

FRANK M. BOWMAN

Associate Professor and Tom Owens Endowed Fellow

Associate Chair for Education and Outreach

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EDUCATION AND PROFESSIONAL EXPERIENCE

Education

1997 Ph.D., Chemical Engineering, California Institute of Technology

1991 B.S., Chemical Engineering, Brigham Young University

Professional Experience

2011-present Associate Chair, Department of Chemical Engineering, University of North Dakota (UND)

2011-present Associate Professor, Department of Chemical Engineering, University of North Dakota

2005-2011 Assistant Professor, Department of Chemical Engineering, University of North Dakota

1998-2005 Assistant Professor, Department of Chemical Engineering, Vanderbilt University

1997 Postdoctoral Scholar, Environmental Engineering & Science, California Institute of Technology

1991-1997 Research Assistant, Department of Chemical Engineering, California Institute of Technology

Professional Associations and Service

1998-Present Member, American Association for Aerosol Research

1998-Present Member, American Institute of Chemical Engineers

1999-Present Member, American Society for Engineering Education

Tau Beta Pi Engineering Society

Journal Reviewer - *Aerosol Science and Technology*, *Atmospheric Environment*, *Chemical Engineering Education*, *Environmental Science and Technology*, *Journal of Geophysical Research*, *Journal of Environmental Engineering & Science*

Research Proposal Reviewer - American Chemical Society Petroleum Research Fund, National Aeronautics & Space Administration, National Science Foundation, Research Corporation, United Kingdom's Natural Environment Research Council, U.S. Environmental Protection Agency, U.S. Civilian Research and Development Foundation

COURSES DEVELOPED AND TAUGHT

Undergraduate Level

- ChE 206 Unit Operations in Chemical Engineering
- ChE 232 Chemical Engineering Laboratory I
- ChE 235 Chemical Engineering Summer Laboratory I
- ChE 321/421 Chemical Engineering Reactor Design

Graduate Level

- ChE 509 Advanced Chemical Engineering Thermodynamics
- ChE 511 Applied Chemical Engineering Kinetics
- ChE 512 Advanced Separations

RESEARCH

Research Advisees

Ph.D. Students

- Prasanna Seshadri 2007-Present, Engineering, University of North Dakota
- Xinlian Chang 2000-2006, Environmental Engineering, Vanderbilt University
- Jin Lu 2000-2005, Chemical Engineering, Vanderbilt University
- Fei Bian 1999-2005, Chemical Engineering, Vanderbilt University

M.S. Students

- Nicole Larson 2015-present, Chemical Engineering, University of North Dakota
- Humphrey Chukwuto 2015-present, Chemical Engineering, University of North Dakota
- Kristin Brevik 2011-2014, Chemical Engineering, University of North Dakota
- Ben Oster 2009-2010, Chemical Engineering, University of North Dakota
- Chen Zhu 2006-2009, Environmental Engineering, University of North Dakota
- Adam Mohs 2005-2008, Chemical Engineering, University of North Dakota
- Paul Sheehan 1998-2000, Chemical Engineering, Vanderbilt University

Other Graduate Committees (not chair) - 37

Undergraduate Research Students Advised – 17

Peer-Reviewed Publications

- Brevik, K., Bowen, B., Bowman, F., Jean, K., "You're Hired! Changing student attitudes towards engineering," Proceedings of ASEE Annual Conference and Exposition, 2014.
- Jassim, E., Benson, S. A., Bowman, F. M., Seames, W. S., "Influence of fragmentation on the behavior of pyrite particles during combustion," *Fuel Processing Technology*, 92, 970-976, 2011.

