

Alexander B. Thames

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Department of Geosciences
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State College, PA, 16803

CURRENT POSITION

Pennsylvania State University

PhD Candidate

Advisors: Dr. Antonia Hadjimichael, Dr. Bradford J. Foley

State College, PA

2019 – Present

EDUCATION

Pennsylvania State University, Eberly College of Science

BS: Physics, *with high distinction*; Minor: Mathematics

State College, PA

2015

RESEARCH EXPERIENCE

Pennsylvania State University, Department of Geoscience

PhD Candidate

State College, PA

2019 – Present

- Developing and implementing a multisite and multivariate synthetic weather generator to be used in conjunction with Colorado's StateCU and StateMod systems in order to provide decision-makers and shareholders with probabilistic information on agricultural and climate risks in the Colorado River Basin
- Constructing exploratory models investigating how Earth's internal and external water reservoirs affect its thermal history and confines the present-day volatile flux into the mantle

Pennsylvania State University, Department of Meteorology and Atmospheric Science

Researcher

Field and laboratory operation of the Airborne Tropospheric Hydrogen Oxides Sensor (ATHOS) and the OH Reactivity (OHR) instruments

State College, PA

2015 – 2019

Atmospheric Tomography (ATom) Mission

2016 – 2018

- Participated in a NASA four-season airborne campaign as the sole operator of the ATHOS and OHR instrument suite for 40+ research flights aboard the NASA DC-8 research aircraft as it flew between northern and southern polar regions, constantly ascending or descending between approximately 500ft and 39,000ft
- Converted raw data into OH, HO₂, and OHR data measurements using MATLAB software that I extensively modified
- Analyzed these measurements by comparing them to a box model

Korean-United States Air Quality (KORUS-AQ) Mission

2016

- Participated in a NASA international field campaign operating the ATHOS and OHR instrument suite for over 120 flight-research hours aboard the NASA DC-8 research aircraft
- Converted raw data into OH, HO₂, and OHR data measurements using MATLAB software that I extensively modified
- Analyzed these measurements by comparing them to a box model

OH Reactivity Inter-Comparison

2015

- Participated in an OH reactivity instrument comparison study in Jülich, Germany as the sole United States representative amongst eleven different participating research organizations
- Helped integrate three distinct laboratory pieces from three separate research institutions into an operational field experiment and operated the instrument during the comparison study
- Converted raw data into OHR data measurements using MATLAB software that I extensively modified

Pennsylvania State University, Eberly College of Science

State College, PA

Undergraduate Researcher, Research Experience for Undergraduates Participant

2014 - 2015

- Used C++ and ROOT schemes to analyze data from the Pierre Auger Observatory to map the incident direction of cosmic ray particles

University of Pennsylvania, LRSM

Philadelphia, PA

Project Manager, Volunteer

2013

- Responsible for the preliminary design and construction of an automated safety cut-off circuit to be used in clinical studies at the Hospital of the University of Pennsylvania and Children's Hospital of Philadelphia

GRANTS and AWARDS

Earle S. Lenker Award

2022

Pennsylvania State University

Paul D. Krynine Scholarship

2020 - 2022

Pennsylvania State University

NASA Group Achievement Award, ATom

2019

National Aeronautics and Space Administration

NASA Group Achievement Award, KORUS-AQ

2016

National Aeronautics and Space Administration

John and Elizabeth Holmes Teas Scholarship Fund

2014

Pennsylvania State University

RELATED PROFESSIONAL EXPERIENCE/SKILLS

Fieldwork

- YAG and dye laser maintenance and realignment

- Diagnostic in-flight physical and electronic instrument repair
- Custom software creation/data processing on atmospheric physics/chemistry data

Languages

- Electronic: MATLAB, python, C#, LaTeX, HSL
- Spoken: English, with some Spanish

Leadership

- College of Earth and Mineral Science Graduate Student Council 2019 - 2022
- Student Government: University Park Undergraduate Association 2014 - 2015
- Fraternity President: Delta Upsilon 2013

