

Curriculum Vitae
James MacKenzie Roberts

BUSINESS ADDRESS

NOAA/ESRL Chemical Sciences Division CSD5
325 Broadway, Boulder, Colorado, 80305
303-497-3982, James.M.Roberts@noaa.gov

BIRTH PLACE and CITIZENSHIP

South Bend, Indiana, U.S. Citizen

EDUCATION

- Ph.D. in Analytical/Environmental Chemistry, University of Colorado, Boulder, 1983.
- B.S. in Chemistry, and Environmental Engineering, California Polytechnic State University, San Luis Obispo, 1978.

RESEARCH INTERESTS

- Quantifying the environmental cycling and fate of atmospheric nitrogen compounds.
- Understanding the molecular basis of the health effects of air pollutants.
- Impacts of wildfires on the atmosphere and biosphere.
- Mechanisms of halogen activation in the atmosphere.
- Development and application of instrumentation and methods for measurement of key atmospheric chemical species.

PROFESSIONAL EMPLOYMENT HISTORY

- 1992-present: Research Chemist, NOAA/ESRL Chemical Sciences Division, (formerly the NOAA/ERL Aeronomy Laboratory), 325 Broadway, Boulder, Colorado, 80305.
- 1991-1992: Research Associate, Cooperative Institute for Research in the Environmental Sciences., University of Colorado., Boulder, Colorado., 80309.
- 1986-1991: Assistant Chemist, and Associate Chemist, Environmental Chemistry Division, Department of Applied Science, Brookhaven National Laboratory, Upton, New York, 11973.
- 1984-1986: Research Associate, National Oceanic and Atmospheric Administration (NOAA), Aeronomy Laboratory, and Cooperative Institute for Research in the Environmental Sciences, Boulder, Colorado.
- 1983-1984: National Research Council Postdoctoral Associate, NOAA Aeronomy Laboratory, and University of Colorado, Boulder, Colorado.
- 1979-1983: Research Assistant, NOAA Aeronomy Laboratory and University of Colorado, Boulder, Colorado.

PROFESSIONAL EXPERIENCE 2003-Present

- 2015-Present: Co-Lead Scientist, NOAA FIREX Project: <https://www.esrl.noaa.gov/csd/projects/firex/>
- 2013-2014: Lead Scientist, Uintah Basin Winter Ozone Study, 2014: <http://www.esrl.noaa.gov/csd/tropchem/2014ubwos/>
- 2013- Present: Co-editor, *Atmospheric Chemistry and Physics*, www.copernicus.org
- 2012-2013: Lead Scientist, Uintah Basin Winter Ozone Study, 2013: <http://www.esrl.noaa.gov/csd/tropchem/2013ubwos/>
- 2011-2012: Lead Scientist, Uintah Basin Winter Ozone Study, 2012: <http://www.esrl.noaa.gov/csd/tropchem/2012ubwos/>
- 2011: Principal Scientist, NACHTT: <http://www.esrl.noaa.gov/csd/tropchem/2011NACHTT/>
- 2010: Principal Scientist, CalNex2010: <http://www.esrl.noaa.gov/csd/calnex/>
- 2009: Principal Scientist – Firelab Study, USDA Fire Laboratory, Missoula, MT.

- 2008 - 2011: Co-Thesis Advisor, Energy and Environmental Studies Program, North Carolina A&T State University, Greensboro, N.C., <http://www.noaaaiset.org/index.php>
- 2008: Principal Scientist, ICEALOT, <http://saga.pmel.noaa.gov/Field/icealot/> and ARPAC, <http://www.esrl.noaa.gov/csd/ARCPAC/>.
- 2006: Principal Scientist, TexAQS/GoMACCS 2006 Study, <http://www.esrl.noaa.gov/csd/2006/>.
- 2005: Visiting Scientist, Department of Environmental Sciences, Peking University, Beijing, China.
- 2004: Principal Scientist, NEAQS/ICARTT 2004 Study, <http://www.esrl.noaa.gov/csd/ICARTT/>.
- 2003: Principal Scientist, Antarctic Tropospheric Chemistry Investigation, South Pole Station,

HONORS and MEMBERSHIPS IN PROFESSIONAL SOCIETIES

- American Chemical Society, American Geophysical Union, American Association for the Advancement of Science, European Geosciences Union.
- NOAA Administrator's Award and U.S. Department of Commerce Bronze Medal, 2020. "For the planning and conduct of FIREX-AQ, the largest interdisciplinary research project ever conducted on Wildfire."
- U.S. Department of Commerce, Gold Medal, Leadership, 2016.
- Governor's Award, Atmospheric Science, Colorado Leveraging Assets for Better Science (CO-LABS) Consortium, 2012, 2014.
- NOAA/OAR Outstanding Scientific Paper Awards, 1998, 2000, 2005, and 2016.
- U.S. Department of Commerce, Silver Medal, 2004.
- Phi Kappa Phi Honor Society, and Environmental Engineering Student of the Year, California Polytechnic State University, 1978.
- NCAA Division II All-American, Track and Field, 1974; 1975.

