

AMANDA L. PATRICK

Assistant Professor
Department of Chemistry
Mississippi State University

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PROFESSIONAL EXPERIENCE

August 2018-Present **Mississippi State, MS**
Assistant Professor, Department of Chemistry, Mississippi State University

August 2016-August 2018 **Kirtland AFB, NM**
NRC Postdoctoral Associate, Drs. Jaime Stearns and Christopher Annesley, Air Force Research Labs

July 2011-August 2016 **Gainesville, FL**
Research Assistant/NSF GRFP Fellow, Prof. Nicolas Polfer, University of Florida

Fall 2011, Spring 2012, Fall 2012 **Gainesville, FL**
Graduate Teaching Assistant, Dr. John Mitchell, University of Florida

EDUCATION

University of Florida **Gainesville, FL**
PhD in Analytical Chemistry, August 2016
Research Advisor: Prof. Nicolas C. Polfer
Dissertation Title: Structural Characterization of Isolated Small Biomolecular Ions: Insights from Mass Spectrometry and Infrared Ion Spectroscopy

North Carolina State University **Raleigh, NC**
B.S. in Chemistry, Minor in Anthropology, May 2011
Summa cum Laude, with Departmental Honors
Research Advisor: Prof. Elon A. Ison

PUBLICATIONS

Patrick, A.L. "Instructor's Reference for Integrating Mass Spectrometry into the General Chemistry Classroom", *J. Chem. Ed.* (in press).

Narayana, G.; Faradizaji, B.; Mukeba, K.M.; Shelar, K.; De Silva, M.; **Patrick, A.**; Donnadieu, B.; and Smith, D.W. "Perfluorocyclohexenyl (PFCH) aromatic ether polymers from perfluorocyclohexene and polycyclic aromatic bisphenols", *Polymer Chemistry*, 11, **2020**, 5051-5056.

Acharya, B.; Kaushalya, W.K.D.N.; Martens, J.; Berden, G.; Oomens, J.; and **Patrick, A.L.** "A Combined Infrared Ion Spectroscopy and Computational Chemistry Study of Hydroxyproline Isomers", *J. Am. Soc. Mass Spectrom.*, 31, **2020**, 1205-1211.

De Silva, M.; Brown, A.C.; and **Patrick, A.L.** "Thermal- and collision-induced dissociation studies of functionalized imidazolium-based ionic liquid cations". *J Mass Spectrom.*, 55, **2020**, e4518.

Perera, V.; Acharya, B.; **Patrick, A.L.**; and Mlsna, D. "Hands-On Electrospray Ionization-Mass Spectrometry for Undergraduate Biochemistry Students: Peptide Identification by Ladder Sequencing." *J. Chem. Ed.*, 97, **2020**, 1437-1442.

Patrick, A.L. "Electrospray Ionization Enters the Final Frontier: Mass Spectrometry's Role in Understanding Electrospray Thrusters and Their Plumes". *Rapid Communications in Mass Spectrometry*, **2019** (in press).

Bailey, L; Alves, M; Galy, N; **Patrick, A**; Polfer, N. "Mechanistic insights into intramolecular phosphate group transfer during collision induced dissociation of phosphopeptides". *J Mass Spectrom*, 54, **2019**, 449-458.

Patrick, A; Annesley, C. "Dissociation pathways of protic ionic liquid clusters: Alkylammonium nitrates". *J Mass Spectrom*, 54, **2019**, 371-377.

Patrick, A.; Vogelhuber, K.; Prince, B.; Annesley, C. "Theoretical and experimental insights into the dissociation of 2-hydroxyethylhydrazinium nitrate clusters formed via electrospray". *J. Phys. Chem. A.*, 122, **2018**, 1960-1966.

Patrick, A.; Cismesia, A.; Tesler, L.; Polfer, N. "Effects of ESI conditions on kinetic trapping of the solution-phase protonation isomer of p-aminobenzoic acid in the gas phase". *Int. J. Mass Spectrom.*, 418, **2017**, 148-155.

Patrick, A.; Polfer, N. "H₂SO₄ and SO₃ transfer reactions in a sulfopeptide-basic peptide complex." *Anal. Chem.*, 87, **2015**, 9551–9554

Patrick, A.; Polfer, N. "Peptide Fragmentation Products in Mass Spectrometry Probed by Infrared Spectroscopy." In *Gas-Phase IR Spectroscopy and Structure of Biological Molecules*, Rijs, A. M.; Oomens, J., Eds.; Springer International Publishing, **2015**, 153-181.

Patrick, A.L.; Stedwell, C.N.; Schindler, B.; Compagnon, I.; Berden, G.; Oomens, J.; and Polfer, N.C. "Insights into the fragmentation pathways of protonated gas-phase sulfoserine". *Int. J. Mass Spectrom.*, 379, **2015**, 26-32.

Patrick, A.L.; Stedwell, C.N.; Polfer, N.C. "Differentiating Sulfopeptide and Phosphopeptide Ions via Resonant Infrared Photodissociation". *Anal. Chem.*, 86, **2014**, 5547-5552.

Stedwell, C.N.; **Patrick, A.L.;** Gulyuz, K.; Polfer, N.C. "Screening for Phosphorylated and Nonphosphorylated Peptides by Infrared Photodissociation Spectroscopy". *Anal. Chem.*, 84, **2012**, 9907-9912.

Chen, H; Longfield, D.E.; Varahagiri, V.S.; Nguyen, K.T.; **Patrick, A.L.;** Qian, H; VanDerveer, D.G.; Anker, J.N. "Optical imaging in tissue with X-ray excited luminescent sensors". *Analyst*, 136, **2011**, 3438-3445.

