Nicholas Clements, PhD.

Department of Mechanical Engineering
1111 Engineering Drive UCB 427
University of Colorado, Boulder, CO 80309
Phone: (303)532-6546; Email: nsclements@gmail.com; Twitter: @DrNickClements
Website: https://sites.google.com/site/nicholassclements/

Professional Preparation

University of Colorado, Boulder, CO

Ph.D. in Mechanical Engineering (Graduate GPA: 3.8) 2010-2013
Dissertation Title - *The CCRUSH Study: Characterization of Coarse and Fine Particulate Matter in Northeastern Colorado*

M.S. in Mechanical Engineering (Air Quality Emphasis) 2009-2010

B.S. in Mechanical Engineering (Undergraduate GPA: 3.7) 2005-2009

Research Experiences

Research Associate, University of Colorado, Boulder, CO 2014-2015

Funded by Veterans Affairs (COHIC)

Worked to update and experimentally validate the engineering aspects of the Palo Alto VA Hospital's plan in the case of a surge of patients caused by a pandemic. Established and monitored the effectiveness of a temporary isolation ward as a solution to increasing surge capacity.

Funded by the Sloan Foundation

Helped finalize data sets and publish results from two studies of the indoor microbiome. The first assessed differences in bacterial and fungal communities in flooded and non-flooded homes. The second assessed relationships between indoor air quality, home occupancy/activity, and seasonal differences in indoor microbe populations.

Graduate Student Research Assistant, University of Colorado, Boulder, CO 2008-2013

Funded through the US EPA Science to Achieve Results Program (Grant R833744)

Implemented a field campaign, performed laboratory experiments, and analyzed large multi-variate data sets for a three-year long regional air quality study aimed at understanding coarse ($PM_{10-2.5}$) and fine ($PM_{2.5}$) particulate matter in urban-Denver and rural-Greeley, Colorado.

Undergraduate Student Research Assistant, University of Colorado, Boulder, CO 2007-2008

Funded through the CU Discovery Learning Apprenticeship Program

The effectiveness of a small-scale (less than 1m) UV-C disinfecting system targeting airborne bacteria was tested using three different light sources: a conventional mercury lamp, a UV-C LED, and a xenon excimer lamp.

Field Technician/Intern, Tetra Tech., Inc., Boise, ID 2006

Collected and analyzed river turbidity data downstream of a road construction site in the Idaho wilderness where river water quality was a concern for endangered fish species.

Research Publications

1. Emerson, Joanne B., Keady, Patricia, Brewer, Tess, Clements, Nicholas, Morgan, Emily, Awerbuch, Jonathan, Miller, Shelly L., Noah Fierer. 2014. Impacts of flood damage on airborne bacteria and fungi in homes after the 2013 Colorado Front Range Flood. *Environmental Science and Technology*, submitted.
2. Duhl, T.R., Clements, N., Mladenov, N., Cawley, K., Rosario-Ortiz, F.L., Hannigan, M.P. 2014. Natural and Unnatural Organic Matter in the Atmosphere: Recent Perspectives on the High Molecular Weight Fraction of Organic Aerosol. *Advances in the Physicochemical Characterization of Dissolved Organic Matter: Impact on Natural and Engineered Systems,* Volume 1160, American Chemical Society, pp. 87-111.
3. Adar, Sara D; Filigrana, Paola A; Clements, Nicholas; Peel, Jennifer L. 2014. Ambient Coarse Particulate Matter and Human Health: A Systematic Review and Meta-Analysis. *Current Environmental Health Reports* 1(3), 258-274.
4. Clements, Nicholas; Eav, Jenny; Xie, Mingjie; Hannigan, Michael P.; Miller, Shelly L.; Schauer, James; Milford, Jana B. 2014. Concentrations and Source Insights for Trace Elements in Fine and Coarse Particulate Matter. *Atmospheric Environment* 89, 373-381.
5. Clements, Nicholas; Milford, Jana B.; Miller, Shelly L.; Navidi, William; Peel, Jennifer L.; Hannigan, Michael P. 2013. Errors in coarse particulate matter ($PM_{10-2.5}$) mass concentrations and spatiotemporal characteristics when using subtraction estimation methods. *Journal of the Air & Waste Management Association* 63, 1386-1398.
6. Robert, Bowers; Clements, Nicholas; Emerson, Joanne; Wiedinmyer, Christine; Hannigan, Michael; Fierer, Noah. 2013. Seasonal variability in the bacterial and fungal diversity of the near-surface atmosphere. *Environmental Science and Technology* 47(21), 12097-12106.
7. Clements, Nicholas; Piedrahita, Ricardo; Ortega, John; Peel, Jennifer L.; Hannigan, Michael; Miller, Shelly L.; Milford, Jana B. 2012. Characterization and Nonparametric Regression of Rural and Urban Coarse Particulate Matter Mass Concentrations in Northeastern Colorado. *Aerosol Science and Technology* 46(1), 108-123.
8. Ryan, Kevin; McCabe, Kevin; Clements, Nick; Hernandez, Mark; Miller, Shelly L. 2010. Inactivation of Airborne Microorganisms Using Novel Ultraviolet Radiation Sources in Reflective Flow-Through Control Devices. *Aerosol Science and Technology* 44(7), 541-550.