PUBLICATION METRICS – Researcher ID# A-1082-2009, ORCID# 0000-0002-8485-8172

Journal Articles and Book Chapters = 196, H-Index = 64: i10 = 166

SELECTED PUBLICATIONS – Complete list available on request

Roberts, James M., Chelsea Stockwell, Robert J. Yokelson, Joost de Gouw, Yong Liu, Vanessa Selimovic, Abigail R. Koss, Kanako Sekimoto, Matthew M. Coggon, Bin Yuan, Kyle J. Zarzana, Steven S. Brown, Cristina Santin, Stefan H. Doerr, and Carsten Warneke, The nitrogen budget of laboratory-simulated western US wildfires during the FIREX 2016 FireLab study, *Atmos. Chem. Phys.*, 20, 8807-8826, 2020, 10.5194/acp-20-8807-2020.

Veres, Patrick R., J. Andrew Neuman, Timothy H. Bertram, Emmanuel Assaf, Glenn M. Wolfe, Christina J. Williamson, Bernadett Weinzierl, Simone Tilmes, Chelsea 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, and Thomas B. Ryerson, In-situ observations reveal the importance of dimethyl sulfide autoxidation in the marine atmosphere, *Proc. Natl. Acad. Sci.*, 117 (9), 4505-4510, 2020, doi.org/10.1073/pnas.1919344117.

Coggon, Matthew M., Christopher Lim, Abigail R. Koss, Kanako Sekimoto, Bin Yuan, Jessica Gilman, David Hagan, Vanessa Selimovic, Kyle Zarzana, Steve Brown, **James M. Roberts**, Markus Müller, Robert Yokelson, Armin Wisthaler, Jordan Krechmer, Jose Jimenez, Christopher Cappa, Jesse Kroll, Joost de Gouw, and Carsten Warneke, OH-chemistry of non-methane organic gases (NMOG) emitted from laboratory and ambient biomass burning smoke: evaluating the influence of furans and oxygenated aromatics on ozone and secondary NMOG formation, *Atmos. Chem. Phys.*, 19, 14875-14899, 10.5194/acp-19-14875-2019, 2019.

