

Resume/Curriculum Vitae (as of January 15, 2019)
Glenn C. Morrison

Professor, Environmental Science and Engineering
University of North Carolina
Chapel Hill, NC; glenn.morrison@unc.edu
Professional Engineer (Washington State, #49938)

ACADEMIC EXPERIENCE/EDUCATION

Ph.D., Department of Civil and Environmental Engineering (Environmental Engineering).
University of California, Berkeley. Dissertation title: Ozone-surface interactions: Investigations of
mechanisms, kinetics, mass transport, and implications for indoor air quality. Advisor: William
Nazaroff. **1999**

M.S., Department of Civil and Environmental Engineering (Environmental Engineering).
University of California, Berkeley. **1995**

B.S., School of Applied Mechanics and Engineering Sciences (Chemical Engineering). University
of California, San Diego. **1988**

WORK EXPERIENCE

Current: Professor, Environmental Science & Engineering Department, University of North
Carolina, Chapel Hill, NC (**8/2017- present**)

Professor of Civil, Architectural and Environmental Engineering; Missouri University of Science
and Technology, Rolla, MO. (**8/2013-9/2017**; Assistant and Associate Professor **8/2001-7/2013**)

Assistant Chair for Distance Education Programs & Advising for the Civil, Architectural and
Environmental Engineering Department; Missouri University of Science and Technology, Rolla,
MO (**6/2012 – 8/2016**)

Interim director of the Environmental Research Center for Emerging Contaminants, Missouri S&T,
Rolla, MO (**6/2014-12/2014**; **2/2015-1/2017**)

Post-Doctoral Research Assistant; National Oceanic and Atmospheric Administration (NOAA),
Aeronomy Laboratory. Group leaders: Carl Howard and Akkihebbal Ravishankara. **1/2000-6/2001**

Adjunct Assistant Professor of Mechanical Engineering; University of Colorado, Boulder. **1/2001-
6/2001**

Graduate Student Research Assistant; Lawrence Berkeley National Laboratory, Indoor
Environment Program; University of California, Berkeley. **1994-1999**

Teaching Assistant; University of California, Berkeley. **1994, 1998**

Engineering Fellow; Catalytica Inc. **1988-1994**

PUBLICATIONS AND PRESENTATIONS

Refereed Journal Articles in Press or Published (*corresponding author)

1. S Duncan, S Tomaz, G Morrison, M Webb, J Atkin, J Surratt, B Turpin. Dynamics of residential water-soluble organic gases: Insights into sources and sinks. *In Press Environmental Science & Technology*. 2019
2. A Eftekhari, GC Morrison*. A high throughput method for measuring air-cloth equilibrium distribution ratios for SVOCs present in indoor environments. *Talanta*, **2018**, 183, 250-257.
3. GC Morrison*. Pseudoscience, snake oil and indoor air quality (editorial). *Indoor air*, **2018**, 28:3, 357-359.
4. G Bekö*, GC Morrison, CJ Weschler, H Koch, C Palmke, T Salthammer, T Schripp, A Eftekhari, J Toftum, G Clausen. Dermal uptake of nicotine from air and clothing: experimental verification. *Indoor Air*, **2018**, 28:2, 247-257.
5. GC Morrison*, H Andersen, L Gunnarsen, D Varol, E Uhde, B Kolarik. Partitioning of PCBs from air to clothing materials in a Danish apartment. *Indoor Air*, **2018**, 28:1, 188-197.
6. GC Morrison*, G Bekö, CJ Weschler, T Schripp, T Salthammer, J Hill, AM Andersson, J Toftum, G Clausen, H Frederiksen. Dermal uptake of benzophenone-3 from clothing. *Environmental Science & Technology*, **2017**, 51:19, 11371-11379.
7. GC Morrison*, N Carslaw, M Waring. A Modeling Enterprise for Chemistry of Indoor Environments (editorial). *Indoor Air*, **2017**, 27:6, 1033-1038.
8. PE Rajan, A Krishnamurthy, GC Morrison*, F Rezaei*. Advanced buffer materials for indoor air CO₂ control in commercial buildings. *Indoor Air*, **2017**, 27:6, 1213-1223.
9. M Kruza, AC Lewis, GC Morrison, N Carslaw*. Impact of surface ozone interactions on indoor air chemistry: a modelling study. *Indoor Air*, **2017** 27:5, 1001-1011.
10. G Bekö*, GC Morrison, CJ Weschler, HM Koch, C Pälme, T Salthammer, T Schripp, J Toftum, G Clausen. Measurements of dermal uptake of nicotine directly from air and clothing. *Indoor Air*. **2017**. 24: 427-433.
11. GC Morrison*, CJ Weschler, G Bekö. Dermal uptake of phthalates from clothing: comparison of model to human participant results. *Indoor Air*. **2017** 27: 642-649. *Corrigendum*: 10.1111/ina.12442.
12. M Lorber*, CJ Weschler, GC Morrison, G Bekö, M Gong, HM Koch, T Salthammer, T Schripp, J Toftum, G Clausen. Linking a dermal permeation and an inhalation model to a simple pharmacokinetic model to study airborne exposure to di(n-butyl) phthalate. *Journal of Exposure Science and Environmental Epidemiology*, **2016**. 27: 601-609. Doi:10.1038/jes.2016.48.
13. E Darling, GC Morrison, RL Corsi*. Passive removal materials for indoor ozone control. *Building and Environment*, **2016**. 106:33-44. DOI: 10.1016/j.buildenv.2016.06.018
14. GC Morrison*, CJ Weschler, G Bekö. Dermal uptake directly from air under transient conditions: advances in modeling and comparisons with experimental results for human subjects. *Indoor Air* **2016**.26(6): 913-924. DOI 10.1111/ina.12277.
15. GC Morrison*, CJ Weschler, G Bekö, H Koch, T Salthammer, T Schripp, J Toftum, G Clausen. Role of clothing in both accelerating and impeding dermal absorption of airborne SVOCs.

Journal of Exposure Science and Environmental Epidemiology, **2016**. 26:113-118.
DOI:10.1038/jes.2015.42.

16. JR Aldred, E Darling, GC Morrison, J Siegel, RL Corsi*. Benefit-cost analysis of commercially available activated carbon filters for indoor ozone removal in buildings. *Science and Technology for the Built Environment*, **2016**. 22(2): 227-236.
17. K Parker, GC Morrison*. Methamphetamine absorption by skin lipids: accumulated mass, partition coefficients and the influence of fatty acids. *Indoor Air*, **2016**, 26: 634–641.
doi:10.1111/ina.12229
18. JR Aldred, E Darling, GC Morrison, J Siegel, RL Corsi*. Benefit-Cost Analysis of Commercially Available Activated Carbon Filters for Indoor Ozone Removal in Residential Buildings. *Indoor Air*, **2016** 26: 501–512. DOI: 10.1111/ina.12220
19. GC Morrison*, H Li, S Mishra, M Buechlein. Airborne phthalate partitioning to cotton clothing. *Atmospheric Environment*, **2015**. 115: 149-152. DOI:10.1016/j.atmosenv.2015.05.051
20. GC Morrison*. Recent advances in indoor chemistry. *Current Sustainable Renewable Energy Reports*, DOI 10.1007/s40518-015-0026-9, **2015**. 2(2):33-40.
21. D Poppendieck, GC Morrison, RL Corsi*. Desorption of a methamphetamine from wallboard under remediation conditions. *Atmospheric Environment*. **2015**. 106:477-484. DOI: 10.1016/j.atmosenv.2014.09.073
22. GC Morrison*, NV Shakila, K Parker . Accumulation of gas-phase methamphetamine on clothing, toy fabrics and skin oil. *Indoor Air*, 25: 405-414. DOI: 10.1111/ina.12159, **2015**.
23. MK Shetty, M Limmer, K Waltermire, GC Morrison, JG Burken*, In planta passive sampling devices for assessing subsurface chlorinated solvents. *Chemosphere*, 104, pp.149-154. **2014**.
24. E Gall, E Darling, GC Morrison, JA Siegel, RL Corsi*. Evaluation of common green building materials for ozone removal, primary and secondary emissions. *Atmospheric Environment*. **2013**. 77: 910-918.
25. E Darling, C Cros, P Wargocki, J Kolarik, A Targowski, GC Morrison and RL Corsi*. Impacts of a clay plaster on indoor air quality assessed using chemical and sensory measurements. *Building and Environment*, **2012** 57: 370-376.
26. C Liu, GC Morrison*, Y Zhang. Role of aerosols in enhancing SVOC flux between air and indoor surfaces and its influence on exposure. *Atmospheric Environment*, **2012** 55:347-356.
27. S Shu*, GC Morrison. Rate and reaction probability of the surface reaction between ozone and dihydromyrcenol measured in a bench scale reactor and a room-sized chamber. *Atmospheric Environment*, **2012** 47:421-427.
28. CJ Cros, GC Morrison, JA Siegel, RL Corsi*. Long-term performance of passive materials for removal of ozone from indoor air. *Indoor Air* **2012** 22:43-53.
29. S Lamble, RL Corsi, GC Morrison*. Ozone deposition velocities, reaction probabilities and product yields for green building materials. *Atmospheric Environment*, **2011** 45:6965-6972.
30. S Shu, GC Morrison*. Surface reaction rate and probability of ozone and α -terpineol on glass, polyvinyl chloride, and latex paint surfaces. *Environmental Science & Technology*, **2011** 45(10):4285-4292.

