

DR. BRIAN C. McDONALD**RESEARCH SCIENTIST**

Chemical Sciences Laboratory (CSL), Earth System Research Laboratories (ESRL), National Oceanic & Atmospheric Administration (NOAA), Boulder, Colorado, USA. E-mail: brian.mcdonald@noaa.gov.

Professional Summary

Dr. Brian McDonald conducts research that improves the quantification and mapping of emissions of air pollutants and greenhouse gases from urban, energy, and transportation systems, through the use of atmospheric measurements and computational models. After receiving his Ph.D. from UC-Berkeley, he was awarded the CIRES Visiting Postdoctoral Fellowship to join the University of Colorado and NOAA ESRL, and is currently a research scientist there. Dr. McDonald also has degrees in Public Policy and Economics, and has experience translating science for policymakers.

Education

Ph.D. Civil & Environmental Engineering, University of California, Berkeley, 2014

M.P.P. Goldman School of Public Policy, University of California, Berkeley, 2011

M.S. Civil & Environmental Engineering, University of California, Berkeley, 2011

B.S. Civil & Environmental Engineering, Virginia Tech, 2008

B.A. Economics, Virginia Tech, 2008

Research Experience

2020 – present Environmental Engineer ZP-3, NOAA ESRL CSL

2018 – 2020 Research Scientist II, University of Colorado, CIRES

Affiliate Scientist, NOAA ESRL CSD

2016 – 2018 Research Scientist I, University of Colorado, CIRES

Affiliate Scientist, NOAA ESRL CSD

2014 – 2016 CIRES Visiting Postdoctoral Fellow, University of Colorado

2008 – 2014 Graduate Research Assistant, University of California, Berkeley

Awards and Recognitions

Gold Star Award for Outreach and Education, *NOAA ESRL*, 2020

Presidential Early Career Award for Scientists and Engineers, *US Department of Commerce*, 2019

Honorable mention CO-LABS Governor's Award, 2018

CIRES Outstanding Performance Award, *University of Colorado, Boulder*, 2018

Science paper on volatile chemical products selected for press briefing, *AAAS Annual Meeting*, 2018

CIRES Visiting Postdoctoral Fellowship, *University of Colorado, Boulder*, 2014-16

Achievement Rewards for College Scientists Fellowship, *University of California, Berkeley*, 2008-12

Outstanding Graduate Student Instructor Award, *University of California, Berkeley*, 2011

Wayne and Claire Horton Honors Scholarship, *Virginia Tech*, 2007

Publications (22 peer-reviewed articles, 7 first/corresponding author, H-index = 13)

Shah, R.U., [...] B.C. McDonald, et al. (2019). Urban Oxidation Flow Reactor Measurements Reveal Significant Secondary Organic Aerosol Contributions from Volatile Emissions of Emerging Importance. *Environmental Science & Technology*, doi: <https://doi.org/10.1021/acs.est.9b06531>.

Dix, B., [...], B.C. McDonald, et al. (2019). Nitrogen Oxide Emissions from US Oil and Gas Production: Recent Trends and Source Attribution. *Geophysical Research Letters*, doi: 10.1029/2019GL085866.

Gray, E., [...], B.C. McDonald, et al. (2019). Impact of Air Pollution Controls on Radiation Fog Frequency in the Central Valley of California. *Journal of Geophysical Research-Atmospheres*, 124, doi: 10.1029/2018JD029419.

Gorchov Negron, A.M., B.C. McDonald, et al. (2018). Development of a Fuel-Based Oil and Gas Inventory of Nitrogen Oxides Emissions. *Environmental Science & Technology*, 52, doi: 10.1021/acs.est.8b02245.

