Curriculum Vitae

Jonathan A. Merten

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EDUCATION

Ph.D. Analytical Chemistry	University of Florida, Gainesville	2011
B.S. Chemistry, minor Spanish	University of Virginia, Charlottesville	1999

RESEARCH INTERESTS

Laser-material interaction; optical parametric oscillator systems; monochromator design; high-resolution spectroscopy; LIBS diagnostics; signal/noise considerations; atomic spectroscopy; optical isotope ratio measurements

ACADEMIC APPOINTMENTS

Associate Professor, Department of Chemistry and Physics 2018 – Present
Assistant Professor, Department of Chemistry and Physics 2012 – 2018
Arkansas State University

ADDITIONAL PROFESSIONAL EXPERIENCE

Postdoctoral Research Associate 2011 – 2012
Arkansas State University
Designed and carried out research in molecular diagnostics in LIBS plasmas. Supervised graduate students and undergraduate researchers.

Spectroscopy Consultant 2011
University of Florida Department of Human and Environmental Toxicology
Designed and constructed infrared laser fluorescence imaging (microscopic and macroscopic) instrument for carbon nanotube detection in-vivo in collaboration with researchers at other universities.

Scientific Editor 2006 – 2007
Chromedia
Ensured clarity and consistency, improved sentence structure, and corrected scientific content of international expert-written texts on HPLC and GC separations for a commercial chromatography education website (www.chromedia.org).

Chromatographer, Department of Veterinary Medicine 2002 – 2003
University of Florida

Operated and maintained HPLC for animal drug pharmacokinetics study. Maintained laboratory records, equipment, developed QA procedures.

Chemistry Teacher (Volunteer, US Peace Corps) 1999 – 2001
Musoma Day Secondary School, Tanzania
Taught 320 high school students with special emphasis on laboratory work. Organized and supervised labs for students and participated in training of teachers in basic lab skills.

Research Assistant, Pate Physical Chemistry Group 1998 – 1999
University of Virginia
Operated high resolution molecular beam IR spectroscopy equipment.

HONORS AND AWARDS

Ralph E. Powe Junior Faculty Enhancement Award (Oak Ridge Associated Universities). 2014.

North American Society for Laser-Induced Breakdown Spectroscopy Student Poster Contest, First Place. "High Speed Gating in Powerchip-Induced LIBS Microplasmas." 2011.

Procter and Gamble Scholarship. 2009.

SCHOLARLY ACTIVITIES

A. Manuscripts in preparation (undergraduate authors underlined)

J. Merten, B. Rougeau. A Modified Indicator Endpoint Statistics Laboratory in Analytical Chemistry: Power and the Paired t-Test.

Shawnda Ethridge, Erin Nicholas, Hannah Bariola, Shealyn Chestnut, Mary Foster, **Jonathan Merten**. Dynamically Probing Y and Y^+ Mass Distribution in a Laser-Induced Plasma.

J. Merten, C. Jones, P. Tribbett. A. Anders. LA-LIF Detection of Carbon in Steel.

B. Refereed journal articles (undergraduate authors underlined)

J. Merten, E. Nicholas, S. Ethridge, S. Chestnut, M. Foster, H. Bariola (submitted) Time-Resolved Absolute Mass of Yttrium Laser-Induced Plasma. *Spectrochimica Acta part B.*

J. Merten, A. Anders, E. Nicholas, S. Ethridge, J. Brees, S. Chestnut, M. Foster, H. Bariola (2023) Following Laser-Induced Plasma Stoichiometry with Atomic Absorption Spectroscopy. *Spectrochimica Acta part B*. Vol. 200, 106600.

J. Merten (2021) Laser-ablation atomic absorption spectroscopy: Reviewing an uncommon hyphenation. *Spectrochimica Acta part B.* Vol. 189, 106358. (Invited Review and Journal Cover)

P. Tribbett, A. Anders, C. Jones, B. Rougeau, **J. Merten** (2020) Line-narrowed argon fluoride LA-LEAF for trace arsenic analysis. *Journal of Analytical Atomic Spectrometry*. Vol. 35, 78-83.

J. Merten, B. Johnson (2018) Massing a LIBS plasma with atomic absorption spectroscopy. *Spectrochimica Acta Part B.* Vol. 149, 124-131.