31. M Ongwandee*, R Moonrinta, S Panyametheekul, C Tangbanluekal, GC Morrison. Investigation of volatile organic compounds in office buildings in Bangkok, Thailand: Concentrations, sources, and occupant symptoms. *Building and Environment*, **2011** 42:1512-1522.
32. GC Morrison*, R Shaughnessy, S Shu. Setting maximum emission rates from ozone emitting consumer appliances in the United States and Canada. *Atmospheric Environment*, **2011** 45(11): 2009-2016.
33. MA Springs, JR Wells, GC Morrison*. Reaction rates of ozone and terpenes adsorbed to model indoor surfaces. *Indoor Air*, **2011** 21(4): 319-327.
34. S Shu, GC Morrison*. Dynamic solid phase microextraction sampling for reactive terpenes in the presence of ozone. *Talanta*, **2010** 82:1884-1891.
35. H Wang, GC Morrison*. Ozone-surface reactions in 5 homes: surface reaction probabilities, product yields and trends. *Indoor Air*, **2010** 20(3):224-234.
36. D Kunkel, E Gall, J Siegel, A Novoselac, GC Morrison, RL Corsi*. Passive reduction of human exposure to indoor ozone. *Building and Environment*, **2010** 45(2):445-452.
37. M Ongwandee*, R Moonrinta, S Panyametheekul, C Tangbanluekal, GC Morrison. Concentrations and strengths of formaldehyde and acetaldehyde in office buildings in Bangkok, Thailand. *Indoor and Built Environment*, **2009** 18: 569. DOI: 10.1177/1420326X09349897
38. D Rim, A Novoselec, GC Morrison*. The influence of chemical interactions at the human surface on breathing zone levels of reactants and products. *Indoor Air*, **2009** 19(4):324-334.
39. JR Wells*, GC Morrison, BK Coleman. Kinetics and reaction products of ozone and surface-bound squalene. *Journal of ASTM International*, **2008** 5(7):1-12.
40. GC Morrison*. Interfacial chemistry in indoor environments. Feature Article, *Environmental Science & Technology*, **2008** 42:3495-3499.
41. M Ongwandee, GC Morrison*. The influence of ammonia and carbon dioxide on the sorption of a basic organic pollutant to latex-painted gypsum board and carpet. *Environmental Science & Technology*, **2008** 42(15):5415-5420.
42. L Pandrangi, GC Morrison*. Ozone interactions with human hair: ozone uptake rates and product formation. *Atmospheric Environment*, **2008** 42:5079-5089.
<http://dx.doi.org/10.1016/j.atmosenv.2008.02.009>. (Excerpted in *Popular Science*, *New Scientist*, *Discover Magazine*, and numerous science oriented internet sites)
43. M Ongwandee, GC Morrison*, X Guo, C Chusuei*. Adsorption of trimethylamine on zirconium silicate and polyethylene powder surfaces. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, **2007** 310:62-67.
44. S Regmi, M Ongwandee, R Surampalli, M Fitch, GC Morrison*. Effectiveness of porous covers for control of ammonia, reduced sulfur compounds, total hydrocarbons, selected volatile organic compounds, and odor from hog manure storage lagoons. *Journal of the Air and Waste Management Association*, **2007** 57(6):761-768.
45. GC Morrison*, JC Little, Y Xu, M Rao, D Enke. Gas-phase exposure history derived from material-phase concentration profiles. *Atmospheric Environment*, **2007** 41(15):3276-3286.

46. RL Corsi*, J Siegel, A Karamalegos, H Simon, GC Morrison. Personal reactive clouds: introducing the concept of near head chemistry. *Atmospheric Environment*, **2007** 41(15):3161-3165.
47. H Wang, GC Morrison*. Ozone initiated secondary emission rates of aldehydes from indoor surfaces in four homes. *Environmental Science and Technology*, **2006** 40:5263-5268.
48. GC Morrison*, P Zhao, L Kasthuri. The spatial distribution of pollutant transport to indoor surfaces. *Atmospheric Environment*, **2006** 40(18):3389-3395.
49. GC Morrison*, DJ Wiseman. Temporal considerations in the measurement of indoor mass-transfer coefficients. *Atmospheric Environment*, **2006** 40(20):3677-3685.
50. M Ongwandee, SS Bettinger, GC Morrison*. The influence of ammonia and carbon dioxide on the sorption of a basic organic pollutant to a mineral surface. *Indoor Air*, **2005** 15:408-419.
51. T Custer, V Bierbaum, S Cato, CJ Howard, GC Morrison*. Gas-phase kinetics and mechanisms of the reactions of protonated hydrazine with carbonyl compounds. *Journal of the American Chemical Society*, **2004** 126(9):2744-2754.
52. GC Morrison*, P Zhao, DJ Wiseman, M Ongwandee, H Chang, J Portman, S Regmi. Rapid measurement of indoor mass-transfer coefficients. *Atmospheric Environment*, **2003** 37:5611-5619.
53. GC Morrison*, WW Nazaroff. The rate of ozone uptake on carpet: Mathematical modeling. *Atmospheric Environment*, **2002** 36:1749-1756.
54. GC Morrison*, WW Nazaroff. Ozone interactions with carpet: Secondary emissions of aldehydes. *Environmental Science and Technology*, **2002** 36(10):2185-2192. (Excerpted in *Science News*, *Environmental Health Perspectives*, *Spectroscopynow.com*, and *Shape*)
55. GC Morrison*, CJ Howard. Selective Detection of Gas-Phase Aldehydes And Ketones Using Protonated Hydrazine. *International Journal of Mass Spectrometry*, **2001** 210/211:503-509.
56. GC Morrison, WW Nazaroff*. The rate of ozone uptake on carpets: experimental studies. *Environmental Science & Technology*, **2000** 34(23):4963-4968.
57. GC Morrison, WW Nazaroff*, JA Cano-Ruiz, AT Hodgson, MP Modera. Indoor air quality impacts of ventilation ducts: ozone removal and emissions of volatile organic compounds. *Journal of the Air and Waste Management Association*, **1998** 48(10):941-952.
58. LC Marr, GC Morrison, WW Nazaroff, RA Harley*. Reducing the risk of death due to vehicle-related carbon monoxide poisoning. *Journal of the Air and Waste Management Association*, **1998** 48(10):899-906.

Peer-reviewed journal articles in review

1. P Lakey, GC Morrison, Y Won, KM Parry, M von Domaros, DJ Tobias, D Rim, M Shiraiwa. The impact of clothing on ozone and squalene ozonolysis products in indoor environments. *Submitted to PNAS*. Dec 2018.

Book Chapters and Edited Books

1. GC Morrison and RL Corsi, editors. Proceedings of Indoor Air 2011, the Triennial Conference of the International Society for Indoor Air Quality and Climate. ISIAQ, Austin, TX. **2011**

- GC Morrison. Indoor Chemistry and Exposure, Chapter 3 in Human Exposure to Pollutants via Dermal Absorption and Inhalation. Lazaridis and Colbeck, eds. Springer Science+Business Media, B.V. Dordrecht. pgs 73-96. **2010**
- GC Morrison. Indoor Organic Chemistry, Chapter 13 in Organic Indoor Air Pollutants. Salthammer and Uhde, eds. Wiley-VCH, Weinheim. pgs 301-321, **2009**

Refereed conference papers (all archived)