- McDonald, B.C., et al. (2018). Modeling Ozone in the Eastern U.S. using a Fuel-Based Mobile Source Emissions Inventory. *Environmental Science & Technology*, 52, doi: 10.1021/acs.est.8b00778.
- Jiang, Z., B.C. McDonald, et al. (2018). Unexpected Slowdown of US Pollutant Emission Reduction in the Past Decade. *Proceedings of the National Academy of Sciences*, 115, doi: 10.1073/pnas.1801191115.
- Coggon, M.M., B.C. McDonald, et al. (2018). Diurnal Variability and Emission Pattern of Decamethylcyclopentasiloxane (D5) from the Application of Personal Care products in Two North American Cities. *Environmental Science & Technology*, 52, doi: 10.1021/acs.est.8b00506.
- de Gouw, J.A., [...], B.C. McDonald, et al. (2018). Chemistry of Volatile Organic Compounds in the Los Angeles Basin: Formation of Oxygenated Compounds and Determination of Emission Ratios. *Journal of Geophysical Research-Atmospheres*, 123, doi: 10.1002/2017JD027976.
- Mao, J., [...], B.C. McDonald, et al. (2018). Southeast Atmosphere Studies: Learning from Model-Observation Syntheses. *Atmospheric Chemistry & Physics*, 18, doi: 10.5194/acp-18-2615-2018.
- McDonald, B.C., et al. (2018). Volatile Chemical Products Emerging as Largest Petrochemical Source of Urban Organic Emissions. *Science*, 359, doi: 10.1126/science.aaq0524.
- de Gouw, [...], B.C. McDonald, et al. (2017). Chemistry of Volatile Organic Compounds in the Los Angeles Basin: Nighttime Removal of Alkenes and Determination of Emission Ratios. *Journal of Geophysical Research-Atmospheres*, 122, doi: 10.1002/2017JD027459.
- Hassler, B., B.C. McDonald, et al. (2016). Analysis of Long-Term Observations of NO_x and CO in Megacities and Application to Constraining Emissions Inventories. *Geophysical Research Letters*, 43, doi: 10.1002/2016GL069894.
- Turner, A.J., A.A. Shusterman, B.C. McDonald, et al. (2016). Network Design for Quantifying Urban CO₂ Emissions: Assessing Trade-offs Between Precision and Network Density. *Atmospheric Chemistry & Physics*, 16, doi: 10.5194/acp-16-13465-2016.
- Kim S.W., B.C. McDonald, et al. (2016). Modeling the Weekly Cycle of NO_x and CO Emissions and their Impacts on O₃ in the Los Angeles-South Coast Air Basin during the CalNex 2010 Field Campaign. *Journal of Geophysical Research-Atmospheres*, 121, doi: 10.1002/2015JD024292.
- Bastien, L.A.J., B.C. McDonald, et al. (2015). High-Resolution Mapping of Sources Contributing to Urban Air Pollution Using Adjoint Sensitivity Analysis: Benzene and Diesel Black Carbon. *Environmental Science & Technology*, 49, doi: 10.1021/acs.est.5b00686.
- McDonald, B.C., et al. (2015). Long-Term Trends in California Mobile Source Emissions and Ambient Concentrations of Black Carbon and Organic Aerosol. *Environmental Science & Technology*, 49, doi: 10.1021/es505912b.
- Maness, H.L., M.E. Thurlow, B.C. McDonald, R.A. Harley (2015). Estimates of CO₂ Traffic Emissions from Mobile Concentration Measurements. *Journal of Geophysical Research-Atmospheres*, 120, doi: 10.1002/2014JD022876.
- McDonald, B.C., et al. (2014). High-Resolution Mapping of Motor Vehicle Carbon Dioxide Emissions. *Journal of Geophysical Research-Atmospheres*, 119, doi: 10.1002/2013JD021219.
- Joe, D.K., H.L. Zhang, S.P. DeNero, H.H. Lee, S.H. Chen, B.C. McDonald, R.A. Harley, M.J. Kleeman (2014). Implementation of a High-Resolution Source-Oriented WRF/Chem Model at the Port of Oakland. *Atmospheric Environment*, 82, doi: 10.1016/j.atmosenv.2013.09.055.
- McDonald, B.C., et al. (2013). Long-Term Trends in Motor Vehicle Emissions in U.S. Urban Areas. *Environmental Science & Technology*, 47, doi: 10.1021/es401034z.
- McDonald, B.C., et al. (2012). Long-Term Trends in Nitrogen Oxide Emissions from Motor Vehicles at National, State, and Air Basin Scales. *Journal of Geophysical Research-Atmospheres*, 117, D00V18, doi: 10.1029/2012JD018304.

Science Mentorship

- Harold Gammaro, *City College of New York*, 2020 – present
- Colin Harkins, *University of Colorado, Boulder*, 2019 – present

- Colby Francoeur, *University of Maryland*, 2019 – present
- Alan Gorchoy-Negron, *Brown University*, 2015 – 18
- Shelby Tisinai, *Principia College*, 2017
- Justin DuRant, *University of South Carolina*, 2016
- Zoe McBride, *University of California, Berkeley*, 2013 – 14

Teaching Experience

Head Graduate Student Instructor, *University of California, Berkeley* (Spring 2012, Spring 2014),
Introduction to Computer Programming for Scientists and Engineers, undergraduate level

Graduate Student Instructor, *University of California, Berkeley* (Fall 2010), Air Quality Engineering,
graduate level

Professional Development & Service

Global Emissions Initiative (GEIA) Scientific Steering Committee, 2020 - present

Associate Editor of *Journal of Geophysical Research-Atmospheres*, 2020 - present