

Curriculum Vitae

Assistant Professor

Charles C. Gates Mechanical Engineering Faculty Fellow

Mechanical Engineering Department

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EDUCATION:

<i>B.S., Civil Engineering</i>	1990
Southern Methodist University, Dallas, TX	
<i>M.S., Environmental Engineering Science</i>	1991
California Institute of Technology, Pasadena, CA	
<i>Ph.D., Environmental Engineering Science</i>	1997
California Institute of Technology, Pasadena, CA	
<i>Postdoctoral Fellow, Environmental Health Sciences</i>	1997-98
Massachusetts Institute of Technology, Cambridge, MA	
<i>Postdoctoral Fellow, Atmospheric Science</i>	1998
Colorado State University, Fort Collins, CO	

PROFESSIONAL HISTORY:

Assistant Professor, Department of Mechanical Engineering, University of Colorado	2007 - current
Research Assistant Professor, Department of Mechanical Engineering, University of Colorado	2005-2007
Research Associate, Department of Mechanical Engineering, University of Colorado	2001-2005
Assistant Research Professor, Department of Chemistry, University of Denver	1999-2001

AWARDS:

Mechanical Engineering Department Outstanding Undergraduate Educator Award (2006-2007), University of Colorado Green Faculty Award (2007), Member of University of Colorado President's Teaching and Learning Collaborative (2006-07)

MEMBERSHIPS:

American Association for Aerosol Research, American Chemical Society, American Association for the Advancement of Science

LIST OF PEER-REVIEWED PUBLICATIONS:

Trenbath, K, Hannigan, M.P., Milford, J.B., Evaluation of retrofit crankcase ventilation controls and diesel oxidation catalysts for reducing air pollution in school buses. *Atmospheric Environment*, **2009**, in press.

Dutton, SJ, Rajagopalan, B, Vedal, S, Hannigan, MP. Temporal patterns in daily measurements of inorganic and organic speciated PM_{2.5} in Denver. *Atmospheric Environment*, **2009**, in press.

Krudysz, M.A., Dutton, S.J., Brinkman, G.L., Hannigan, M.P., Fine, P.M., Sioutas, C., Froines, J.R. Intra-community spatial variation of size-fractionated organic compounds in Long Beach, CA. *Air Quality, Atmosphere, and Health*, **2009**, in press.

Mohr, C., Huffman, J.A., Cubison, M.J., Aiken, A.C., Docherty, K.S., Kimmel, J.R., Ulbrich, I.M., Hannigan, M.P., Jimenez, J.L. Characterization of primary organic aerosol emissions from meat cooking, trash burning, and motor vehicles with high-resolution aerosol mass spectrometry and comparison with ambient and chamber observations. *Environmental Science & Technology*, **2009**, 43:2443-2449.

Brinkman, GL, Milford, JB, Schauer, JJ, Shafer, MM, Hannigan, MP. Source identification of personal exposure to fine particulate matter using organic tracers. *Atmospheric Environment*, **2009**, 43: 1972-1981.

Dutton, SJ, Williams, DE, Garcia, JK, Vedal, S, Hannigan, MP. PM_{2.5} characterization for time series studies: organic molecular marker speciation methods and daily measurements in Denver. *Atmospheric Environment*, **2009**, 43: 2018-2030.