- S Duncan, S Tomaz, M Webb, JD Surratt, GC Morrison, B Turpin. Dynamics of residential oxidized organic gases: Insights into sources and sinks. *Indoor Air 2018, Philadelphia, PA. July 22-27. 2018.*
- B Mull, GC Morrison, E Uhde, D Varol, T Salthammer. A novel method to determine SVOC uptake by textiles. *Indoor Air 2018, Philadelphia, PA. July 22-27. 2018.*
- C Fortenberry, M Walker, A Loka, A Dang, G Date, KCD Carvalho, GC Morrison, B Williams. Investigation of molecular composition and phase partitioning of organic particles and gases in a residential environment with natural ventilation. *Indoor Air 2018, Philadelphia, PA. July 22-27. 2018.*
- M Walker, C Fortenberry, A Loka, A Dang, G Date, KCD Carvalho, GC Morrison, B Williams. Impacts of natural ventilation on gas and particle phase organic compounds indoors: insights from chromatogram binning - positive matrix factorization analysis. *Indoor Air 2018, Philadelphia, PA. July 22-27. 2018.*
- P Lakey, GC Morrison, M Shiraiwa. The impact of clothing on squalene ozonolysis products in skin and indoor environments. *Indoor Air 2018, Philadelphia, PA. July 22-27. 2018.*
- A Eftekhari, GC Morrison. Dermal uptake of benzophenone-3 from clothing: comparison of model to human participant results. *Indoor Air 2018, Philadelphia, PA. July 22-27. 2018.*
- GC Morrison, G Bekö, CJ Weschler. Dermal uptake from clothing of SVOCs not removed by laundering. *Indoor Air 2018, Philadelphia, PA. July 22-27. 2018.*
- GC Morrison, G Date. Window opening occurrence in the US: influence of climate and region. *Indoor Air 2018, Philadelphia, PA. July 22-27. 2018.*
- A Eftekhari, J Hill, GC Morrison. Partitioning of oxybenzone to clothing. *Indoor Air 2018, Philadelphia, PA. July 22-27. 2018.*
- G Bekö, GC Morrison, CJ Weschler, HM Koch, T Salthammer, T Schripp, J Toftum, G Clausen. Dermal uptake of nicotine from air and clothing: Experimental verification. *Healthy Buildings 2017, Lublin, Poland, July 2017*
- GC Morrison, CJ Weschler, G Bekö. Further advances in modeling transdermal uptake of SVOCs. Paper 268. *Indoor Air 2016, Ghent, Belgium, July 2016.*
- GC Morrison, CJ Weschler, G Bekö. Dermal uptake of phthalates from clothing: comparison of model to human participant results. Paper 685 *Indoor Air 2016, Ghent, Belgium, July 2016.*
- A Eftekhari, M Buechlein, GC Morrison. A method for rapidly measuring air-cloth partition coefficients for SVOCs. Paper 1027 *Indoor Air 2016, Ghent, Belgium, July 2016.*

14. G Bekö, GC Morrison, CJ Weschler, HM Koch, T Salthammer, T Schripp, J Toftom, G Clausen. Measurements of dermal uptake of nicotine directly from air and clothing. Paper 241 *Indoor Air 2016, Ghent, Belgium, July 2016*.
15. E Uhde, GC Morrison, T Schripp, D Varol. Experimental approach to determine the SVOC-uptake of different fabric types. Paper 979. *Indoor Air 2016, Ghent, Belgium, July 2016*.
16. GC Morrison, H Li, S Mishra, C Holtmeyer. Phthalate partitioning to cotton fabrics. Paper 146. *Healthy Buildings 2015 Europe, Eindhoven, Netherlands, May 2015*.
17. A Korff, M Buechlein, M Gibler, GC Morrison*. Comparison of advective and diffusive transport of SVOCs through cloth for indoor conditions. Paper 49. *Healthy Buildings 2015 America, Boulder, CO, USA, July 2015*.
18. M Buechlein, KG Parker, GC Morrison. Skin uptake of gas phase methamphetamine: effect of clothing. *Indoor Air 2014*. Hong Kong. **2014**.
19. H Li, GC Morrison. Adsorption capacity of methamphetamine in gypsum drywall. *Indoor Air 2014*. Hong Kong. **2014**.
20. KG Parker, GC Morrison. New routes of human exposure to methamphetamine from residential meth labs: post remediation accumulation from air to skin oil. *Indoor Air 2014*. Hong Kong. **2014**.
21. R Shaughnessy, D Reisdorph, GC Morrison. Field testing to estimate ozone emission rates of in-duct air cleaners in occupied homes. *Indoor Air 2014*. Hong Kong. **2014**.
22. S Shu, Z He, GC Morrison. Large agglomerates formed from ozone reactions with surface bound alpha-terpineol and dihydromyrcenol. *Indoor Air 2014*. Hong Kong. **2014**.
23. JA Siegel, GC Morrison. A laboratory method for measuring ozone emission from in-duct air cleaners. *Indoor Air 2014*. Hong Kong. **2014**.
24. GC Morrison*, RL Corsi. Climate Change Effects on Residential Air Quality as Influenced by Changes in Ventilation Rates. *Healthy Buildings, 2012*, Brisbane, Australia. **2012**
25. RL Corsi*, GC Morrison. Climate Change Effects on Residential Air Quality as Influenced by Extreme Events. *Healthy Buildings, 2012*, Brisbane, Australia. **2012**
26. C Liu, Y Zhang, GC Morrison*. Particle mediated transport of SVOCs between gas and surfaces. *Healthy Buildings, 2012*, Brisbane, Australia. **2012**
27. C Liu, S Shi, GC Morrison, B Zhao, Y Zhang*. Model analysis of the mechanism and rate of SVOC partitioning between gas and aerosol. *Healthy Buildings, 2012*, Brisbane, Australia. **2012**
28. D Pan, GC Morrison*. Polyurethane foam cushions used as indoor air samplers: comparison of VOCs chemical activity in air and cushions *Healthy Buildings, 2012*, Brisbane, Australia. **2012**
29. NV Shakila, J McLeod, GC Morrison*. Transport of a methamphetamine surrogate through drywall and accumulation within insulation. *Healthy Buildings, 2012*, Brisbane, Australia. **2012**
30. S. Dahal, RH Hall, GC Morrison, SP Lamble, R Luna*. A Web-Based Learning Module for Teaching GIS within the Context of Environmental Engineering. *American Society for Engineering Education Annual Meeting, Vancouver BC, Canada, 2011*.

31. SP Lamble, GC Morrison*. Air Cleaning With Green Building Materials: Ozone Removal And Aldehyde Yields. *Indoor Air 2011*. Austin, TX. **2011**
32. S Shu, M Ke, RL Corsi, GC Morrison*. Methamphetamine Accumulation In Residential Paint Films: Modeling And Exposure Risk. *Indoor Air 2011*. Austin, TX. **2011**
33. C Cros, GC Morrison, JA Siegel, RL Corsi*. Passive Removal Of Indoor Ozone By Green Building Materials. *Indoor Air 2011*. Austin, TX. **2011**
34. EK Darling, C Cros, P Wargocki, J Kolarik, A Targowski, GC Morrison, RL Corsi*. Impacts Of Zeap Materials On Actual And Perceived Indoor Air Quality. *Indoor Air 2011*. Austin, TX. **2011**
35. M Ongwandee*, R. Moonrinta, S Panyametheekul, C Tanbanluekal, GC Morrison. Sources And Concentrations Of Volatile Organic Compounds In Bangkok Office Buildings. *Indoor Air 2011*. Austin, TX. **2011**
36. ET Gall, E Darling, S Lamble, GC Morrison, RL Corsi*. Primary And Secondary Emissions From Green Building Materials - Large Chamber Experiments. *Indoor Air 2011*. Austin, TX. **2011**.
37. M Gunther, J Rhodes, GC Morrison, JA Siegel*. A Laboratory Method For Measuring The Ozone Emission From In-duct Air Cleaners. *Indoor Air 2011*. Austin, TX. **2011**.
38. S Shu, GC Morrison*. Surface Reaction Rate Of Ozone And Dihydromyrcenol On Polyvinylchloride And Glass. *Indoor Air 2011*. Austin, TX. **2011**
39. GC Morrison*, S Shu and M Springs. Kinetics of terpenoid reactions with ozone on indoor surfaces. *American Chemical Society Meeting*, San Francisco, CA. **2010**
40. S Shu, GC Morrison*. Surface reaction rate of ozone and alpha-terpineol on polyvinylchloride and glass. *Healthy Buildings 2009*. Syracuse, NY. **2009**
41. GC Morrison*, R Shaughnessy. Statistical approach to establishing ozone emission rates for consumer appliances. *Healthy Buildings 2009*. Syracuse, NY. **2009**
42. RL Corsi*, GC Morrison. Tradeoffs between energy conservation and adverse outcomes of indoor chemistry in residential buildings. *Healthy Buildings 2009*. Syracuse, NY. **2009**
43. CC Chusuei, M Ongwandee, GC Morrison. COLL 273-Sorption chemistry of an environmental tobacco smoke (ETS) analog on indoor surfaces. *American Chemical Society V 235*. **2008**
44. MS Waring, JA Siegel, GC Morrison, RL Corsi*. Dynamics of indoor particle formation from ozone/terpene reactions: The role of surfaces. *American Association for Aerosol Research*, Orlando, FL. **2008**.
45. D Kunkel, GC Morrison, A Novoselac, J Siegel, R Corsi*. Passive control of ozone in residences using reactive panels. *2008 Air and Waste Management Association Annual Conference and Exposition*. Portland, OR. **2008**.
46. R Luna*, C Morris, GC Morrison. Introduction of GIS into civil engineering curricula. *ASEE Annual Conference*. Pittsburgh, PA **2008**
47. JR Wells*, B Coleman, GC Morrison. Impact of skin oil on the aircraft cabin environment. *Symposium on Airliner Cabin Environment: Recent Progress in Characterization and Improvement, ASTM D22*. Anaheim, California. **2008**.