PEER-REVIEWED PUBLICATIONS

First Author

1. **Alexander B Thames**, William H Brune, David O Miller, Hannah M Allen, Eric C Apel, Donald R Blake, T Paul Bui, Roisin Commane, John D Crouse, Bruce C Daube, Glenn S Diskin, Joshua P DiGangi, James W Elkins, Samuel R Hall, Thomas F Hanisco, Reem A Hannun, Eric Hints, Rebecca S Hornbrook, Michelle J Kim, Kathryn McKain, Fred L Moore, Julie M Nicely, Jeffrey Peischl, Thomas B Ryerson, Jason M St Clair, Colm Sweeney, Alex Teng, Chelsea R Thompson, Kirk Ullmann, Paul O Wennberg, Glenn M Wolfe, (2020). Missing OH reactivity in the global marine boundary layer. *Atmospheric Chemistry and Physics*, 20(6), 4013-4029.

Co-Author

1. Hendrik Fuchs, Anna Novelli, Michael Rolletter, Andreas Hofzumahaus, Eva Y Pfannerstill, Stephan Kessel, Achim Edtbauer, Jonathan Williams, Vincent Michoud, Sebastien Dusanter, Nadine Locoge, Nora Zannoni, Valerie Gros, Francois Truong, Roland Sarda-Esteve, Danny R Cryer, Charlotte A Brumby, Lisa K Whalley, Daniel Stone, Paul W Seakins, Dwayne E Heard, Coralie Schoemaeker, Marion Blocquet, Sebastien Coudert, Sebastien Batut, Christa Fittschen, **Alexander B Thames**, William H Brune, Cheryl Ernest, Hartwig Harder, Jennifer BA Muller, Thomas Elste, Dagmar Kubistin, Stefanie Andres, Birger Bohn, Thorsten Hohaus, Frank Holland, Xin Li, Franz Rohrer, Astrid Kiendler-Scharr, Ralf Tillmann, Robert Wegener, Zhujun Yu, Qi Zou, Andreas Wahner (2017). Comparison of OH reactivity measurements in the atmospheric simulation chamber SAPHIR. *Atmospheric Measurement Techniques*, 10(10), 4023-4053.
2. Paul S Romer, Paul J Wooldridge, John D Crouse, Michelle J Kim, Paul O Wennberg, Jack E Dibb, Eric Scheuer, Donald R Blake, Simone Meinardi, Alexandra L Brosius, **Alexander B Thames**, David O Miller, William H Brune, Samuel R Hall, Thomas B Ryerson, Ronald C Cohen (2018). Constraints on Aerosol Nitrate Photolysis as a Potential Source of HONO and NO_x. *Environmental Science and Technology*, 52(23), 13738-13746.
3. GM Wolfe, JM Nicely, JM St Clair, TF Hanisco, J Liao, L Oman, WH Brune, DO Miller, **AB Thames**, GG Abad, TB Ryerson, J Peischl, K McCain, C Sweeney, PO Wennberg, MI Kim, JD Crouse, SR Hall, K Ullmann, GS Diskin, TP Bui, CS Chang, JM Dean-Day,

