Adam P Cismesia

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Professional Summary

- Oversaw the design, development and implementation of custom mass spectrometry and infrared spectroscopy instrumentation funded by NSF and NIH grant cycles.
- Designed and executed new analytical methods and protocols in LC-MS, MS^n, GC-MS, IRPD, IRMPD, FTIR, and UHV.
- Managed and supervised 1 high school student, 1 undergraduate researcher, 5 graduate students and 2 international researchers. Published author in 4 physical/analytical chemistry peer-reviewed journals. Presented results in the format of 1 oral and 7 poster presentation at local and international conferences.

Research Experience

Doctoral Research: Department of Chemistry, Analytical Division, University of Florida **August 2013 – present**
(research advisor: Prof. Nicolas C. Polfer)

- Performed infrared predissociation (IRPD) and infrared multiple photon dissociation (IRMPD) spectroscopy to determine dissociation mechanisms and structurally elucidate gas-phase ions
  - ➢ Determined protonation sites of small molecules and metabolites by analysis of distinct vibrational stretching modes
  - ➢ Developed a method for isomeric/isobaric separation based upon spectral shifts of vibrational modes and comparisons to computationally you derived vibrational spectra
  - ➢ Performed dual infrared laser experiments to elucidate suppressed vibrational bands and enhance IRMPD yield
- Designed/Implemented/Optimized instrumentation for performing cryogenic vibrational spectroscopy
  - ➢ Utilized SolidWorks 3D CAD and AutoCAD software to design: RF ion guides; cryogenic linear ion trap; heat shield; electron multiplier detection system; custom vacuum chambers; electrical feedthroughs; DC Enziel lenses; laser optics; and gas mixing chambers
  - ➢ Simulated ion trajectories to develop and optimize instrumental geometries for ion guides, traps and optics using SIMION software
  - ➢ Engineered custom instrumentation and electronic components and collaborated with machine and electronic shop staff to ensure design specifications were met
  - ➢ Installed and optimized custom rectilinear ion trap for the pre-accumulation of ions to increase overall sensitivity and duty cycle of experiments along with cryogenic ion trap to perform infrared predissociation (IRPD) spectroscopy
- Operated, diagnosed and repaired instrumentation and electronics relevant to mass spectrometry
  - ➢ Operated, maintained and repaired custom-built electrospray ionization/quadrupole mass filter/quadrupole ion trap/time-of-flight mass spectrometer (ESI/QMF/QIT/TOF MS) using custom LabVIEW software
  - ➢ Tested and diagnosed high-voltage (200V – 12KV) RF and DC power supplies using testing equipment such as a digital multimeter and oscilloscope with high voltage probes
  - ➢ Installed and aligned an optical parametric oscillator/amplifier (OPO/A) pumped by a pulsed Nd:YAG laser and a CO_2 laser for IRMPD and IRPD spectroscopic studies
  - ➢ Utilized commercial software (Agilent, Advion, Bruker, Thermo, etc.) to operate and tune liquid chromatographs and mass spectrometers
  - ➢ Developed standard operating procedures and safety protocols for correct operation of multiple instruments and lasers

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Undergraduate Research: Department of Chemistry, Purdue University **August 2011 – December 2012**
(research advisor: Prof. Hilkka Kentammaa)

- Used separation techniques and high-resolution, tandem mass spectrometry to examine heavy crude oil fractions to determine structural features
  - ➢ Used a LTQ LQIT and a LTQ-FT-ICR mass spectrometer to perform collision induced dissociation techniques to fragment asphaltene samples along with multiple mass isolation techniques to gain structural information
  - ➢ Assisted with organic synthesis of model compounds for structural comparison to field obtained samples
  - ➢ Proposed molecular structures of asphaltenes based on statistical analysis of fragmentation pathways based on mass spectra
  - ➢ Assisted in diagnostic and repair of commercial mass spectrometers using electronic diagnostic tools

Internship Research: Nalco Company, Naperville, IL **May 2011 – August 2011**
(research manager: Dr. Kevin O'Brien) **May 2012 – August 2012**

- Developed and performed organic and inorganic polymer synthesis to be utilized in cooling and descaling processes
  - ➢ Assisted in development of de-scaler polymers to reduce metallic buildup on heating elements during alumina manufacturing
  - ➢ Maintained and calibrated analytical instruments such as a densitometer, viscometer, auto titrator, and RSV tubes
  - ➢ Recorded data from FT-IR, torque test, settling test, and percent solids test
  - ➢ Compiled and organized detailed information in a lab notebook
  - ➢ Collaborated with team members to design experimental procedures

Education

University of Florida, Gainesville, FL
Ph. D. in Analytical Chemistry, Anticipated May 2018
Area of Specialization: Mass Spectrometry/Ion Spectroscopy
Purdue University, West Lafayette, IN
B.S. in Chemistry, December 2012
Area of Specialization: Tandem Mass Spectrometry

Awards/Travel Grants

Center for Chemical Physics Graduate Student Travel Award - UF Chemistry (2016 & 2017)
The center for chemical physics awards graduate students travel funding based on research results to present data at local and international conferences.
American Society for Mass Spectrometry Student Travel Award (2017)
The American society of mass spectrometry student travel award is awarded based on research abstracts to help fund students to present data at the international ASMS conference.
Purdue Undergraduate Research Symposium Award in Physical Science – 1st place (2012)
Awarded to 1 out of 120 students that competed in this symposium.

Publications

Cismesia, A.P.; Tesler, L.F.; Bell, M.R.; Bailey, L.S.; Polfer, N.C. Infrared Ion Spectroscopy Inside a Mass-Selective Cryogenic 2D Linear Ion Trap. *J. Mass Spectrom.*, **2017**, *52*, 720-727.

Cismesia, A.P.; Nicholls, G.R.; Polfer, N.C. Amine vs. Carboxylic Acid Protonation in *ortho-*, *meta-*, and para-Aminobenzoic Acid: An IRMPD Spectroscopy Study. *J. Molec. Spectroscopy.*, **2017**, *332*, 79-85.

Patrick, A.L.; Cismesia, A.P.; Tesler, L.F.; Polfer, N.C. 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.*, **2016**, *418*, 148-155.

Cismesia, A.P.; Bailey, L.S.; Bell, M.R.; Tesler, L.F.; Polfer, N.C. Making Mass Spectrometry See the Light: The Promises and Challenges of Cryogenic Infrared Ion Spectroscopy as a Bioanalytical Technique. *J. Am. Soc. Mass Spectrom.*, **2016**, *27*, 757-766.

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