

Dr. Angela Raso

(505)819-9825
angela.raso@env.nm.gov

Education

Purdue University, West Lafayette, IN

December 2018

Doctor of Philosophy, Analytical Chemistry / Atmospheric Chemistry

Dissertation: "Iodine, Bromine, and Chlorine in the Arctic Atmosphere – Emission Rates, Sources, and Impacts"

Advisor Dr. Paul B. Shepson, Dr. Kerri A. Pratt (University of Michigan)

Whitman College, Walla Walla, WA

May 2012

Bachelor of Arts, Chemistry. Mathematics minor.

Undergraduate Thesis: "Determining the Presence of Dense Non-Aqueous Phase Liquid (DNAPL) Pollutants in River Sediments"

Advisor Dr. Frank M. Dunnivant

Professional Experience

Permitting Program Manager, New Mexico Environment Department, Climate Change Bureau

January 2024 - Present

- Manage a team of environmental scientists in implementing greenhouse gas emission reducing climate measures
- Support legislative efforts for a clean transportation fuel standard in New Mexico

Environmental Scientist, New Mexico Environment Department, Climate Change Bureau

September 2023 – January 2024

- Coordinate New Mexico's statewide greenhouse gas emissions inventory, with an emphasis on greenhouse gas emissions from the oil and gas industry
- Lead greenhouse gas and criteria air pollutant emission reduction estimates for climate action measures for the climate pollution reduction grant program in New Mexico
- Testify at the hearing for the adoption of Advanced Clean Cars II, Advanced Clean Trucks, and Heavy-Duty Omnibus rules as a technical air quality and greenhouse gas emissions expert
- Contribute to writing New Mexico's administrative rules adopting Advanced Clean Cars II, Advanced Clean Trucks, and Heavy-Duty Omnibus rules

Dispersion Modeler, New Mexico Environment Department, Air Quality Bureau

September 2018 – September 2023

- Review dispersion modeling of proposed facilities for compliance with Ambient Air Quality Standards
- Evaluate excess emissions from facilities to determine if Air Quality Standards have been violated
- Conduct data analysis and quality control for emissions inventory
- Prepare and evaluate modeling for state implementation plans
- Review and interpret photochemical modeling proposals and results, including for regional haze, ozone transport, and state ozone precursor rules
- Participate in development of air quality policies, as part of a planning team
- Present complex technical material for public hearings and meetings as a subject matter expert
- Testify at hearings for permit hearings and rulemaking as a technical expert
- Prepare and edit complex technical documents for the public, industry, and other agency subject matter experts

Research Experience

Research Assistant, Purdue University

September 2012 – August 2018

- Led field work based research on gas phase oxidation processes in the Arctic
- Collaboratively designed and performed atmospheric chemistry field experiments
- Full process responsibility for analytical measurements during remote field work
- Management, optimization and maintenance of gas and aerosol instrumentation
- Conducted and evaluated zero- and one- dimensional photochemical modeling in a novel model platform
- Collected data for eddy covariance flux calculations

Visiting Research Assistant, University of Michigan

August 2015 - January 2016

- Collaboratively planned for a spring 2016 field study in Barrow, Alaska

**User, Environmental Molecular Sciences Laboratory,
Pacific Northwest National Laboratory**

October 2015

- Acquired first ever measurements of iodide in Arctic snow using ion chromatography coupled with inductively coupled plasma mass spectrometry (IC-ICPMS)

Undergraduate Research Assistant, Whitman College

September 2010 –May 2012

- Conducted research on dense non-aqueous phase liquids in mixed stream-bed media for detection at highly polluted sites using gas chromatography – electron capture detection

Teaching Experience

**General Chemistry, Analytical Chemistry, and Organic Chemistry
Purdue University and Santa Fe Community College**

Fall 2011 – Spring 2019

Publications and Presentations

- Chen, Q., J. A. Mirrielees, S. Thanekar, N. A. Loeb, R. M. Kirpes, L. M. Upchurch, A. J. Barget, N. N. Lata, A. R. W. Raso, S. M. McNamara, S. China, P. K. Quinn, A. P. Ault, A. Kennedy, P. B. Shepson, J. D. Fuentes, K. A. Pratt (2022) "Atmospheric particle abundance and sea salt aerosol observations in the springtime Arctic: a focus on blowing snow and leads". *Atmos. Chem. Phys.* 22, 15263-15285
- McNamara, S. M., N. M. Garner, S. Wang, A. R. W. Raso, S. Thanekar, A. J. Barget, J. D. Fuentes, P. B. Shepson, K. A. Pratt (2020) "Bromine chloride in the coastal Arctic: diel patterns and production mechanisms"
- McNamara, S. M., A. R. W. Raso, S. Wang, S. Thanekar, E. J. Boone, K. R. Kolesar, P. K. Peterson, W. R. Simpson, J. D. Fuentes, P. B. Shepson, K. A. Pratt (2019) "Springtime nitrogen oxide-influenced chlorine chemistry in the coastal arctic" *Environmental Science & Technology* 53(14) 8057-8067
- Wang, S., S. M. McNamara, C. W. Moore, D. Obrist, A. Steffen, P. B. Shepson, R. M. Staebler, A.R.W. Raso, K. A. Pratt (2019) "Direct detection of atmospheric atomic bromine leading to mercury and ozone depletion" *Proceedings of the National Academy of Sciences* 116(29) 14479-14484
- Raso, A. R. W., K. D. Custard, N. W. May, D. J. Tanner, M. K. Newburn, L. Walker, R. Moor, L. G. Huey, M. L. Alexander, P. B. Shepson, K. A. Pratt (2017) "Active Molecular Iodine Photochemistry in the Arctic" *Proceedings of the National Academy of Sciences* 114(38) 10053-10058
- Custard, K. D., A. R. W. Raso, K. A. Pratt, R. M. Staebler, and P. B. Shepson (2017) "Molecular halogen production in and flux measurements from tundra snow" *ACS earth and space chem.* 1(3), 142-151
- Raso, A.R.W., B. Elstrott, and F. M. Dunnivant, (2012) Envirolab: Simulations of Laboratory experiments in environmental chemistry [Computer Program] Available at <http://people.whitman.edu/~dunnivfm/software.html>

Presentations

- "Active Molecular Iodine Photochemistry in the Arctic" December 11, 2017. Oral Presentation, American Geophysical Union Meeting. New Orleans, La
- "Surface fluxes and recycling of molecular halogens above the snowpack" December 11, 2017. Poster, American Geophysical Union Meeting. New Orleans, La
- "Mass transport and recycling of molecular halogens near the snowpack surface in Barrow (Utqiagvik), Alaska" December 12, 2016. American Geophysical Union Fall Meeting. San Francisco, Ca.
- "The impact of Molecular iodine photochemistry in the Arctic" December 17, 2014. Poster, American Geophysical Union Fall Meeting. San Francisco, Ca.
- "Determining the presence of dense non-aqueous phase liquid (DNAPL) pollutants in river sediments" March 26, 2012. Poster, National Spring Meeting of the American Chemical Society. San Diego, Ca.