48. H Wang, GC Morrison*. Secondary emissions of aldehydes from consumer products in the presence of ozone. *Indoor Air 2008*, Copenhagen, Denmark. **2008**. Paper ID 615.
49. M Springs, JR Wells, GC Morrison*. Reaction probability between terpenes and ozone on model indoor surfaces. *Indoor Air 2008*, Copenhagen, Denmark. **2008**. Paper ID 601.
50. MS Waring, JA Siegel*, RL Corsi, GC Morrison. Do surface reactions influence formation of secondary organic aerosol? *Indoor Air 2008*, Copenhagen, Denmark. **2008**. Paper ID 603
51. H Wang, GC Morrison*. Ozone-initiated secondary emission rates of aldehydes from indoor surfaces in field homes. *Air and Waste Management Association Annual Conference and Exposition*. Pittsburgh, PA. **2007**.
52. M Springs, GC Morrison*. Chemical kinetics of a monoterpene with ozone on a model indoor surface. *Air and Waste Management Association Annual Conference and Exposition*. Pittsburgh, PA. **2007**.
53. L Pandrangi, GC Morrison*. Ozone interactions with human hair: ozone uptake rates and product formation. *Air and Waste Management Association Annual Conference and Exposition*. Pittsburgh, PA. Paper #48, **2007**.
54. GC Morrison*, JC Little, Y Xu, M Rao, D Enke. Gas-phase exposure history derived from material-phase concentration profiles. *International Society for Exposure Analysis annual conference, ISEA2006*, Paris, France, **2006**. Also: *Epidemiology*, 17 (6): S360, Supp S. **2006**.
55. H Wang, GC Morrison*. Ozone initiated secondary emission rates of aldehydes from indoor surfaces in four homes. *AWMA/EPA specialty conference Indoor Environment Quality - Problems, Research, and Solutions*, Research Triangle Park, NC, **2006**.
56. GC Morrison*, RL Corsi, H Destailats, JC Little, WW Nazaroff, and JR Wells. Indoor chemistry and the lifecycle of a building: Materials, operation and occupant activities. *Healthy Buildings 2006*, Lisbon, Portugal. II, 237-241. **2006**
57. M Ongwadee, GC Morrison*, CC Chusuei. Characterizing the chemical nature of a sorbed amine on indoor surfaces using ATR-FTIR. *Healthy Buildings 2006*, Lisbon, Portugal. IV, 55-58. **2006**
58. M Ongwadee, GC Morrison*. The influence of ammonia and carbon dioxide on sorption of basic pollutants on carpet and paint. *Healthy Buildings 2006*, Lisbon, Portugal. IV, 69-73. **2006**
59. A Srirama, GC Morrison*. Geometric design of a mass transfer sensor for evaluating pollutant transport in indoor air. *Indoor Air 2005*, Beijing, China. III, 2877. **2005**
60. GC Morrison*, JC Little, D Grow. Estimation of historic indoor exposures from pollutant distribution in indoor materials. *Indoor Air 2005*, Beijing, China. III, 2833. **2005**
61. M Ongwadee, SS Bettinger, GC Morrison*. Adsorption of basic compounds on indoor surfaces: influence of pH, CO₂ and NH₃. *Indoor Air 2005*, Beijing, China. II(1), 1942. **2005**
62. A Karamalegos, H Simon, P Zhao, G Morrison, J Siegel, and RL Corsi*. Personal reactive clouds: Introducing the concept of near-head chemistry. *Indoor Air 2005*, Beijing, China, II(2), 2356. **2005**
63. H Wang, GC Morrison*. Field measurements of ozone-induced secondary emission rates of aldehydes from indoor surfaces. Paper #1232 *Air and Waste Management Association 2005*, Minneapolis, MN. **2005**

64. GC Morrison*, S Regmi, Y Liu, M Fitch, R Surampali. Odor control for anaerobic swine lagoons using lagoon covers. Paper #1228 *Air and Waste Management Association 2005*, Minneapolis, MN. **2005**
65. M Fitch*, S Regmi, Y Liu, R Surampali, GC Morrison. Odor control technologies for swine barns. *Air and Waste Management Association 2005*, Minneapolis, MN. **2005**
66. A Srirama, GC Morrison*. Geometric design of a mass transfer sensor for measuring pollutant transport in indoor air. *Proceedings of ACE2004, Air and Waste Management Association 2004 Annual Conference*, Indianapolis, IN. pap 217. **2004**
67. GC Morrison*, P Zhao, DJ Wiseman. The influence of temperature, humidity and changing conditions on the measurement of mass transfer coefficients in indoor air. *Proceedings of ACE2004, Air and Waste Management Association 2004 Annual Conference*, Indianapolis, IN. pap 215. **2004**
68. DJ Wiseman, P Zhao, GC Morrison*. Microbalance Measurements of Indoor Mass-Transfer Coefficients. *Proceedings of Engineering Solutions to Indoor Air Quality Problems, AWMA/EPA Joint conference 2003*, Research Triangle Park, NC. ps1.
69. P Zhao, DJ Wiseman, GC Morrison*. Mass transfer measurements of ozone using coated filters *Proceedings of Engineering Solutions to Indoor Air Quality, AWMA/EPA Joint conference 2003*, Research Triangle Park, NC. s4A. **2003**
70. GC Morrison*, M Ongwandee, H Chang, J Portman. Rapid Measurements Of Indoor Mass-Transfer Coefficients. *Indoor Air 2002*, Monterey, CA. 3:524-529. **2002**
71. GC Morrison* and CJ Howard. Examination of indoor chemistry using chemical ionization mass spectrometry. *Proceedings of the Air and Waste Management Association's 94th Annual Conference and Exhibition*, Orlando, FL. pap 165. **2001**
72. GC Morrison, WW Nazaroff*. Emissions of odorous oxidized compounds from carpet after ozone exposure. *Proceedings of the 8th International Conference on Indoor Air Quality and Climate*, Edinburgh, Scotland. (4): 664-669. **1999**
73. GC Morrison, WW Nazaroff*. Ozone uptake on carpets: implications for indoor air quality. *Proceedings of the Air and Waste Management Association Annual Meeting*, St Louis, MO. paper 51. **1999**
74. GC Morrison and WW Nazaroff*. Ozone removal in ventilation ducts. *Engineering Solutions to Indoor Air Quality Problems: Proceedings of the Air & Waste Management Association/ Environmental Protection Agency Symposium*. Research Triangle Park, NC VIP-75: 514-521. **1997**
75. GC Morrison and AT Hodgson*. Evaluation of ventilation system materials as sources of volatile organic compounds in buildings. *Proceedings of the 7th International Conference on Indoor Air Quality and Climate*, Nagoya, Japan. (3):585-590. **1996**
76. WW Nazaroff*, RA Harley, GC Morrison. Preventing accidental deaths caused by carbon monoxide emissions from motor vehicles. *Proceedings of the 7th International Conference on Indoor Air Quality and Climate*, Nagoya, Japan. (2):357-362. **1996**

Refereed outreach publications

GC Morrison, RL Corsi. Smog and lemons: Discovering indoor air chemistry. *EM: Environmental Manager*. **May 2003** 14-21.

Invited presentations and panels

1. GC Morrison. How clothing impacts your exposure to chemicals. *Centre Scientifique et Technique du Bâtiment*, Paris, France. October 3, **2018**.
2. GC Morrison. You are what you wear: how clothing impacts your exposure to indoor chemicals. *Plenary presentation, Indoor Air 2018*. July 27, **2018**.
3. GC Morrison. Clothing as sources of endocrine disruptors: dermal uptake of oxybenzone. *Fraunhofer Institute -WKI*. Braunschweig, Germany. March 5, **2018**.
4. GC Morrison. Dermal uptake of SVOCs from indoor air and clothing. *University of North Carolina, Environmental Science and Engineering seminar series*. Chapel Hill, NC, Jan 17, **2018**.
5. GC Morrison. Dermal uptake of SVOCs from indoor air and clothing. *North Carolina State, Environmental engineering seminar series*. Raleigh, NC, Nov 11, **2017**.
6. GC Morrison. Ozone emissions from in-duct air cleaners: Laboratory and field studies. *National Air Filtration Association 2017 Technical Seminar*. Louisville, KY April 4-6, **2017**.
7. GC Morrison. The role of mathematical models in advancing indoor chemistry. *Technical University of Denmark*, Lyngby, Denmark. April 20, **2017**.
8. GC Morrison. The influence of clothing on exposure to methamphetamine, phthalates and nicotine. *Southern Ontario Centre for Atmospheric Aerosol Research, University of Toronto*, March 22, **2016**.
9. GC Morrison. Role of clothing in dermal uptake of SVOCs from indoor air. *University of North Carolina, Department of Environmental Sciences and Engineering, Gillings School of Global Public Health*. Chapel Hill, NC. March 24, **2016**.
10. GC Morrison. Indoor chemistry and aerosols. Workshop on the Health Risks of Indoor Exposure to Particulate Matter. *Institutes of Medicine, National Academy of Sciences*. Washington, DC. February 10, **2016**.
11. GC Morrison. Interview on *IAQ Radio with Joe Hughes*. July 10, **2015**
12. GC Morrison. Clothing as a vehicle for increasing dermal uptake of chemicals in air. *Fraunhofer Institute for Wood Research-WKI*. June 12, **2015**.
13. GC Morrison. Indoor chemistry, science and practice. *Technical University of Denmark Grad Research Program*. DTU, March 18, **2015**
14. GC Morrison. Indoor chemistry, science and practice. *Technical University of Denmark Grad Research Program*. DTU, February 18, **2014**.
15. GC Morrison. The hazardous waste dump that is your house. *Environmental Research Center Seminar Series*. Missouri S&T, September, 27, **2013**.
16. GC Morrison. Methamphetamine accumulation in building materials and future contamination of furnishings and clothing after re-occupation. *Methamphetamine contamination stakeholders meeting*, Missouri Department of Health and Human Services, April 1, **2013**.
17. GC Morrison Passive reduction of indoor pollutants with building materials. *University of Colorado, graduate lecture series*. Boulder, CO. October, **2011**.