Conference Presentations

1. Clements, Nicholas; Miller, Shelly; Peel, Jennifer; Milford, Jana; Hannigan, Michael. The Colorado Coarse Rural-Urban Sources and Health Study: Spatiotemporal Variability of Coarse and Fine Particulate Matter Mass Concentrations and Composition. DUST 2014 Conference, Castellaneta Marina, Italy, 2014. Platform Presentation.
2. Clements, Nicholas; Duhl, Tiffany; Lee, Eunkyung; Chhun, Bounkheana; Rosario-Ortiz, Fernando; Milford, Jana B.; Miller, Shelly L.; Hannigan, Michael P. Exploring the Composition of Urban and Rural Organic Matter Found in Coarse Particles ($PM_{10-2.5}$) in Northeastern Colorado. American Association of Aerosol Research (AAAR) Annual Conference, Portland, OR, 2013. Platform Presentation.
3. Clements, Nicholas; Eav, Jenny; Moore, Allison; Albano, Kelly; Milford, Jana B.; Miller, Shelly L.; Hannigan, Michael P. Characterization of Metal and Ion Concentrations in Rural

and Urban $PM_{2.5}$ and $PM_{10-2.5}$ in Colorado. American Association of Aerosol Research (AAAR) Annual Conference, Minneapolis, MN, 2012. Poster Presentation.