- Fleming, Lauren T., Peng Lin, **James M. Roberts**, Vanessa Selimovic, Robert Yokelson, Julia Laskin, Alexander Laskin, Sergey A. Nizkorodov, Molecular composition and photochemical lifetimes of brown carbon chromophores in biomass burning organic aerosol, *Atmos. Chem. Phys.*, 20, 1105-1129, 2020, 10.5194/acp-20-1105-2020.
- Tomaz, S., T. Cui, Y. Chen, K.G. Sexton, **J.M. Roberts**, C. Warneke, R.J. Yokelson, J.D. Surratt, and B.J. Turpin, Photochemical cloud processing of primary wildfire emissions as a potential source of secondary organic aerosol, *Environ. Sci. Technol.*, 52, 11027-11037, doi.org/10.1021/acs.est.8b03293, 2018.
- Roberts J.M.**, and Y. Liu, Solubility and solution-phase chemistry of isocyanic acid, methyl isocyanate and cyanogen halides, *Atmos. Chem. Phys.*, 19, 4419-4437, 2019.
- Decker, Z.C.J., Kyle J. Zarzana, Matthew Coggon, Kyung-Eun Min, John Holloway, Ilana Pollack, Thomas B. Ryerson, Peter Edwards, William P. Dube, Joshua P. Schwarz, Milos Z. Markovic, Charles A. Brock, **James M. Roberts**, Patrick R. Veres, Abigail R. Koss, Lindsay E. Hatch, Kelley C. Barsanti, Steven S. Brown, Nighttime chemical transformation in biomass burning plumes: A box model analysis initialized with aircraft observations, *Environ. Sci. Technol.*, 53, 2529-2538, doi: 10.1021/acs.est.8b05359, 2019.
- MacDonald, B.C., Michael K. Trainer, Stuart A. McKeen, Jessica Gilman, Christopher Cappa, Robert Harley, Gregory J. Frost, Drew Gentner, Thomas B. Ryerson, Joost A. de Gouw, **James M. Roberts**, Jose L. Jimenez, Allen Goldstein, Gabriel Isaacman-VanWertz, Shantanu Jathar, Ali Akherati, Julia Lee-Taylor, Patrick Hayes, YuYan Cui, Si-Wan Kim, Volatile chemical products emerging as largest petrochemical source of urban organic emissions, *Science*, 359, 760-764, 2018.
- Stockwell, C.E., R.A. Washenfelder, A. Kupc, B. Witkowski, R.K. Talukdar, Y. Liu, V. Selimovic, K.J. Zarzana, K. Sekimoto, C. Warneke, R.J. Yokelson, A.M. Middlebrook, **J.M. Roberts**, Characterization of a catalyst-based conversion technique to measure total particle nitrogen and organic carbon and comparison to a particle mass measurement instrument, *Atmos. Meas. Technol.*, 11, 2749-2768, 2018.
- Koss, Abigail R, Kanako Sekimoto, Jessica B. Gilman, Vanessa Selimovic, Matthew M. Coggon, Kyle J. Zarzana, Bin Yuan, Brian M. Lerner, Steven S. Brown, José-Luis Jimenez, Jordan Krechmer, **James M. Roberts**, Carsten Warneke, Robert J. Yokelson, Joost de Gouw, Volatile organic compound emissions from biomass burning: identification, quantification, and emission factors from PTR-ToF during the FIREX 2016 laboratory experiment, *Atmos. Chem. Phys.*, 18, 3299-3319, 2018.
- Burkholder, J.B.; Abbatt, J.P.D.; Barnes, I.; **Roberts, J.M.**; Melamed, M.L.; Ammann, M.; Bertram, A.K.; Cappa, C.D.; Carlton, A.G.; Carpenter, L.J.; Crowley, J.N.; Dubowski, Y.; George, C.; Heard, D.E.; Herrmann, H.; Keutsch, F.N.; Kroll, J.H.; McNeill, V. F.; Ng, N.L.; Nizkorodov, S.A.; Orlando, J. J.; Percival, C.J.; Picquet-Varrault, B.; Rudich, Y.; Seakins, P.W.; Surratt, J.D.; Tanimoto, H.; Thornton, J.A.; Zhu, Tong; Tyndall, G.S.; Wahner, A.; Weschler, C.J.; Wilson, K.R.; Ziemann, P.J., The Essential Role for Laboratory Studies in Atmospheric Chemistry, *Environ. Sci. Technol.*, 51, 2519-2528, doi:10.1021/acs.est.6b04947, 2017.
- Edwards, P. M., K. Aikin, W.P. Dube, J. L. Fry, J.B. Gilman, J.A. de Gouw, M.G. Graus, T.F. Hanisco, J. Holloway, G. Hübler, J. Kaiser, F.N. Keutsch, B.M. Lerner, J.A. Neuman, D.D. Parrish, J. Peischl, I. Pollack, A.R. Ravishankara, **J.M. Roberts**, T.B. Ryerson, M. Trainer, P. Veres, G.M. Wolfe, C. Warneke, and S.S. Brown, Transition from high to low NO_x control of nighttime oxidation in the Southeast U.S., *Nature Geoscience.*, 10, 490-495, doi:10.1038/ngeo2976, 2017.
- West, J.J., A. Cohen, F. Dentener, B. Brunekreef, T. Zhu, B. Armstrong, M.L. Bell, M. Brauer, G. Carmichael, D.L. Costa, D.W. Dockery, M. Kleeman, M. Krzyzanowski, N. Künzli, C. Liousse, S.C.C. Lung, R. V. Martin, U. Pöschl, C. A. Pope III, **J. M. Roberts**, A. G. Russell, C. Wiedinmyer, What we breathe impacts our health: Improving understanding of the link between air pollution and health, *Environ. Sci. Technol.*, 50, 4895-4904, doi:10.1021/acs.est.5b038267, 2016.
- VandenBoer, T.C., C.J. Young, R.K. Talukdar, M.Z. Markovic, S.S. Brown, **J.M. Roberts**, and J.G. Murphy, Nitrous acid reactive uptake and displacement connects nocturnal loss and daytime source, *Nature Geoscience*, 8, 55-60, doi:10.1038/NNGEO2298, 2015.
- Edwards, P.M., S.S. Brown, **J.M. Roberts**, R.Ahmadov, R. Banta, J. de Gouw, W.P. Dubé, R.A. Field, J. Flynn, J. Gilman, M.Graus, D. Helmig, A. Koss, A.O. Langford, B. Lefer, B. Lerner, R. Li, S. McKeen, S.-M. Li, S. Murphy, D. Parrish, C.J. Senff, J. Soltis, C. Stephens, J. Stutz, C. Sweeney, M.K. Trainer, C. Tsai, P. Veres, R.A. Washenfelder, C. Warneke, Robert Wild, C.J. Young, B. Yuan, R. Zamora, High winter ozone pollution from carbonyl photolysis in an oil and gas basin, *Nature*, 514, 351-354, doi:10.1038/nature13767, 2014.