18. GC Morrison and RL Corsi. Passive reduction of indoor pollutants with building materials. *US Green Building Council Webcast*. September, **2011**.
19. GC Morrison. Ozone reactions with human hair and skin: implications for human exposure to ozone and its reaction products. *Columbia University, graduate lecture series*. New York, NY. December, **2010**.
20. GC Morrison. Ozone reactions with human hair and skin: implications for human exposure to ozone and its reaction products. *University of West Virginia, graduate lecture series*. Morgantown, WV. November, **2010**.
21. GC Morrison. Building materials as pollutant sinks: passive control of indoor pollutants. *Sherwin Williams*. Cleveland, OH, September, **2010**
22. GC Morrison. Building materials and indoor air pollution. *Koahsiung Technical University, graduate lecture series*. Kaohsiung, Taiwan. August, **2010**.
23. GC Morrison. Building materials and indoor environments: beyond pollutant emissions 2010 *Asian Workshop on Indoor Environment and Health*, Keynote. Tainan, Taiwan. August, **2010**.
24. GC Morrison. Building materials as pollutant sinks: passive control of indoor pollutants. *University of Innsbruck, graduate lecture series*. Innsbruck, Austria. June, **2010**.
25. GC Morrison. Ozone reactions with human hair and skin: implications for human exposure to ozone and its reaction products. *Franhofer Institute, graduate lecture series*. Braunschweig, Germany. May, **2010**.
26. GC Morrison. Building materials as pollutant sinks: passive control of indoor pollutants. *Filter Manufacturers Association Annual Meeting*. Louisville, KY. April, **2010**.
27. GC Morrison, RL Corsi. Ozone removal for passively and actively ventilated buildings. *National Institute of Standards and Technology (NIST)*. Bethesda, MD. August, **2009**
28. GC Morrison. Ozone reactions with human hair and skin: implications for human exposure to ozone and its reaction products. *Environmental and Occupational Health Sciences Institute*, Rutgers NJ. March, **2009**.
29. GC Morrison and RL Corsi. Passive reactive panels for control of indoor ozone and its reaction products. *Indoor Environment Division 2008 Research Symposium, E.O. Lawrence Berkeley National Laboratory*. Berkeley, CA. April, **2008**.
30. GC Morrison. Using chemical activity in materials to reconstruct pollution histories and improve exposure analysis. *University of Texas, CAEE graduate lecture series*. Austin, TX. March **2008**.
31. GC Morrison. Indoor interfacial chemistry: laying the groundwork for controlling personal exposure to smog. *Rice University, Civil and Environmental Engineering graduate lecture series*. Houston, TX. November **2007**.
32. GC Morrison. Interfacial chemistry in indoor environments. *National Science Foundation*. Arlington, VA. October **2007**.
33. GC Morrison. Impact of surfaces on ozone-terpene conversion rates in buildings. *E.O. Lawrence Berkeley National Laboratory*. Berkeley, CA. July, **2007**.
34. JG Burken and GC Morrison. Hog farm odor control technologies. *Odor task force workgroup meeting*. Jefferson City, MO. April **2007**

35. GC Morrison. Unanticipated outcomes: chemical transformations and the future of IEQ. *Healthy Indoor Environments Conference*. Kansas City, Kansas. October **2006**.
36. S Burian, GC Morrison, A Morse. Making it work at your institution: a recipe for success. *Excellence in Civil Engineering Education seminar*. Fayetteville, AR. August, **2006**.
37. GC Morrison. Indoor air pollution: Physics, chemistry and engineering. *University of South Carolina, graduate lecture series*. Columbia, SC. October, **2005**.
38. GC Morrison. Indoor air pollution: Physics, chemistry and the long road to solutions. *University of Georgia, Savannah River Ecology Laboratory*. Aiken, SC. October, **2005**.
39. GC Morrison. Surfaces and their influence on indoor air pollution. *University of Missouri-Rolla, graduate lecture series in Chemical and Biological Engineering, Rolla, MO*. September, **2005**.
40. GC Morrison. Pre-tenure writer's collective: increased scholarship and career development. *UMR New Faculty Teaching Scholars, Rolla, MO*. August, **2005**.
41. GC Morrison. Indoor air pollution: Physics, chemistry and engineering. *University of Missouri-Columbia, graduate lecture series, Columbia, MO*. October, **2004**.
42. GC Morrison, et al. Making the most of teaching resources in the pre-tenure years. *Invited panel presentation for UM New Faculty Teaching Scholars course design workshop, Lake of the Ozarks, MO*. July, **2004**.
43. GC Morrison, B Fahrenholtz, GK Venayagamoorthy. Tips on Being a Successful Teacher-Scholar in an Evolving University. *UMR New Faculty Teaching Scholars, Rolla, MO*. July **2004**.
44. GC Morrison. Indoor air pollution: Physics, chemistry and engineering. *Washington University graduate lecture series, St. Louis, MO*. April, **2004**.
45. GC Morrison. Indoor air pollution: the (long) road to solutions. *Air and Waste Management Association (AWMA) St. Louis Chapter meeting, St. Louis, MO*. November, **2003**.
46. GC Morrison. Indoor air, pollutant transport and personal exposure. *Virginia Technological University graduate lecture series, Blacksburg, VA*. October, **2003**.
47. GC Morrison. Implications of air chemistry in ducts. *ASHRAE 2003 conference in Kansas City, MO*. June, **2003**.
48. J Groccia, A Dorestani, J Fleming, M Qureshi, G Morrison. Preparing for the Academic Job Search and Hiring Process: Conversations with Recent Hires *University of Missouri, Teaching Renewal Conference. Columbia, MO*. June, **2003**.
49. GC Morrison, *Fourth Friday KUMR radio Interview with Louise Morgan*. October, **2002**.
50. GC Morrison. Real time measurement of carbonyl compounds in the atmosphere. *University of Denver graduate lecture series, Denver, CO*. March **2001**.
51. GC Morrison. Carpet emissions and indoor air quality. *University of Colorado-Boulder graduate lecture series, Boulder, CO*. February, **2000**.
52. GC Morrison. Secondary formation of carbonyl compounds at indoor surfaces. *National Oceanic and Atmospheric Administration-Aeronomy Lab, Boulder, CO*. January, **2000**.