4. Bowers, Robert; Clements, Nicholas; Moore, Allison; Hannigan, Michael; Wiedinmyer, Christine; Fierer, Noah. The Spatial and Temporal Variability in Bioaerosol Community Structure in Urban and Rural Colorado. American Association of Aerosol Research (AAAR) Annual Conference, Minneapolis, MN, 2012. Poster Presentation.
5. Clements, Nicholas; Milford, Jana; Miller, Shelly L; Hannigan, Michael; Peel, Jennifer L. Characterization of Rural and Urban $PM_{2.5}$ and $PM_{10-2.5}$ Mass Concentrations in Colorado from 3 Years of Continuous Monitoring. American Association of Aerosol Research (AAAR) Annual Conference, Minneapolis, MN, 2012. Poster Presentation.
6. Clements, Nicholas; Milford, Jana; Hannigan, Michael; Solheim, Fred. Using Boundary Layer Dynamics for Air Pollution Concentration Prediction. EPA National Air Quality Conference, Denver, CO, 2012. Poster Presentation.
7. Clements, Nicholas; Albano, Kelly; Moore, Allison; Hannigan, Michael; Miller, Shelly; Milford, Jana; Schauer, James; Sioutas, Constantinos. The Spatial and Temporal Variability of the Composition of Fine and Coarse Particulate Matter in Colorado. American Association of Aerosol Research (AAAR) Annual Conference, Orlando, FL, 2011. Poster Presentation.
8. Clements, Nicholas; Coons, Teresa; Hannigan, Michael; Miller, Shelly; Milford, Jana. Spatiotemporal Analysis of Particulate Matter Volatility using Filter Dynamic Measurement System - Equipped TEOMs. American Association of Aerosol Research (AAAR) Annual Conference, Portland, OR, 2010. Poster Presentation.
9. Clements, Nicholas; Piedrahita, Ricardo; Hannigan, Michael; Milford, Jana; Miller, Shelly; Peel, Jennifer. Continuous Coarse Particulate Matter Concentration Measurement and Source Identification Using Non-Parametric Regression. American Association of Aerosol Research (AAAR) Speciality Conference: Air Pollution and Health: Bridging the Gap from Sources to Health Outcomes, San Diego, CA, 2010. Poster Presentation.
10. Clements, Nicholas; Hannigan, Michael; Milford, Jana; Miller, Shelly; Ortega, John; Peel, Jennifer. Measuring Mass Concentrations of Urban and Rural Coarse Particulate Matter in Northeastern Colorado. American Association of Aerosol Research (AAAR) Annual Conference, Minneapolis, MN, 2009. Poster Presentation.

Other Writing and Publications

1. Clements, Nicholas. 2014. Temporary Isolation Rooms and their Application to Hospital Surge Capacity for Infection Control. *microBEnet*: *The microbiology of the Built Environment Network*. [microbe.net: link].
2. Miller, Shelly, Clements, Nicholas. 2014. Flooding and Indoor Air Quality. *microBEnet: The microbiology of the Built Environment Network*. [microbe.net: link].

Teaching Experience

Instructor, University of Colorado, Boulder, CO 2013

MCEN 4037 Measurements Lab 1 (Course Website: http://mcenlab1.pbworks.com)
Senior-level mechanical engineering laboratory (2-credit core curriculum class)

Instructor, University of Colorado, Boulder, CO 2013
MCEN 4047 Measurements Lab 2 (Course Website: http://mcenlab1.pbworks.com)
Senior-level mechanical engineering laboratory (2-credit core curriculum class)
Instructor, University of Colorado, Boulder, CO 2013
Paid employment through the Department of Mechanical Engineering Graduate Teaching Fellowship and Practicum
MCEN 4047 Measurements Lab 2 (Course Website: http://mcenlab2.pbworks.com)
Senior-level mechanical engineering laboratory (2-credit core curriculum class)
Teaching Assistant, University of Colorado, Boulder, CO 2010
MCEN 3208 Experimental Design and Data Analysis
Teaching Assistant, University of Colorado, Boulder, CO 2009
MCEN 4228 Measurements Lab 1

Mentorships

Zoey Craun (CU Mechanical Engineering YOU'RE@CU Program) 2014
Bounkheana Chhun (Lab Assistant) 2012-2013
Jenny Eav (NCAR SOARS Program) 2012
Kasey Wactendorf (CU Mechanical Engineering YOU'RE@CU Program) 2012
Kelli Fischer (Lab Assistant) 2011-2012
Allison Moore (Lab Assistant) 2009-2012
Kelly Albano (Lab Assistant) 2009-2011
Paul Monteford (Lab Assistant) 2009-2010

References

Prof. Michael P. Hannigan
Department of Mechanical Engineering
University of Colorado at Boulder
(303)735-5045
hannigan@colorado.edu

Prof. Shelly L. Miller
Department of Mechanical Engineering
University of Colorado at Boulder
(303)492-0587
shelly.miller@colorado.edu

Prof. Jana B. Milford
Department of Mechanical Engineering
University of Colorado at Boulder
(303)492-5542
jana.milford@colorado.edu

Professional Organizations

Tau Beta Pi Engineering Honors Fraternity
American Association of Aerosol Research (AAAR)