- (2019). ATom: Column-Integrated Densities of Hydroxyl and Formaldehyde in Remote Troposphere. *ORNL DAAC*.
4. Glenn M Wolfe, Julie M Nicely, Jason M St Clair, Thomas F Hanisco, Jin Liao, Luke D Oman, William B Brune, David Miller, **Alexander Thames**, Gonzalo González Abad, Thomas B Ryerson, Chelsea R Thompson, Jeff Peischl, Kathryn McKain, Colm Sweeney, Paul O Wennberg, Michelle Kim, John D Crouse, Samuel R Hall, Kirk Ullmann, Glenn Diskin, Paul Bui, Cecilia Chang, Jonathan Dean-Day, (2019). Mapping hydroxyl variability throughout the global remote troposphere via synthesis of airborne and satellite formaldehyde observations. *Proceedings of the National Academy of Sciences*, *116*(23), 11171-11180.
 5. Saewung Kim, Roger Seco, Dasa Gu, Dianne Sanchez, Daun Jeong, Alex B Guenther, Young-Ro Lee, John E Mak, Luping Su, Dan Bi Kim, Joonyoung Ahn, John Sullivan, Thomas Mcgee, Russell Long, William H Brune, **Alexander Thames**, Armin Wisthaler, Markus Müller, Andrew Weinheimer, Tomas Mikoviny, Melissa Yang, Jung-Hun Woo, Soyoung Kim, Hyunju Park, (2020). The roles of suburban forest in controlling vertical trace gas and OH reactivity distributions—a case study for Seoul Metropolitan Area. *Faraday Discussions*.
 6. WH Brune, DO Miller, **AB Thames**, HM Allen, EC Apel, DR Blake, TP Bui, R Commane, JD Crouse, BC Daube, GS Diskin, JP DiGangi, JW Elkins, SR Hall, TF Hanisco, RA Hannun, EJ Hintsa, RS Hornbrook, MJ Kim, K McKain, FL Moore, JA Neuman, JM Nicely, J Peischl, TB Ryerson, JM St. Clair, C Sweeney, AP Teng, C Thompson, K Ullmann, PR Veres, PO Wennberg, GM Wolfe, (2020). Exploring oxidation in the remote free troposphere: Insights from Atmospheric Tomography (ATom). *Journal of Geophysical Research: Atmospheres*, *125*(1), e2019JD031685.
 7. Patrick R Veres, J Andrew Neuman, Timothy H Bertram, Emmanuel Assaf, Glenn M Wolfe, Christina J Williamson, Bernadett Weinzierl, Simone Tilmes, Chelsea R Thompson, **Alexander B Thames**, Jason C Schroder, Alfonso Saiz-Lopez, Andrew W Rollins, James M Roberts, Derek Price, Jeff Peischl, Benjamin A Nault, Kristian H Møller, David O Miller, Simone Meinardi, Qinyi Li, Jean-François Lamarque, Agnieszka Kupc, Henrik G Kjaergaard, Douglas Kinnison, Jose L Jimenez, Christopher M Jernigan, Rebecca S Hornbrook, Alan Hills, Maximilian Dollner, Douglas A Day, Carlos A Cuevas, Pedro Campuzano-Jost, James Burkholder, T Paul Bui, William H Brune, Steven S Brown, Charles A Brock, Ilann Bourgeois, Donald R Blake, Eric C Apel, Thomas B Ryerson, (2020). Global airborne sampling reveals a previously unobserved dimethyl sulfide oxidation mechanism in the marine atmosphere. *Proceedings of the National Academy of Sciences*, *117*(9), 4505-4510.
 8. Katherine R Travis, Colette L Heald, Hannah M Allen, Eric C Apel, Stephen R Arnold, Donald R Blake, William H Brune, Xin Chen, Róisín Commane, John D Crouse, Bruce C Daube, Glenn S Diskin, James W Elkins, Mathew J Evans, Samuel R Hall, Eric J Hintsa, Rebecca S Hornbrook, Prasad S Kasibhatla, Michelle J Kim, Gan Luo, Kathryn McKain, Dylan B Millet, Fred L Moore, Jeffrey Peischl, Thomas B Ryerson, Tomás Sherwen, **Alexander B Thames**, Kirk Ullmann, Xuan Wang, Paul O Wennberg, Glenn M Wolfe, Fangqun Yu, (2020). Constraining remote oxidation capacity with ATom observations. *Atmospheric Chemistry and Physics*, *20*(13), 7753-7781.
 9. Agnieszka Kupc, Christina J Williamson, Anna L Hodshire, Jan Kazil, Eric Ray, T Paul Bui, Maximilian Dollner, Karl D Froyd, Kathryn McKain, Andrew Rollins, Gregory P Schill, **Alexander Thames**, Bernadett B Weinzierl, Jeffrey R Pierce, Charles A Brock, (2020). The potential role of organics in new particle formation and initial growth in the remote tropical upper troposphere. *Atmospheric Chemistry and Physics Discussions*, 1-38.