- Vedal, S, Hannigan, MP, Dutton, SJ, Miller, SL, Milford, JB, Rabinovitch, N, Kim, SY, Sheppard, L. The Denver Aerosol Sources and Health (DASH) study: overview and early findings. *Atmospheric Environment*, **2009**, 43: 1666-1673.
- Hemann, JG, Brinkman, GL, Dutton, SJ, Hannigan, MP, Milford, JA, Miller, SL. Assessing positive matrix factorization model fit: a new method to estimate uncertainty and bias in factor contributions at the daily time scale. *Atmospheric Chemistry and Physics*, **2009**, 9: 497-513.
- Dutton, SJ, Schauer, JJ, Vedal, S, Hannigan, MP. PM_{2.5} characterization for time series studies: pointwise uncertainty estimation and bulk speciation methods applied in Denver atmospheric environment. *Atmospheric Environment*, **2009**, 43: 1136-1146.
- Kleeman, MJ, Riddle, SG, Robert, MA, Jakober, CA, Fine, PM, Hays, MD, Schauer, JJ, Hannigan, MP. Source apportionment of fine (PM_{1.8}) and ultrafine (PM_{0.1}) airborne particulate matter during a severe winter pollution episode. *Environmental Science and Technology*, **2009**, 43: 272-279.
- Landreman, AP, Shafer, MM, Hemming, JC, Hannigan, MP, Schauer, JJ. A macrophage-based method for the assessment of the reactive oxygen species activity of atmospheric particulate matter and application to routine (daily-24h) aerosol monitoring studies. *Aerosol Science and Technology*, **2008**, 42: 946-957.
- Zhang, YX, Schauer, JJ, Shafer, MM, Hannigan, MP, Dutton, SJ. Source apportionment of in vitro reactive oxygen species bioassay activity from atmospheric particulate matter. *Environmental Science and Technology*, **2008**, 42: 7502-7509.
- Riddle, SG, Robert, MA, Jakober, CA, Hannigan, MP, Kleeman MJ. Size-resolved source apportionment of airborne particle mass in a roadside environment. *Environmental Science and Technology*, **2008**, 42, 6580-6586.
- Kleeman, MJ, Robert, MA, Riddle, SG, Fine, PM, Hays, MD, Schauer, JJ, Hannigan, MP. Size distribution of trace organic species emitted from biomass combustion and meat charbroiling. *Atmospheric Environment*, **2008**, 42, 3059-3075.
- Riddle, SG, Robert, MA, Jakober, CA, Hannigan, MP, Kleeman MJ. Size distribution of trace organic species emitted from light-duty gasoline vehicles. *Environmental Science & Technology*, **2007**, 41, 7464-7471.
- Riddle, SG, Robert, MA, Jakober, CA, Hannigan, MP, Kleeman MJ. Size distribution of trace organic species emitted from heavy-duty diesel vehicles. *Environmental Science & Technology*, **2007**, 41, 1962-1969.
- Brinkman G, Vance G, Hannigan, MP, Milford, JB. Use of synthetic data to evaluate positive matrix factorization as a source apportionment tool for PM_{2.5} exposure data. *Environmental Science & Technology*, **2006**, 40: 1892-1901.
- Barth, M, McFadden, J, Sun, C, Wiedinmyer, C, et al. Coupling between land ecosystems and the atmospheric hydrologic cycle through biogenic aerosol pathways. *Bulletin of the American Meteorological Society*, **2005**, 86: 1738-1742.
- Hannigan, MP, Cass, GR, Busby, Jr., WF. Source contributions to the human cell mutagenicity of urban particulate air pollution, *Journal of the Air & Waste Management Association*, **2005**, 55:399-410.
- Moore, KF, Sherman, DE, Reilly, JE, Hannigan, MP, Lee, T, Collett, JL. Drop size-dependent chemical composition of clouds and fogs: II. Relevance to interpreting the aerosol/trace gas/fog system, *Atmospheric Environment*, **2004**, 38: 1403-1415.
- Brown, SG, Herckes, P, Ashbaugh, L, Hannigan, MP, Kreidenweis, SM, Collett, JL. Characterization of organic aerosol present in Big Bend National Park, Texas during the Big Bend Regional Aerosol and Visibility Observational (BRAVO) study, *Atmospheric Environment*, **2002**, 36: 5807-5818.
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- Dutton, SJ, Hannigan, MP, Miller, SL. Indoor pollutant levels from the use of unvented natural gas fireplaces in Boulder, CO, *Indoor Air*, **2001**, 51: 1654-1661.
- Christoforou, CS, Salmon, LG, Hannigan, MP, Solomon, PA, Cass, GR. Trends in fine particle concentration and chemical speciation in Southern California, *Journal of the Air and Waste Management Association*, **2000**, 50: 43-53.
- Hannigan, MP, Cass, GR, Penman, BW, Crespi, CL, Busby, Jr, WF, Lafleur, AL, Thilly, WG, Simoneit, BRT. Bioassay-directed chemical analysis of Los Angeles airborne particulate matter using a human cell mutagenicity assay, *Environmental Science and Technology*, **1998**, 32: 3502-3514.
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- Hannigan, MP, Cass, GR, Busby, Jr, WF, Lafleur, AL, Thilly, WG. Seasonal and spatial variation of the bacterial mutagenicity of fine organic aerosol in Southern California, *Environmental Health Perspectives*, **1996**, 104: 428-436.
- Hannigan, MP, Cass, GR, Lafleur, AL, Longwell, J, Thilly, WG. Bacterial mutagenicity of urban organic aerosol sources in comparison to atmospheric samples, *Environmental Science & Technology*, **1994**, 28: 2014-2024.
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