J. Merten, B. Johnson (2018) Laser continuum source atomic absorption spectroscopy: Measuring the ground state with nanosecond resolution in laser-induced plasmas. *Spectrochimica Acta Part B.* Vol. 139, 38-43. (Journal Cover)

P. Tribbett, C. Jones (Advisor: **J. Merten**) (2017) Laser Ablation-Laser Induced Fluorescence (LA-LIF) for Arsenic Detection in Steel. *Proceedings of the National Council for Undergraduate Research.*

J. Merten, C. Jones, P. Tribbett (2017) Argon Fluoride LA-LEAF for Rapid Arsenic Quantitation. *Journal of Analytical Atomic Spectrometry*. Vol 32, 1697-1704.

J. Merten, M. Jones, S. Hoke, S. Allen (2014) Differential Spectral Imaging of the CN Violet Band in Laser-Induced Plasmas on TNT Simulant Molecules. *Journal of Physics: Conference Series.* Vol 548, 012042.

J. B. Johnson, S. D. Allen, **J. Merten**, L. Johnson, D. Pinkham, S. Reeve (2014) Standoff Methods for the Detection of Threat Agents: a review of several promising laser-based techniques. *Journal of Spectroscopy*. Vol 2014, Article ID 613435.

M. Witte, C. Parigger, N. A. Bullock, **J. A. Merten**, S. D. Allen. (2014) Carbon swan spectra measurements following breakdown of nitro compound explosive simulants. *Applied Spectroscopy*. Vol 68, 367-370.

J. Merten, E. Ewusi-Annan, B. Smith, N. Omenetto. (2014) Optimizing gated detection in high-jitter kilohertz powerchip laser-induced breakdown spectroscopy. *Journal of Analytical Atomic Spectrometry*. Vol 29, 571-577.

J. Merten, B. Smith, N. Omenetto. (2013) Local thermodynamic equilibrium considerations in powerchip laser-induced plasmas. *Spectrochimica Acta Part B.* Vol 83-84, 50-55.

J. Bisesi, **J. Merten**, P. L. Ferguson, T. Sabo-Attwood. (2013) Tracking and Quantification of Single-Walled Carbon Nanotubes in Fish Using Near Infrared Fluorescence. *Environmental Science and Technology*. Vol 48, 1973-1983.

X. Wu, **J. A. Merten**, N. Omenetto, B. W. Smith, J. D. Winefordner. (2009) Development, characterization, and application of a versatile single particle detection apparatus for time-integrated and time-resolved fluorescence measurements — Part II: Experimental Evaluation. *Laser Chemistry*. Vol. 2009. DOI:10.1155/2009/474858.

C. Patents

Pseudocontinuum Atomic Absorption Spectrometer for Detection of Uranium Enrichment. J. Merten, J. B. Johnson. Provisional patent filed. 2014.

D. Grants (undergraduate researchers underlined)

National Science Foundation 2019
Awarded $489,000, PI: J. Merten (prime), K. Hartig, (U. Florida)
Project: *RUI: Elucidation of Matrix Effects in Laser Ablation Elemental Analysis through Absolute Quantification of Ablated Mass*

Arkansas Space Grant Consortium 2019
Awarded $14,000, PI: J. Merten/B. Johnson
Project: *Two-Photon Fluorescence for Nonmetal Imaging in Laser-Induced Plasmas*

Arkansas Space Grant Consortium 2017
Awarded $5,000, PI: J. Merten
Project: *Mechanistic Studies of ArF LA-LEAF in Iron*

Student Undergraduate Research Fellowship 2016
Awarded $3,000, PI: C. Jones (J. Merten Advisor)
Project: *LA-LIF for Determination of Carbon in Steels*

US Defense Threat Reduction Agency 2016
Awarded $450,000, PI: J. Merten
Project: *Pseudo-Continuum Source Volume Isotope Effect Absorption Spectra for Fieldable Measurement of Uranium and Plutonium Enrichment*

Arkansas Biosciences Institute 2015
Awarded $100,000, PI: J. Merten
Project*: A Rapid Method for Arsenic Determination in Hulled Rice*

Arkansas Space Grant Consortium 2015
Awarded $15,000, PI: J. Merten
Project: *Pseudo-Continuum Atomic Absorption in Turbulent Atomic Reservoirs*