Roberts, J.M., P.R. Veres, A.K. Cochran, C. Warneke, I.R. Burling, R.J. Yokelson, B. Lerner, J.B. Gilman, W.C. Kuster, R. Fall, and J. de Gouw, Isocyanic acid in the atmosphere and its possible link to smoke-related health effects, *Proc. Natl. Acad. Sci.*, doi: 10.1073/pnas.1103352108, 2011.

Roberts, J.M., P. Veres, C. Warneke, J.A. Neuman, R. Washenfelder, S.S. Brown, M. Baasandorj, J. Burkholder, I.R. Burling, T.J. Johnson, R.J. Yokelson, and J. de Gouw, Measurement of HONO, HNCO, and other inorganic acids by negative-ion proton-transfer chemical-ionization mass spectrometry (NI-PT-CIMS): Application to biomass burning emissions. *Atmos. Meas. Tech.*, 3, 981-990, 2010.

Roberts, J.M., Hans D. Osthoff, Steve S. Brown, and A.R. Ravishankara, N₂O₅ Oxidizes Chloride to Cl₂ in Acidic Atmospheric Aerosol, *Science*, 321, 1059, 2008.

Osthoff, H.D., **J.M. Roberts**, A. R. Ravishankara, E. J. Williams, B.M. Lerner, R. Sommariva, T.S. Bates, D. Coffman, P.K. Quinn, H. Stark, J.B. Burkholder, R.K. Talukdar, J. Meagher, F.C. Fehsenfeld, and S.S. Brown, High Levels of Nitryl Chloride in the Polluted Subtropical Marine Boundary Layer, *Nature Geoscience*, 1, 324-328, 2008.

Veres, P., **Roberts, James M.**, Warneke, C., Welsh-Bon, D., Zahniser, M., Herndon, S., Fall, R., and de Gouw, J., Development of Negative-Ion Proton-Transfer Chemical-Ionization Mass Spectrometry (NI-PT-CIMS) for the Measurement of Gas-Phase Organic Acids in the Atmosphere, *Int. J. Mass Spectrom.*, 274, 48-55, 2008.

Slusher, D.L., L.G. Huey, D.J. Tanner, F. Flocke, and **J.M Roberts**, A TD-CIMS Technique for the Simultaneous Measurement of Peroxyacyl Nitrates and Dinitrogen Pentoxide, *J. Geophys. Res.*, 109, 2004JD004670, 2004.

Sparks, J.P., **J.M. Roberts**, and R.K. Monson, The uptake of gaseous organic nitrogen by leaves: A significant global nitrogen transfer process, *Geophys. Res. Lett.*, 30, No. 23, 2189, 10.1029/2003GL018578, 2003.

Collaborators (in addition to co-authors)

Graduate and Postdoctoral Advisors:

Dr. Robert E. Sievers, Department of Chemistry, University of Colorado, Boulder, Colorado, 80301.
Dr. Fred C. Fehsenfeld, NOAA/ESRL, Chemical Sciences Division, Boulder, Colorado, 80305.

Thesis or Postdoctoral Research Advisees:

Students:

Dr. Craig Stroud, Environment Canada, Toronto, Canada.
Dr. Patrick Veres, Chemical Sciences Division, NOAA/ESRL, Boulder, Colorado.
Dr. Trevor VandenBoer, York University, Toronto, Canada.

Postdoctoral Researchers:

Dr. Steven Bertman, Department of Chemistry, Western Michigan University, Kalamazoo, MI.
Dr. Jonathan Williams, Atmospheric Chemistry Division, Max Planck Inst. Chemistry, Mainz, Germany.
Dr. Jed Sparks, Department of Ecology and Evolutionary Biology, Cornell University, Ithaca, NY.
Dr. Aaron Swanson, Chemistry Technology Department, Northrop Grumman, Redondo Beach, CA.
Dr. Wengang Zheng, Systems Design Engineer, KLA-Tencor, Hayward, CA.
Dr. Patrick Veres, NOAA/ESRL, Chemical Sciences Division, Boulder, CO.
Dr. Chelsea Stockwell, NOAA Chemical Sciences Laboratory, Boulder, CO.
Dr. Rishabh Shah, Environmental Defense Fund, San Francisco, CA.
Dr. Derek Price, NOAA Chemical Sciences Laboratory, Boulder, CO.