Presentations, posters, and other papers

1. M Webb, S Duncan, Y Zhang, GC Morrison, J Atkins, JD Surratt, BJ Turpin. Understanding the roles of water and water-soluble gases on indoor surface chemistry and indoor air composition. *Chemistry of Indoor Environments Science Meeting*, Sloan Foundation, University of Colorado, Boulder. October 25-26, 2018.
2. M Webb, S Duncan, Y Zhang, GC Morrison, J Atkins, JD Surratt, BJ Turpin. Wall loss kinetics of ozone and a model epoxide on “clan” interior window surfaces under dry and humid conditions. *Chemistry of Indoor Environments Science Meeting*, Sloan Foundation, University of Colorado, Boulder. October 25-26, 2018.
3. A Eftekhari, GC Morrison. Continuous measurement of indoor/outdoor reactive oxygen species in a residential house. *Chemistry of Indoor Environments Science Meeting*, Sloan Foundation, University of Colorado, Boulder. October 25-26, 2018.
4. GC Morrison, P Lakey, J Abbatt, M Shiraiwa. MOCCIE Investigates: Chemistry in the near-surface boundary layer. *Chemistry of Indoor Environments Science Meeting*, Sloan Foundation, University of Colorado, Boulder. October 25-26, 2018.
5. M Walker, C Fortenberry, A Loka, A Dang, G Date, K Cysniewski De Carvalho, GC Morrison, B Williams. The role of outdoor atmospheric pollutants on secondary organic aerosol in indoor environments. *American Association for Aerosol Research*, Oct 16-20. **2017**.
6. GC Morrison, G Bekö, CJ Weschler, G Clausen, HM Koch, T Salthammer, J Toftum, T Schripp. Kinetics of dermal uptake of nicotine from air. *International Society of Exposure Science, Oct 14-19, 2017*
7. T Salthammer, G Bekö, G Clausen, GC Morrison, HM Koch, J Toftum, T Schripp. CJ Weschler. Assessing dermal exposure to nicotine – an interdisciplinary approach. *International Society of Exposure Science, Oct 14-19, 2017*
8. GC Morrison, Brent Williams, Mike Walker, Claire Fortenberry, Arun Loka, Azin Eftekhari, Gauri Date, Jon Hill. Field studies of indoor chemistry in St Louis residences. *Gordon Research Conference, July 30- August 4, 2017*
9. H Frederiksen, G Bekö, CJ Weschler, T Schripp, T Salthammer, J Hill, AM Andersson, J Toftum, G Clausen, GC Morrison. Dermal uptake of benzophenone-3 from clothing. *9th Copenhagen Workshop on Endocrine Disruptors. May 2-5, 2017*
10. T Salthammer, E Uhde, T Schripp, D Varol, GC Morrison. Accumulation of SVOCs in clothing from air. *ISES 2016, Utrecht, Netherlands, October 2016*
11. G Bekö, GC Morrison, CJ Weschler, H Koch, T Salthammer, T Schripp, Jørn Toftum, G Clausen. Measurements of dermal uptake of nicotine from air and clothing. *ISES 2016, Utrecht, Netherlands, October 2016*
12. GC Morrison, CJ Weschler, G Bekö. The role of clothing in dermal uptake of SVOCs from indoor air. *ISES 2016, Utrecht, Netherlands, October 2016*.
13. M Lorber, G Morrison, CJ Weschler, G Bekö, M Gong. A model to predict concentrations of DnBP metabolites in urine from a vapor-phase exposure. *ISES, 2015*.
14. GC Morrison, DB Oerther, AW Schriener, MJ Puckett, LJ Briggs. Window opening behavior and exposure in the US. *Environment and Health – Bridging South, North, East and West Conference of ISEE, ISES and ISIAQ*. Basel, Switzerland 19 – 23 August **2013**

15. NS Vijayakumar, K Parker, GC Morrison. Methamphetamine Contamination in Household Materials and the Effect of Skin Oil. *Environment and Health –Bridging South, North, East and West Conference of ISEE, ISES and ISIAQ*. Basel, Switzerland 19 – 23 August **2013**
16. AW Schriener, LJ Briggs, MJ Puckett, DB Oerther, GC Morrison. Using human computation and Google Streetview to asses window-opening frequency and catalyze sustainable economic growth. *Association of Environmental Engineering and Science Professors Conference*, Golden, CO. **2013**.
17. GC Morrison, E Darling, S Lamble, C Cros, E Gall, RL Corsi. Passive control of indoor pollutants using green building materials. *Greenbuild*, Chicago, IL. **2010**.
18. S Lamble, GC Morrison. Green building materials: ozone removal and byproduct formation. *Missouri S&T graduate research conference*. Rolla, MO. **2010** (3rd place prize)
19. S Lamble, GC Morrison. Green building materials: ozone removal and byproduct formation. *Mid America Environmental Engineering Conference*. Edwardsville, IL. **2009**
20. J McKinney, GC Morrison. Methods for determining historical exposures from chemical analysis of building materials. *Missouri S&T undergraduate research conference*. Rolla, MO. **2009** (2nd place prize)
21. J McKinney, GC Morrison. Methods for determining historical exposures from chemical analysis of building materials. *Missouri S&T undergraduate research conference*. Rolla, MO. **2008** (2nd place prize)
22. A Balakrishnan, GC Morrison. Design of a wind tunnel for calibration and reproducibility studies of an indoor mass-transfer sensor. *Presented at the Mid America Environmental Engineering Conference, Washington University*. St. Louis, MO. **2005**.
23. R Corsi, J Siegel, P Zhao, GC Morrison. Near-head chemistry. *International Society for Exposure Analysis*. Tucson, AZ. **2005**.
24. M Ongwadee, GC Morrison. Adsorption of acidic and basic compounds on indoor surfaces. *Presented at the Mid America Environmental Engineering Conference, Southern Illinois University*. Edwardsville, IL. **2004**.
25. S Regmi, Y Liu, M Fitch, R Surampalli, GC Morrison. The shiny raft: A device for simultaneous measurement of manure lagoon odor control technologies. *Presented at the Frontiers in Assessment and Measurement in the Environment, Association of Environmental Engineering and Science Professors*. Minneapolis, MN. **2003**.
26. P Zhao, D Wiseman, GC Morrison. Rapid Measurements of Mass Transfer Coefficients using a microbalance and coated sensors. *Presented at the Mid America Environmental Engineering Conference, University of Missouri*. Columbia, MO. **2003**.
27. TG Custer, S Kato, R Fall, GC Morrison, CJ Howard, VM Bierbaum. Chemical-ionization Monitoring of Plant VOCs. *Presented at the 2001 American Society of Mass Spectrometry conference*. **2001**.
28. GC Morrison. Ozone-surface interactions: Investigations of mechanisms, kinetics, mass transport, and implications for indoor air quality. Report # LBNL-45044 E.O. Lawrence Berkeley National Laboratory. **1999**.

29. A Gadgil and GC Morrison. Production of Third Party Verification Document for the AquaGenesis Desalinization Process. Report # E.O. Lawrence Berkeley National Laboratory. **1998.**
30. GC Morrison. Ozone interactions with carpeting. *Air & Waste Management Association Annual Meeting Student Paper*. San Diego, CA. **1998.**
31. A Gadgil, et. al. Saving energy and lives with UV disinfection of drinking water in the developing world. *American Council for an Energy-Efficient Economy 1996 Summer Study*. **1996.**
32. MA Richard, OW Bynum, DR Sheridan, PH Mark, GC Morrison, LT Brewer. Sensor technology for advanced combustion control and monitoring instrumentation. *Abstracts of papers of the American Chemical Society* 206: 64-FUEL Part 1, AUG 22 **1993.**

Reports of note

RL Corsi, JR Aldred, EK Darling, JA Siegel, GC Morrison. Literature and Product Review and Cost Benefit Analysis of Commercially Available Ozone Air Cleaning for HVAC Systems. Final report for ASHRAE project 1491RP, June **2014.**

GC Morrison*, J Siegel, RJ Shaughnessy. In-duct air cleaning devices: ozone emission rates and test methodology. March **2014.** http://www.arb.ca.gov/research/single-project.php?row_id=64860

GRANTS AWARDED

PI, "Emission rates of volatile ozonation products from human skin", Colgate (100% effort over 5 months) 12/18-5/19. Active

Co-PI, "Indoor chemistry and the role of water on surfaces" Alfred P. Sloan Foundation, (20% UNC effort over 3 years) 7/17-6/20. Active

Co-PI, "Modeling consortium for chemistry of indoor environments (MOCCIE)", Alfred P. Sloan Foundation, \$75,001 (100% UNC effort over 1 year) 8/17-7-19. Active

PI, "Workshop: Modeling chemistry in indoor environments", Alfred P. Sloan Foundation, \$55,533 (100% S&T effort over 0.5 year) 5/16-7/17. Complete.

PI, "Workshop: Interactions Between Indoor and Ambient Chemistry-2", Sloan Foundation via subcontract through University of Toronto, \$17,650 (100% S&T effort over 1 year). 12/15-12/16 Complete.

PI, "Workshop: Interactions Between Indoor and Ambient Chemistry", Sloan Foundation, \$35,000 (100% S&T effort over 1 year) 1/15-9/15. Complete

PI, "Workshop: interactions Between Indoor and Ambient Chemistry, National Science Foundation, \$50,000 (100%, S&T effort over 1 year). *Supplement in 2016 for second workshop*, \$28,133. 3/15-3/17. Complete.

PI, "Indoor exposure to pollutants associated with oxidative chemistry: field studies and window-opening behavior", Environmental Protection Agency, \$999,999. (100% S&T effort over 3 years; Washington University as subcontractor) 11/14-12/17. Active.

PI, "COLLABORATIVE RESEARCH: Particle mediated enhanced transport of semi-volatile organic compounds in indoor environments" National Science Foundation, \$134,028. (100% S&T effort over 3 years; Virginia Tech and South Dakota School of Mines and Technology collaborators for an additional \$241,312) 9/13-12/17. Complete.

Co-PI, "Plants as pollution sentinels for improved health in the built environment" National Science Foundation, \$252,711 (15% GCM effort over 3 years). 10/13-9/16. Complete.

PI, "In-duct air cleaning devices: Ozone emission rates and test methodology" California Air Resources Board. \$325,000. (100% S&T effort over 2.5 years; UT Austin and U Tulsa as subcontractors) 6/10-1/14. Complete.