Ralph E. Powe Junior Faculty Enhancement Award, ORAU 2014
Awarded $10,000, PI: J. Merten
Project: *Pseudo-Continuum Atomic Absorption Spectroscopy for Fieldable Measurement of Uranium Enrichment*

Faculty Research Award, Arkansas State University 2013
Awarded $4,600, PI: J. Merten
Project: *Pseudo-Continuum Atomic Absorption Source Spectroscopy Pilot Study*

RISC Teaching Pilot Grant, Arkansas State University 2013
Awarded $5,000, coPI's: J. Merten and W. Burns
Project: *Faculty-Led Recitations for Improved Learning Outcomes*

Faculty Start-up Funding, Arkansas State University 2012 – 2015
Department of Chemistry and Physics
Awarded $30,000, PI: J. Merten

E. Conference paper presentations and invited seminars (undergraduate authors underlined)

Jonathan Merten, Shawnda Ethridge, Hannah Bariola, Erin Nicholas, Marybeth Foster, Shealyn Chestnut. (Invited Talk) Probing LIP-Atmosphere Interaction with Atomic Absorption Spectroscopy. SCIX 2022, Cincinnati.

Jonathan Merten. (Invited Talk) A Critical Comparison of Laser-Ablation Atomic Absorption Spectroscopy Paradigms. SCIX 2022, Cincinnati.

Jonathan Merten, Erin Nicholas, Hannah Bariola, Shealyn Chestnut, Shawnda Ethridge, Marybeth Foster. (Invited Talk) Death of a LIP- Influence of Reactive Gas on Persistence of Ground State Vapor. LIBS 2022, Bari, Italy.

Hannah Bariola, Shawnda Ethridge, Erin Nicholas and **Jonathan Merten**, Massing the Y(I) and Y(II) Content of a Rare-Earth LIP with Atomic Absorption. Winter Conference on Plasma Spectrochemistry 2022, Tucson, AZ.

Shawnda Ethridge, Erin Nicholas, Aaron Hopson, Jackie Brees and **Jonathan Merten**. Comparing the Evolution of Imaged Titanium Mass after Ablation of Pure Titanium and a Titanium Alloy. SCIX 2021. Providence, RI.

Erin Nicholas, Shawnda Ethridge, Aaron Hopson, Jackie Brees and **Jonathan Merten**. Spatiotemporally Resolved Temperatures in Titanium LIBS Plasmas via Atomic Absorption Spectroscopy. SCIX 2021. Providence, RI.

J. Merten, Anna G. Anders, Erin Nicholas, Aaron Hopson, Jackie Brees, Shawnda Ethridge (Invited talk). Influence of atmosphere on laser-ablation atomic absorption measurements- findings and potential for artifacts. SCIX 2021. Providence, RI.

J. Merten (Invited seminar). Hyphenating the laser-induced plasma. University of Florida Department of Chemistry, Analytical Division Seminar 2021. Gainesville, FL.

J. Merten (Invited talk). psCS-AAS measurements of mass ablated under He, Ar, Ne and air atmospheres. SCIX 2020. Reno, NV.

J. Merten (Invited talk). What are we looking at? An atypical view of the LIP. SCIX 2019. Palm Springs, CA.

J. Merten, J. Gonzalez. Comparison of Vaporized Neutral Mass and Signal in LA-ICP Spectrometry. Conference on Laser Ablation 2019. Maui, HI.

J. Merten (Invited talk). LA-LIF with a Tunable ArF Laser for Selective Measurements in a Challenging Matrix. Eastern Analytical Symposium 2018. Princeton, NJ.

J. Merten. Measuring the Ablated Mass in LIBS Plasmas with Atomic Absorption Spectroscopy. SCIX 2018. Atlanta, GA.

J. Merten, Patrick Tribbett, Chris Jones and Anna Anders. Selective LA-LIF of Arsenic, Carbon and Platinum with a Tunable, Line-Narrowed ArF Laser. SCIX 2018. Atlanta, GA.

J. Merten. Measuring Lithium in an Aluminum LIP with Atomic Absorption Imaging. SCIX 2018. Atlanta, GA.

Anna Anders, **J. Merten**. LA-LEAF Quantitation of Platinum. SCIX 2018. Atlanta, GA.

J. Merten, B. Johnson. pseudoContinuum Source Atomic Absorption Spectroscopy for Rapid Measurement of Lithium Isotope Ratios. Methods and Applications of Radioanalytical Chemistry 2018. Kona, HI.