- Mohs, A. J.; Bowman, F. M.; "Method for Eliminating Dispersion in Moving Center Sectional Method Aerosol Size Distributions," *Aerosol and Air Quality Research*, 11, 21-30, 2011.
- Bowman, F. M.; Eskelson, K.; "Thermodynamic Consistency of Raoult's Law and Henry's Law Approaches for Multiphase Organic Aerosol Partitioning," *Journal of Atmospheric Chemistry*, 64, 179-193, 2010.
- Lu, J.; Bowman, F. M.; "A Detailed Aerosol Mixing State Model for Investigating Interactions Between Mixing State, Semivolatile Partitioning, and Coagulation," *Atmospheric Chemistry and Physics*, 2010, Vol. 10, 4033-4046.
- Bowman, F.; Tande, B.; *A Tale of Two Houses: A Case Study in Heat Transfer*, National Center for Case Study Teaching in Science, 2009.
- Vaneck, R.; Hung, W.; Bowman, F.; Love, S.; "21st Century Game Design: Model and Prototype for Promoting Scientific Problem Solving with Games," The Twelfth IASTED International Conference on Computers and Advanced Technology in Education, 2009.
- Bowman, F. M., "A multi-parent assignment method for analyzing atmospheric chemistry mechanisms," *Atmospheric Environment*, 39, 2519-2533, 2005.
- Bian, F. and Bowman, F. M., "A lumping model for composition- and temperature-dependent partitioning of secondary organic aerosols," *Atmospheric Environment*, 39, 1263-1274, 2005.
- Bowman, F. M. and Melton, J. A., "Effect of activity coefficient models on predictions of secondary organic aerosol partitioning," *Journal of Aerosol Science*, 35, 1415-1438, 2004.
- Bowman, F. M., "ChemECar experiments in a chemical engineering freshman seminar," *Proceedings of the 2004 ASEE Annual Conference & Exposition*, Salt Lake City, UT, 2004.
- Knipping, E.M., Griffin, R.J., Bowman, F. M., Pun, B., Seigneur, C., Dabdub, D. and Seinfeld, J.H., "Comment on 'Instantaneous secondary organic aerosol yields and their comparison with overall aerosol yields for aromatic and biogenic hydrocarbons' by Weimin Jiang," *Atmospheric Environment*, 38, 2759-2761, 2004.
- Lu, J. and Bowman, F. M., "Conversion of multicomponent aerosol size distributions from sectional to modal representations," *Aerosol Science and Technology*, 38, 391-399, 2004.
- Bowman, F. M., Balcarcel, R. R., Jennings, G. K. and Rogers, B. R., "A Freshman Chemical Engineering Seminar," *Chemical Engineering Education*, 37, 24-29, 2003.
- Bowman, F. M. and Karamalegos, A. M., "Estimated effects of composition on secondary organic aerosol concentrations," *Environmental Science & Technology*, 36, 2701-2707, 2002.
- Bian, F. and Bowman, F. M., "Theoretical method for lumping multicomponent secondary organic aerosol mixtures," *Environmental Science & Technology*, 36, 2491-2497, 2002.

- Sheehan, P. E. and Bowman, F. M., "Estimated effects of temperature on secondary organic aerosol concentrations," *Environmental Science & Technology*, 35, 2129-2135, 2001.
- Bowman, F. M., Odum, J. R., Seinfeld, J. H. and Pandis, S. N., "Mathematical model for gas/particle partitioning of secondary organic aerosols," *Atmospheric Environment*, 31, 3921-3931, 1997.
- Hoffmann, T., Odum, J. R., Bowman, F., Collins, D., Clockow, D., Flagan, R. C. and Seinfeld, J. H., "Formation of organic aerosols from the oxidation of biogenic hydrocarbons," *Journal of Atmospheric Chemistry*, 26, 189-222, 1997.
- Hoffmann, T., Klockow, D., Odum, J., Bowman, F., Collins, D., Flagan, R. F., and Seinfeld, J. H., "Secondary organic aerosol formation from aromatic and biogenic hydrocarbons," *Proceedings of EUROTRAC Symposium 1996*, 1, 303-307, 1997. (non-refereed)
- Odum, J. R., Hoffmann, T., Bowman, F., Collins, D., Flagan, R. C. and Seinfeld, J. H., "Gas/particle partitioning and secondary organic aerosol yields," *Environmental Science & Technology*, 30, 2580-2585, 1996.
- Bowman, F. M. and Seinfeld, J. H., "Atmospheric chemistry of alternate fuels and reformulated gasoline components," *Progress in Energy and Combustion Science*, 21, 387-417, 1995.
- Bowman, F. M., Pilinis, C. and Seinfeld, J. H., "Ozone and aerosol productivity of reactive organics," *Atmospheric Environment*, 29, 579-589, 1995.
- Bowman, F. M. and Seinfeld, J. H., "Fundamental basis of incremental reactivities of organics in ozone formation in VOC/NO_x mixtures," *Atmospheric Environment*, 28, 3359-3368, 1994.
- Bowman, F. M. and Seinfeld, J. H., "Ozone productivity of atmospheric organics," *Journal of Geophysical Research*, 99, 5309-5324, 1994.

HONORS/AWARDS

Grant Proposals Submitted and Awarded (since 2005)

- Submitted 42 proposals with a combined value of \$43.1 million.
- Awarded 8 research grants as PI, Co-PI, or project leader with a total value of \$9.2 million.

Honors

- Tom Owens Endowed Fellow, 2011-present
- CEM Outstanding Faculty Award, 2015
- UND Outstanding Student Organization Advisor, 2014
- UND Foundation Award for Departmental Excellence in Research, 2011
- SEM Outstanding Professor of the Year, 2009
- UND Foundation Award for Departmental Excellence in Teaching, 2007
- AIChE Student Chapter Honor Roll Advisor, 2001-2005, 2009-2015
- National Science Foundation CAREER Award, 2000