PI. "Characterization of the interactions between building materials and the chemicals associated with methamphetamine production" National Institute for Standards and Testing, \$163,405. (100% S&T effort over 1 year; UT Austin as subcontractor) 1/11-1/12. Complete.

PI: "Workshop: Atmospheric chemistry moves indoors". NSF; \$12,000. (100% effort over 3 months). 3/10-6/10. Complete.

PI: "EPA STAR Award for Jonathan McKinney" (100% effort for 2 years). \$50,000 for graduate research. 9/10-8/12. Complete.

PI: "Characterization of the Interactions Between Building Materials and the Chemicals Associated with Methamphetamine Production." National Institute for Standards and Testing (100% effort over 1 yr; UT Austin as subcontractor). \$116,574. 1/10-12/10. Complete.

PI: "Development and Implementation of a New Protocol for Testing the Air Quality Implications of Green Building Materials." US Green Building Council (100% S&T effort over 1.5 yr; UT Austin as subcontractor), \$149,769.1/09-7/10. Complete.

PI: "EPA GRO Fellowship for undergraduate Jon McKinney". EPA. (100% effort over 1 yr), \$25,000. 9/08-6/09. Complete.

Co-PI: "Investigating Subsurface Impacts of Chlorinated Solvents Using Tree Cores and In-planta Sampling". Ministry of the Environment, Ontario, CA; \$95,164 total (10% Co-PI effort over 2 years). Joel Burken, PI. 9/08-8/10. Complete.

Co-PI: "Indoor Air Quality Simulator with Lab Interface and Interactive Consumer Interface". Computer Research Association's Committee on the Status of Women in Computing Research (with Daniel Tauritz of CompSci). (50% effort over 1 yr), \$22,500, Direct payment from CRA of student stipends and supplies/travel reimbursement. 7/07-7/08. Complete.

Co-PI: "Introduction of GIS into Civil Engineering Curricula". NSF; \$499,794 total (10% Co-PI effort over 2.5 years). Ronaldo Luna, PI. 8/07-6/10. Complete.

PI: "Workshop on Interfacial Chemistry in Indoor Environments". NSF; \$23,762. California Air Resources Board; \$4,999 (100% effort over 5 months). 4/07 – 8/07. Complete.

PI: "Ozone chemistry on indoor surfaces". NIOSH; \$70,000 (100% effort over 2 years). 7/06-7/08. Complete.

Co-PI: "Learning System to Integrate GIS into Civil Engineering Curricula". National Science Foundation (NSF); \$74,935 (3% effort over 1 year). Ronaldo Luna, PI. 1/05-1/06. Complete.

PI: "Indoor Surface Adsorption of Acids and Bases". University of Missouri Research Board. \$26,735 (100% effort over 1 year). 1/04-1/05. Complete.

PI: "CAREER: Secondary Emissions of Chemical Irritants into Indoor Air". National Science Foundation (NSF); \$400,000 (100% effort over 5 years). 7/03-7/08. Complete.

Co-PI: "Environmental Technologies for Concentrated Animal Feed Operations". Environmental Protection Agency (EPA); \$2,000,000 total (10% Co-PI effort over 3 years). Craig Adams, PI. 7/01-7/04. Complete.

GRADUATE STUDENTS ADVISED

PhD

Azin Eftekhari. PhD Dissertation tentative title, "Indoor surface characterization and influence on chemical interactions and transformations." (PhD-expected completion **2018**)

Meredith Springs. PhD Dissertation tentative title, "Kinetics of terpene-ozone reactions on indoor surfaces." (PhD- expected completion **2016**)

Shi Shu (Segovia). PhD Dissertation title, "Ozone and terpene reactions on indoor surfaces: reaction rates and implications for indoor air quality". (PhD- **2011**)

Hong Wang. PhD Dissertation title, "Field and laboratory investigation of ozone-indoor surface reactions: Ozone uptake rates, secondary emissions inventory and implications for indoor air quality" **2007**

Maneerat Ongwandee. PhD Dissertation title, "Adsorption of basic compounds on indoor surfaces: influence of pH, CO₂ and NH₃" **2006**

MS (thesis)

Pavithra Ethi Rajan, MS Thesis, "Development of CO₂ adsorption materials for passive control of CO₂ in buildings". May **2017**.

Jon Hill, MS Thesis title, "Partitioning of oxybenzone to clothing from air and its influence on dermal uptake.". May, **2017**

Gauri Date, MS Thesis Tentative title, "Influence of window opening on building air exchange rates.", May, **2017**

Melissa Buechlein, MS Thesis Tentative title, "Chemical exposure protection and enhancement by clothing", Dec **2015**

Hongwan Li, MS Thesis tentative title, "Methamphetamine sorptive interactions with drywall". Dec **2014**

Kristia Parker, MS Thesis title, "Methamphetamine absorption by skin oils: accumulated mass, partition coefficients and the influence of fatty acids" May **2014**

Nishanthini Vijayakumar Shakila, MS Thesis title, "Transport of a methamphetamine surrogate through painted drywall and accumulation in insulation." May **2012**.

Seth Lamble, MS Thesis tentative title, "Methods for evaluating the ability of green building materials to remove ozone and reduce occupant exposure to smog. " May, **2011**.

Lakshmi Pandrangi. MS Thesis title, "Ozone interactions with human hair: ozone uptake and product formation." **2007**

Anjana Srirama. MS Thesis title, "Geometric design of a mass-transfer sensor using computational fluid dynamics." **2005**

Shekhar Regmi. MS Thesis title, "Odor Evaluation and Control at an Anaerobic Swine Lagoon." **2004**

Deborah-Jean Wiseman. MS Thesis title, "Rapid Measurement of Indoor Mass Transfer Coefficients." **2003**

Ping Zhao. MS Thesis title, "Indoor Mass Transfer Coefficient Measurements of Ozone Using Nitrite Coated Filters." **2003**

UNDERGRADUATE RESEARCH STUDENTS ADVISED

Julie Portman (ChemEng), Hong Chang, Katie Boring, Samuel McEwan, Sarah Bettinger, Anthony Chiles, Erin Duggan, Benjamin Johnson, William Granich, Amy Cervantes, Ryan Stringer, Jonathan McKinney, Josh Eads (CompSci), Elizabeth Babb, Amber Loftis (ChemEng), Ashley Lang (CompSci), Janet Guntley, Sarah Shell, Connie Rozycki, Michael Pyles, Pan Dong, Jenny McLeod, Julia Kuebrich, Leslie Thornburg, Melissa Buechlein, Brandon Pollpeter, Caleb Holtmeyer, Rebecca Johnson, Adienne Angelos, Angela Mendrala

ADVISED STUDENT AWARDS

A Eftekhari, 2nd Place Poster Award, Grad Poster competition, Missouri S&T, **2017**

J Hill, Chancellor's Fellowship, Missouri S&T, **2015-2017**

M Buechlein, Chancellor's Fellowship, Missouri S&T. **2014-2016**

J McKinney. EPA STAR Award (\$50,000) for graduate research **2010-2012**

J McKinney, GC Morrison. 2nd place Award. Methods for determining historical exposures from chemical analysis of building materials. *Missouri S&T undergraduate research conference*. **2009**

L Pandrangi. 2nd place Award. Barr Engineering Journal Article Competition. **2009**

J McKinney. EPA-GRO Award (\$25,000) for undergraduate research. **2009-2010**

J McKinney, GC Morrison. 2nd place Award. Methods for determining historical exposures from chemical analysis of building materials. *Missouri S&T undergraduate research conference*. **2008**

M Ongwandee. 2nd place Award. Barr Engineering Journal Article Competition. **2007**

UNIVERSITY LEVEL COURSES TAUGHT AT MISSOURI S&T (THROUGH Fall 2017)

(Course number (new/old); Course name; Level; Years taught (#/yr); Avg enrollment)

2601/261; Introduction to Environmental Engineering; U; 2002(2), 2003, 2004, 2005(2), 2006, 2009, 2010; 9 total; 30 avg enrollment.

5660/367; Introduction to Air Pollution; U/G; 2001, 2004, 2010, 2012; 4 total; 23 avg enrollment.

5662/368; Air Pollution Control Engineering; U/G; 2002, 2006, 2009, 2010, 2012, 2013, 2014, 2015, 2016, 2017; 10 total; 17 avg enrollment. Taught 2 times as a distance course.

5665/366; Indoor Air Pollution; U/G; 2005, 2007, 2008, 2009, 2011, 2013, 2014, 2015, 2016; 9 total; 23 avg enrollment. Taught 2 times as a distance course.

6600/460; Physical and Chemical fundamentals in Environmental Engineering; G; 2003, 2004, 2005, 2006, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016; 12 total; 10 avg enrollment. Taught 3 times as a distance course.

5650/362; Public Health Engineering (co-taught); U/G; 2011, 2012; Co-taught 2 total; 30 avg enrollment. Taught 2 times as distance course.