J. Merten, B. Johnson. pseudoContinuum Source Atomic Absorption Spectroscopy for Ground State Measurements in LIBS. Winter Conference on Plasma Spectrochemistry 2018. Amelia Island, FL.

C. Jones, **J. Merten**. Carbon Determination in Steel via ArF-Induced LA-LEAF. Winter Conference on Plasma Spectrochemistry 2018. Amelia Island, FL.

J. Merten, B. Johnson. Time-Resolved Absorption Measurements in Transient Plasmas: toward Single-Shot Optical Measurements of Uranium Isotope Ratios. SCIX 2017. Reno.

J. Merten, P. Tribbett, C. Jones. Argon Fluoride LA-LEAF for Arsenic: toward Selective Measurements in Rice. SCIX 2017. Reno.

P. Tribbett, C. Jones, **J. Merten**. Optimizing LA-LEAF for Arsenic in Metals using a Tunable ArF Laser. SCIX 2017. Reno.

P. Tribbett, C. Jones, **J. Merten**. Optimization of Laser Ablation-Laser Induced Fluorescence for Arsenic Detection in Steel. National Council for Undergraduate Research 2017. Memphis, TN.

J. Merten, C. Jones. Selectivity Considerations in LA-LEAF Detection of Arsenic in Metallic Matrices. Arkansas Biosciences Institute Fall Conference 2016. Little Rock, AR.

J. Merten, C. Jones. Laser Induced Fluorescence for Arsenic Detection in Laser Induced Plasmas. FACSS SCIX 2016. Minneapolis.

J. Merten, A. Goff. pseudoContinuum Source Atomic Absorption Spectroscopy in Transient Plasmas. FACSS SCIX 2016. Minneapolis.

M. Northcutt, **J. Merten**. Magnetic Enhancement of Powerchip LIBS Microplasmas. Joint Southeast/Midsouth Regional Meeting of the American Chemical Society 2015. Memphis, TN.

J. Merten, C. A. Jones. Preliminary Investigation of LA-LIF for Arsenic Determination in Rice. Arkansas Biosciences Research Symposium 2015, Fayetteville, AR.

J. Merten, Matt Jones, Steven Hoke, Susan Allen. Differential Spectral Imaging of the CN Violet Band in LIP's on TNT Simulant Molecules. International Conference on Spectral Lineshapes 2014. Tullahoma, TN.

J. Merten, B. Johnson. Novel pseudo-Continuum Source Atomic Absorption Spectroscopy (psCS-AAS). Winter Conference on Plasma Spectrochemistry 2014. Amelia Island, FL.

J. Merten A.Goins, B. Smith, N. Omenetto. LED-Excited Atomic Fluorescence Determination of Lead. Winter Conference on Plasma Spectrochemistry 2014. Amelia Island, FL.

J. Merten, M. Jones, C. Shepard, C. Parigger, S. Allen. Spatiotemporal Evolution of Plasma Molecular Emission following Laser Ablation of Explosive Analogs. SPIE Defense and Sensing 2013. Baltimore, MD.

N. Bullock, **J. Merten**, C. Shepard, M. Jones, C. Parigger, S. Allen. Temporal Evolution of the LIBS Spectra of a Representative Nitro Compound. FACSS SciX 2012. Kansas City, MO.

J. Merten, B. Smith, N. Omenetto. Time Resolved Powerchip Laser Plasma Diagnostics: Beyond the McWhirter Criterion. FACSS SciX 2012. Kansas City, MO.

J. H. Bisesi, **J. Merten**, A. N. Parks, P. L. Ferguson, T. Sabo-Attwood. Imaging Real Time Single Walled Nanotube Distribution in Fish Using Near Infra-Red Fluorescence Detection. ICEENN 2012. Banff, Alberta.

J. H. Bisesi, **J. Merten**, A. N. Parks, P. L. Ferguson, T. Sabo-Attwood. Examining single walled carbon nanotube distribution in live fish during gavage and feeding studies using near infrared florescence detection. SETAC 2011. Boston, MA.

J. Merten, B. Smith, N. Omenetto. High speed gating in powerchip induced LIBS microplasmas. NASLIBS 2011. Clearwater, FL.