Chen, H; **Patrick, A.L.;** Yang, Z; VanDerveer, D.G.; Anker, J.N. "High-Resolution Chemical Imaging through Tissue with an X-ray Scintillator Sensor". *Anal. Chem.*, 83, **2011**, 5045-5049.

PRESENTATIONS

Patrick, A. "Pushing the Limits of Mass Spectrometry: Using Allied Technologies to Improve Analysis of Modified Peptides". Invited Seminar at Millsaps College, Jackson, MS, 11 October 2019.

De Silva, M; Patrick, A. "Next-generation spacecraft propellant performance and the ultimate fate of their exhaust plumes: Insights from mass spectrometry". Oral presentation at the American Chemical Society National Meeting & Expo, Orlando, FL, March 2019. *Note: This abstract was chosen to also be presented as a poster at the SciMix session.*

De Silva, M; Patrick, A. "Dissociation of ionic liquid clusters and cations in the gas phase". Poster presented at Gordon Research Conference on Gaseous Ions, Ventura, CA, February 2019.

Patrick, A. "Electrospray Ionization: From the Lab to Outer Space". Chemistry Department Seminar, Mississippi State University, 31 August 2018.

Patrick, A.; Annesley, C. "Mass spectrometry's role in understanding and evaluating the clustering and dissociation of next-generation spacecraft propellants." Poster Presentation. 66th ASMS Conference, 2018, San Diego, CA, USA.

Patrick, Amanda; Vogelhuber, K; Prince, B; Annesley, C. "Proton Sharing and Transfer in Ionic Liquids Probed by Mass Spectrometry and Molecular Modeling". Poster Presentation. ASMS Sanibel Conference, 2018, St. Petersburg, FL, USA.

Patrick, A.; Hause, M.; Vogelhuber, K.; Prince, B.; Annesley, C.; and Stearns, J. "Next-generation electrospray thrusters: Fate of ionic liquid clusters in vacuum studied by mass spectrometry". Poster Presentation. AFOSR Molecular Dynamics/Theoretical Chemistry Program Review, 2017, Kirtland AFB, NM, USA.

Patrick, A.; Lemke, K.; Hause, M.; Annesley, C.; Prince, A.; and Stearns, J. "Toward a Fundamental Understanding of Ionic Liquids for Space Applications: Mass Spectrometric and Collision-Induced Dissociation Studies". Poster Presentation. Gordon Research Conference on Gaseous Ions: Structures, Energetics, and Reactions, 2017, Ventura, CA, USA.

Patrick, A., Cismesia, A., and Polfer, N. "Effects of solvent systems and source conditions on protonation site: The case of p-aminobenzoic acid". Poster Presentation. 64th ASMS Conference, 2016, San Antonio, TX, USA.

Patrick, A. and Polfer, N. "Dissociation pathways, rearrangement reactions, and relative stabilities of O-sulfated amino acids and small peptides." Oral Presentation. 71st SWRM/67th SERMACS, 2015. Memphis, TN, USA.

Patrick, A. and Polfer, N. "Investigating sulfo group transfer in non-covalent complexes of acidic sulfopeptides and polyarginine peptides." Poster Presentation. 63rd ASMS Conference, 2015. St. Louis, MO, USA.

Patrick, A.; Stedwell, C.; and Polfer, N. "Differentiating isobaric compounds by infrared ion spectroscopy: peptides and PTMs." Poster Presentation. 62nd ASMS Conference, 2014. Baltimore, MD, USA.

Patrick, A.; Stedwell, C.; and Polfer, N. "Differentiating sulfo- and phospho-peptides on the basis of their IR bands." Poster Presentation. IBBI 14 - Conference on Isolated Biomolecules and Biomolecular Interactions, 2014. Porquerolles, France.

Patrick, A.; Wolff, J; and Polfer, N. "Extending the Phosphoproteomics Toolkit". Poster Presentation. 61st ASMS Conference, 2013. Minneapolis, MN, USA

AWARDS and FUNDING

- 2020 ORAU Ralph Powe Junior Faculty Enhancement Award
- 2020/2021 PCC Pilot Project grant
- 2020 MS State ORED Undergraduate Research Program project
- 2019 MS State ORED Undergraduate Research Program project
- 2019 ACS CIBA/Younger Chemists Committee travel award
- 2018 MS State Center for Teaching and Learning Small Grant
- 2016 NRC Research Associateship Program award
- 2014 Rick Schaeffer Memorial Fund ASMS Travel Award
- 2014 UF Graduate Student Research Abroad Program award
- 2013 National Science Foundation Graduate Research Fellowship (NSF GRFP)
- 2011 UF Graduate School Fellowship

SERVICE

- Volunteer judge at student poster sessions and symposia
- Graduate recruiting at ACS National Meeting (March 2019, Orlando)

- Chemistry Representative to MSU College of Arts & Sciences Faculty Senate (2019-Spring 2020)
 - Peer Reviewer: PCCP, JPCA
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ADVISED STUDENTS

Current:

Maleesha De Silva (5th Year PhD student), WKDN Kaushalya (master's; successful defense Fall 2020), Baku Acharya (master's; successful defense Fall 2020), Matthew Carlo (2nd Year graduate student), Peyton York (undergraduate)

Former:

Andrew Brown (Undergraduate junior, Chemistry), William Davis (undergraduate senior, Chemistry)

MEMBERSHIPS

- American Chemical Society (ACS)
- American Society for Mass Spectrometry (ASMS)
- Phi Beta Kappa Society (ΦBK)