PROFESSIONAL DEVELOPMENT

Promotion and Tenure Writer's Group (Chair F'02-F'06) **2002-2007**

EXCEED: Assistant mentor for the Excellence in Engineering Education (2 day teaching workshop at UMR). **2005**

EXCEED: Excellence in Engineering Education (6 day teaching workshop at West Point, NY). **2004**

University of Missouri New Faculty Teaching Scholars (year-long teaching program/workshop). **2002-2003**

University of Missouri-Rolla New Faculty Forum. **2001-2002**

AWARDS

Outstanding Teaching Award 2015-2016, Missouri University of Science & Technology, **2016**

Outstanding Teaching Award of Excellence for Global Learning, Missouri University of Science & Technology, **2016**

Faculty Research Award, Missouri University of Science & Technology, **2015**

Otto Mønsted Guest Professorship, Danish Technical University, Lyngby, Denmark **2015-2016**

Wilhelm Klauditz Fellowship, Fraunhofer Institute-WKI, Braunschweig, Germany, **2015**

Outstanding Teaching Award, Missouri University of Science & Technology, **2012**

Outstanding Teaching Award of Excellence for Global Learning, Missouri University of Science & Technology, **2011**

Faculty Excellence Award, Missouri University of Science & Technology, **2011**; campus award, 1 of 5 annually.

Fellow of the Academy of the International Society of Indoor Air Quality and Climate, **2011**

Joseph H. Senne, Jr.- Academy of Civil Engineers Faculty Achievement Award. **2009**

Cockrell Family Regents Chair in Engineering, University of Texas-Austin. **2007-2008**

Outstanding Teaching Award, University of Missouri-Rolla. **2007**

School of Engineering Teaching Innovation Award. University of Missouri. **2005**

American Society of Civil Engineering EXCEED Fellowship, **2004**

National Science Foundation Career Award, **2003**

First prize in the Air and Waste Management Association Student Poster Competition, **1998**

Science to Achieve Results (STAR) Fellowship for Graduate Environmental Study; United States Environmental Protection Agency, **1996**

National Laboratories Graduate Fellowship; Associated Western Universities, **1996**

Member of team that won Discover Magazine's 1996 Environmental Technology Award for "UV Waterworks" ultraviolet-light water disinfection system for developing nations. **1996**

UNIVERSITY SERVICE

University level

CARÉ representative, University P&T Committee (F14-present)

Environmental Research Center, Interim Director, (F13-Sp14)

Faculty Senate (F'10-Sp'12)

Third-year review committees (S'11, F'15)

CARÉ representative, Information Technology Campus Committee (F'03-S'06),

Promotion and tenure writers group (chair, F'02-F'06; member F'06- present)

School of Engineering level

CARÉ representative, Area P&T Committee (F14-present)

CARÉ representative, Freshman Engineering Advising Program (F'03-Sp'05)

CARÉ Department level

Chair P&T Committee (F14-present)

Assistant Chair of Distance Education Program (Su'12 – present)

Coordination of the Environmental Engineering distance MS program (F'09- present)

Coordination of S&T/MSU program for Environmental Engineering courses (Sp'10-present)

Search committees (Chair, member, periodic)

Computer committee (F'03-F'09; chair through Sp'06)

Civil engineering undergraduate curriculum committee (F'01-W'02); (F'09- W'10)

Civil engineering graduate curriculum committee (F'10-Sp'12)

Environmental engineering curriculum committee (F'01-present)

Architectural engineering curriculum committee (F'03-present; voluntary member)

Phonathon (each semester)

Undergraduate recruiting (Springfield, 2000; Rolla High School 2003, 2004, 2005; Rolla night, St. Louis Engineers Club 2003, 2004)

CARÉ dept. Open House organizer and participant (periodic)

GTA workshop evaluator (frequently)

BE10 presentations.

PROFESSIONAL SERVICE AND AFFILIATIONS

International

Immediate past-president: International Society of Indoor Air Quality and Climate (ISIAQ), *2016-present*

President: International Society of Indoor Air Quality and Climate (ISIAQ), *2014- 2016*

Associate Editor, *Indoor Air*, Journal of the International Society of Indoor Air Quality and Climate. Wiley-Blackwell. 2013-present

Lead organizer, *Workshop on Indoor Chemistry Modeling*, Washington, DC, November, 2016. Sponsored by NSF and the Sloan Foundation

Lead organizer, *Workshop on Interactions Between Indoor and Ambient Chemistry*, Ghent, Belgium, July 3-4, 2016. Sponsored by NSF and the Sloan Foundation

Program committee, *Healthy Buildings*, Lublin, Poland 2016-2017.

Lead organizer, *Workshop on Interactions Between Indoor and Ambient Chemistry*, Lille, France, May 15-16, 2015. Sponsored by NSF and the Sloan Foundation

Vice-President of Policy: International Society of Indoor Air Quality and Climate (ISIAQ), 2012-2014

Technical Program Committee, ISES/ISEA/ISIAQ Environment and Health Conference, 2013, Basel, Switzerland.

Technical Chair and Organizer of *Indoor Air 2011*, Austin, TX. International Society of Indoor Air Quality and Climate (ISIAQ), 2008-2011

National Scientific Committee: ISIAQ; Chair/co-chair and peer reviewer for conference sessions *Healthy Buildings 2009*, Syracuse, USA.

International Scientific Committee: ISIAQ; Chair/co-chair and peer reviewer for conference sessions *Indoor Air 2005*, Beijing, China.

International Scientific Committee: ISIAQ; Chair/co-chair and peer reviewer for conference sessions *Indoor Air 2002*, Monterey, CA.

National

Organizing Committee, *Healthy Buildings, 2015 America*, Boulder, CO. (F13-Sp15)

Program Committee, *ASHRAE Indoor Air Quality 2013*, Chicago, IL.

Organizer, *Symposium: Outdoor chemistry comes indoors*. At the American Chemical Society Meeting, San Francisco, March 2010. Sponsored by NSF (\$12,000 via S&T). Resulted in article in *Chemical and Engineering News*.

National Technical Advisory Committee. *Clean Air 2010*, Breckenridge, CO, USA

Environmental Protection Agency Green Buildings SBIR review panel (2009)

Organizer, *Workshop on Interfacial Chemistry in Indoor Environments*. Sponsored by NSF and California Air Resources Board. July 2007.

Project Advisory Committee for California Energy Commission study, "Implication of Natural Gas Interchangeability for California Gas Customers". 2006-2009.

Technical committee and session chair: AWMA-EPA specialty conference, "Indoor Environmental Quality: Problems, Research and Solutions". July 2006

Technical committee and session organizer: Air & Waste Management Association (AWMA): Officer of the AB-7 Indoor Air Committee (Chair 2006-2009; vice-chair 2003-2006; secretary 2001-2003); Chair and Co-chair for conference sessions 2000-present.

Assistant mentor for EXCEED: Excellence in Engineering Education: 6 day teaching workshop at Fayetteville, AK, 2006.

Assistant mentor for EXCEED: Excellence in Engineering Education: 2 day teaching workshop at UMR, Rolla , MO 2004.

Invited panelist for *Workshop on Indoor Air Chemistry and Health*, National Institutes for Industrial and Occupational Safety and Health (NIOSH). (2004)

National Science Foundation Biosensors Panel Review (2002 and 2006)

Invited panelist for *Workshop on Combining Environmental Fate and Air Quality Modeling*. Reactivity Research Working Group (RRWG). EPA and Chemical Manufacturers Association (2000).

Professional affiliations

American Chemical Society (ACS)

Association of Environmental Engineering and Science Professors (AEESP)

American Society of Civil Engineers (ASCE)

International Society of Indoor Air Quality and Climate (ISIAQ)

Peer reviewer for archival journals

ASHRAE Journal, Atmospheric Environment, Building and Environment, Environmental Science and Technology, Indoor Air, International Journal of Heat and Mass Transfer, Journal of the Air and Waste Management Association, Microelectronics Reliability

OUTREACH

GC Morrison. Bad Air: the dirt on indoor air pollution. *Gateway Teen Science Cafe* St Louis Science Center, January 15, **2014**. <http://www.teencafestl.org/previous-cafes.html>

GC Morrison. Bad Air: the dirt on indoor air pollution. *Gateway Teen Science Cafe* Cohokia High School, December 4, **2013**.

CONSULTING

Scientific review of research proposals for agencies in the US, Canada, Australia, UK and EU.

Scientific review and development of research recommendations for the Environmental Protection Agency (EPA)

Scientific review of policy and test procedures for ozone generating air purifiers used in Canadian homes for Health Canada.

Policy document review for the federal Consumer Product Safety Commission (CPSC).

Engineering evaluation of in-situ process gas analyzers, engineering analysis of proposed water purification systems.

Scientific consultant for litigation related to indoor air quality.

PATENTS

DR Sheridan and GC Morrison; U.S. Patent 5,627,328. Gas sampling system and method. **1997**

RA Dalla Betta, JC Schlatter, GC Morrison, J Nikkel; U.S. Patent 5,040,551. Optimizing the oxidation of carbon monoxide. **1991**