10. Siyuan Wang, Eric C Apel, Rebecca H Schwantes, Kelvin H Bates, Daniel J Jacob, Emily V Fischer, Rebecca S Hornbrook, Alan J Hills, Louisa K Emmons, Laura L Pan, Shawn Honomichl, Simone Tilmes, Jean-François Lamarque, Mingxi Yang, Christa A Marandino, Eric S Saltzman, Warren de Bruyn, Sohiko Kameyama, Hiroshi Tanimoto, Yuko Omori, Samuel R Hall, Kirk Ullmann, Thomas B Ryerson, Chelsea R Thompson, Jeff Peischl, Bruce C Daube, Róisín Commane, Kathryn McKain, Colm Sweeney, **Alexander B Thames**, David O Miller, William H Brune, Glenn S Diskin, Joshua P DiGangi, Steven C Wofsy, (2020). Global Atmospheric Budget of Acetone: Air-Sea Exchange and the Contribution to Hydroxyl Radicals. *Journal of Geophysical Research: Atmospheres*, 125(15), e2020JD032553.
11. Katherine R Travis, Colette L Heald, Hannah M Allen, Eric C Apel, Stephen R Arnold, Donald R Blake, William H Brune, Xin Chen, Róisín Commane, John D Crouse, Bruce C Daube, Glenn S Diskin, James W Elkins, Mathew J Evans, Samuel R Hall, Eric J Hints, Rebecca S Hornbrook, Prasad S Kasibhatla, Michelle J Kim, Gan Luo, Kathryn McKain, Dylan B Millet, Fred L Moore, Jeffrey Peischl, Thomas B Ryerson, Tomás Sherwen, **Alexander B Thames**, Kirk Ullmann, Xuan Wang, Paul O Wennberg, Glenn M Wolfe, Fangqun Yu, (2020). Constraining remote oxidation capacity with ATom observations. *Atmospheric chemistry and physics*, 20(13), 7753-7781.
12. Saewung Kim, Roger Seco, Dasa Gu, Dianne Sanchez, Daun Jeong, Alex B Guenther, Youngro Lee, John E Mak, Luping Su, Dan Bi Kim, Youngjae Lee, Joon-Young Ahn, Tom Mcgee, John Sullivan, Russell Long, William H Brune, **Alexander B Thames**, Armin Wisthaler, Markus Müller, Thomas Mikoviny, Andy Weinheimer, Melissa Yang, Jung-Hun Woo, Soyoung Kim, Hyunjoo Park, (2020). The role of a suburban forest in controlling vertical trace gas and OH reactivity distributions—a case study for the Seoul metropolitan area. *Faraday Discussions*, 226, 537-550.

CONFERENCES

American Geophysical Union

Poster Presentation

Online
2021

Thames, A.B., Foley, B.J: *Producing Feasible Water and Thermal Evolutions for Earth's Mantle Using Monte Carlo Analysis*

American Geophysical Union

Poster Presentation

Online
2020

Thames, A.B., Foley, B.J: *Using Monte Carlo Analysis and Present-Day Constraints on Earth's Water Budget to Produce Feasible Water and Thermal Histories via Reverse-Time Integration*

American Geophysical Union

Poster Presentation

Washington, D.C
2018

Thames, A.B., Brune, W.B., Miller, D.O.; NASA ATom Science Team: *Global OH Reactivity in the Remote Marine Boundary Layer and the Potential of Missing Reactivity*

Atmospheric Tomography Mission Science Team Meeting II

Oral Presentation of Research

Boulder, CO
2018

Thames, A.B., Brune, W.B., Miller, D.O.; NASA ATom Science: *Research Update #2*

Korea-US Air Quality Mission, Science Team Meeting II Irvine, CA
Oral Presentation of Research 2018

Thames, A.B., Brune, W.B., Miller, D.O.; NASA KORUS-AQ Science: *Research Update #2*

American Meteorological Society Austin, TX
Poster Presentation 2018

Thames, A.B., Brune, W.B., Miller, D.O.; NASA ATom Science: *Measured OH Reactivity in ATom1 and ATom2*

Atmospheric Tomography Mission Science Team Meeting I Boulder, CO
Poster Presentation 2017

Thames, A.B., Brune, W.B., Miller, D.O.; NASA ATom Science: *Research Update #1*

Korea-US Air Quality Mission, Science Team Meeting I Jeju Island, South Korea
Oral Presentation of Research 2017

Thames, A.B., Brune, W.B., Miller, D.O., Brosius, A.L.; NASA KORUS-AQ Science: *Research Update #1*

OH Reactivity Intercomparison Science Team Meeting Jülich, Germany
Oral Presentation of Research 2016

Thames, A.B., Brune, W.B., Miller, D.O.; *Research Update #1*