao Li, Ashley Balderrama, Runting Li, Heather R. Siedhoff, Catherine E. Johnson, C. Michael Greenlief, Ibolja Cernak, Ralph G. DePalma, Jiankun Cui, Zezong Gu.
- 2023 ASMS Conference on Mass Spectrometry and Allied Topics, Houston, TX, June 2023, “Profiling of the Polyphenol Content of Honey and its Relationship to Geographical Origins using HPLC-MS/MS,” Kate Nyarko, Kaitlyn Boozer, and C. Michael Greenlief.
- 2023 ASMS Conference on Mass Spectrometry and Allied Topics, Houston, TX, June 2023, “Determination of polyphenols in American elderberry using HPLC-MS/MS, and total phenolic and monomeric anthocyanins by UV-Vis methods,” Nihari D Perera, Bonnie Rogers, Andrew L. Thomas, and C. Michael Greenlief.
- 2023 ASMS Conference on Mass Spectrometry and Allied Topics, Houston, TX, June 2023, “Quantitative Proteomic Profiling in Brain Subregions of Mice Exposed to Open-Field Low-intensity Blast Reveals Position-Dependent Blast Effects,” Marcus Jackson, Shanyan Chen, Martin Langenderfer, Chao Li, Heather R. Siedhoff, Ashley Balderrama, Runting Li, Catherine E. Johnson, C. Michael Greenlief, Ibolja Cernak, Ralph G Depalma, Jiankun Cui, and Zezong Gu.
- Spring 2023 National Meeting of the American Chemical Society, Indianapolis, IN, March 2023, “Determination of polyphenols in American elderberry pomace using HPLC-MS/MS, statistical analysis, and quantification of total phenolic content by UV-Vis spectrophotometry methods,” Nihari Perera, Bonnie C. Rogers, and C. Michael Greenlief.
- Spring 2023 National Meeting of the American Chemical Society, Indianapolis, IN, March 2023, “Analysis of the accumulation of heavy metals in American elderberry pomace using ICP-MS,” Nihari Perera, Bonnie C. Rogers, and C. Michael Greenlief.
- Spring 2023 National Meeting of the American Chemical Society, Indianapolis, IN, March 2023, “Honey phenolic compound profiling in relationship to geographical sources using liquid chromatography tandem mass spectrometry,” Kate Nyarko, Kaitlyn Boozer, and C. Michael Greenlief.
- 9th Biennial Berry Health Benefits Symposium, Tampa Bay, FL, February 2023, “Microencapsulation of elderberry juice and pomace extract to produce phytochemical-rich food ingredients,” K.S. Ravichandran, R. Hoskin, M. Moncada, P. Perkins-Veazie, M.A. Lila, C.M. Greenlief, A.L. Thomas, and K. Krishnaswamy.
- 2022 Neuroscience Meeting, San Diego, CA, November 2022, “Ultrastructural Abnormalities of the Neurovascular Unit Induced by Low-Intensity Blast Exposure in Mice,” Heather Siedhoff, Chao Li, Shanyan Chen, DeAna Grant, Pei Liu, Ashley Balderrama, C. Michael Greenlief, Ralph G. DePalma, Ibolja Cernak, Jiankun Cui, Zezong Gu.

- 56th Midwest Regional Meeting of the American Chemical Society, Iowa City, IA, October 2022, “The use of NMR in food authenticity testing and food adulteration,” Colleen Ray, Madison Bylo, Jonny Pescaglia, and C. Michael Greenlief.
- 56th Midwest Regional Meeting of the American Chemical Society, Iowa City, IA, October 2022, “Effects of dietary docosahexaenoic acid on lipid peroxidation products on offspring mice,” Kate Nyarko, Brady Fisher, Michael Appenteng, and C. Michael Greenlief.
- 49th Annual Conference of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, Orlando, FL September 2022, “Comparison of MALDI matrices for peptide mass fingerprinting of salivary peptides,” Kate Nyarko, Stephen Mensah, and C. Michael Greenlief.
- Fall 2022 National Meeting of the American Chemical Society, Chicago, IL, August 2022, “Determination of presence of polyphenols in American elderberry,” Nihari Perera and C. Michael Greenlief.
- Fall 2022 National Meeting of the American Chemical Society, Chicago, IL, August 2022, “Applications of NMR spectroscopy in food authenticity testing,” Colleen L. Ray, James A. Gawenis, Madison P. Bylo, Jonny Pescaglia, and C. Michael Greenlief.
- 2022 Comprehensive Elderberry Workshop, Columbia, MO, June 2022, “Cyanogenic Glycosides Analysis in American Elderberry: Picrate Paper and LC-MS/MS Method Development and Validation,” Michael K. Appenteng, Ritter Krueger, Mitch C. Johnson, Harrison Ingold, Richard Bell, Andrew Thomas, and C. Michael Greenlief.
- 2022 Comprehensive Elderberry Workshop, Columbia, MO, June 2022, “Untargeted metabolomic profiling and identification of polyphenols in American Elderberry, *Sambucus nigra* (subsp. *Canadensis*),” Paul H. Bruner, Andrew L. Thomas, and C. Michael Greenlief.
- Neurotrauma 2022, The 39th Annual Symposium of the National Neurotrauma Society, Atlanta, GA, June 2022, “Glutamatergic hyperexcitability in hippocampal neurons induced by low-intensity blast exposure is contributive to long-term learning deficits and anxiety-like responses in mice,” Heather Siedhoff, Shanyan Chen, Hua Zhang, Pei Liu, Ashley Balderrama, Catherine Johnson, C. Michael Greenlief, De-Pei Li, Ralph G. DePalma, Jiankun Cui, and Zezong Gu.
- 2022 ASMS Conference on Mass Spectrometry and Allied Topics, Minneapolis, MN, June 2022, “Brain Phosphoproteome Quantitation Revealed Characteristic Features of Tauopathy in Human Tau_{P301L} Transgenic Mice Exposed to Low-Intensity Blast,” Marcus Jackson, Shanyan Chen, Pei Liu, Heather R. Siedhoff, Martin J. Langenderfer, Ashley Balderrama, Runting Li, C. Michael Greenlief, Catherine Johnson, Jiankun Cui, Ibolja Cernak, Ralph G. Depalma, and Zezong Gu.
- Spring 2022 National Meeting of the American Chemical Society, San Diego, CA, March 2022, “Effect of gradient type and duration on the number of identified proteins in HeLa digest by NanoLC-NESI-timsToF Pro,” Xing Wei, Pei Liu, Thi Thao Nguyen, and C. Michael Greenlief.

Spring 2022 National Meeting of the American Chemical Society, San Diego, CA, March 2022, “SPE-HPLC-ESI-ion trap method development and validation to quantify per- and polyfluoroalkyl substances in water systems,” Xing Wei, Colleen Ray, and C. Michael Greenlief.