J. Merten, B. W. Smith, J.D. Winefordner, N. Omenetto. Construction of an LED-Based Pb Resonance Monochromator. Winter Conference on Plasma Spectrochemistry 2010. Sanibel Island, FL.

J. Merten, N. Omenetto, B. Smith, J. Winefordner. Powerchip laser induced breakdown spectroscopy: plasma diagnostics and analytical considerations. NASLIBS 2009. New Orleans, LA.

J. Merten, N. Omenetto, B. Smith, J. Winefordner. Evaluation of time-resolved fluorescence for discrimination of bioaerosols. Pittcon 2008. New Orleans, LA.

X. Wu, **J. Merten**, N. Omenetto, B. Smith, J. Winefordner. Development of a real-time bioaerosols detection system. Pittcon 2005. Orlando, FL.

D. Green, **J. Merten**, S. Ali, B. Pate. Full assignment of the high-resolution infrared spectrum of the 1-butyne acetylenic C-H stretch fundamental. Ohio State International Symposium on Molecular Spectroscopy 1998. Columbus, OH.

R. A. Warren Jr., D. Shelby, **J. Merten**, B. Smith, J. D. Winefordner, N. Omenetto. LIBS studies of single suspended particles for the investigation of laser-particle and plasma-particle interactions. Winter Conference on Plasma Spectrochemistry 2010. Fort Myers, FL.

TEACHING EXPERIENCE

A. Classes Taught

Arkansas State University
MCAT Preparation for Chemistry

General Chemistry I, II

General Chemistry I Laboratory

Instrumental Analysis, lecture and laboratory with Labview emphasis

Graduate Analytical Chemistry, statistics/chemometrics emphasis, spectrochemical analysis emphasis.

Analytical Chemistry

Musoma Day Secondary School, Musoma, Tanzania
Secondary School Chemistry, laboratory and lecture (Forms 1-4)

B. Mentoring

Past Undergraduate Researcher accomplishments:

Patrick Tribbett (B.Sc. Physics, minor Chemistry, May 2018)- Meinhard Student Poster Award (FACSS/SCIX 2017), Society for Applied Spectroscopy Student Travel Award (FACSS/SCIX 2017), first author on publication at Journal of Analytical Atomic Spectrometry. Currently PhD student in Space and Planetary Science (Northern Arizona University).

Christopher Jones (B.Sc. Electrical Engineering, May 2018)- Student Undergraduate Research Fellowship (2016), SCIX 2017, Winter Conference on Plasma Spectrochemistry 2018. Completed MSc. Engineering (Arkansas State University, 2020).

A. Grace Anders (B.Sc. Biology, B.A. Chemistry, 2020)- Posters at the [Arkansas] Capitol 2018, SCIX 2018 (Atlanta). Currently PhD student in Chemistry (U. Michigan).

Erin Nicholas (B.Sc. Chemistry, B.Sc. Math, 2022)- SCIX 2021 (Providence). Currently PhD student in Chemistry (U. Illinois).

Shawnda Ethridge (B.Sc. Chemistry 2022)- SCIX 2021 (Providence). Working analytical chemist. St. Louis, MO.

UNIVERSITY AND PROFESSIONAL SERVICE

A. Peer review (journals)

Applied Physics B
Journal of Analytical Atomic Spectrometry
Spectrochimica Acta Part B: Atomic Spectroscopy
(selected member of editorial board with term beginning January 2022)

Applied Optics
Optics Letters
Optics Express
Analytical Chemistry
Applied Spectroscopy
Journal of Applied Physics

B. Peer review (funding agencies)

PNNL/DOD-funded project review, Lawrence Berkeley National Laboratory, 2018.
NSF Molecular and Atomic Spectroscopy review panel, 2020.
NSF ad hoc reviewer 2021.

C. University service

Organic Chemistry Faculty Search, Department of Chemistry and Physics, 2014.
University Fulbright Committee, 2014-present.
Regional Science Fair Judge, 2012-present.
College Seed Grant review committee, 2019.
College Workload Policy Committee, 2021.
University Parking and Motor Vehicle Committee, 2022.
University Faculty Grievance Committee, 2022.

LANGUAGES

Fluent in Spanish, Swahili

PERMITS AND SPECIAL SKILLS
Subpermit holder for trapping, banding and handling of Sialia sialis (Eastern Bluebird).