

Christopher John Damm, Ph.D.

Profile

Dr. Damm's consulting focuses on energy conversion and minimizing exposure to pollutant emissions associated with energy conversion. Current topics of interest are: carbon monoxide generation, fate, and transport in buildings; air contaminants from Heating Ventilation and Air Conditioning (HVAC) systems; internal combustion engine emissions from motor vehicles, generators and other equipment/tools; electric power generation; pollutant emission factors from combustion sources; safety in engineering design and product safety analysis.

Dr. Damm has been on the Mechanical Engineering faculty of the Milwaukee School of Engineering since the fall of 2004 where he teaches courses in thermodynamics, heat transfer, fluid mechanics, engineering design, internal combustion engines, and emerging energy systems. He also teaches inspection, maintenance, and safety of gas-fired appliances to students in the Milwaukee Area Technical College HVAC technician program.

Dr. Damm has authored over 70 technical articles and reports. He has worked on consulting assignments throughout the U.S., including California, Colorado, Florida, Georgia, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Montana, Pennsylvania, Rhode Island, Tennessee, Texas, Virginia, and Wisconsin.

Education

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| 2001 | Ph.D. | University of California, Berkeley
<i>Major field:</i> Mechanical Engineering (Combustion/Thermodynamics)
<i>Minor fields:</i> Chemistry, Air Quality Engineering |
| 1995 | M.S. | Brown University
<i>Major field:</i> Physics |
| 1993 | M.S. | University of Minnesota
<i>Major field:</i> Mechanical Engineering
(Combustion/Thermodynamics/Physical Chemistry) |
| 1991 | B.M.E. | University of Minnesota
<i>Major field:</i> Mechanical Engineering (Power and Propulsion concentration)
<i>Minor field:</i> Economics |

Current/Recent Positions

Senior Lecturer, Department of Mechanical Engineering, **Milwaukee School of Engineering**
(Sept 2020-present, on MSOE faculty since 2004)

- Teaching expertise includes: Thermodynamics I, Thermodynamics II, Applied Thermodynamics, Heat Transfer, Fluid Mechanics, Energy Systems (including HVAC systems), Internal Combustion Engines, Engineering Design, and Design for Safety.
- Faculty Advisor to student design groups including the Supermileage Vehicle Team (since 2008).

President and Chief Engineer, **Chris Damm and Associates LLC**, Milwaukee, WI (July 2017-Present)

- Engineering Consulting focused on Indoor Air Quality, Combustion, and Air Pollution
- Areas of expertise include: carbon monoxide generation, fate, and transport in buildings and motor vehicles; combustion; heating, ventilation, and air conditioning (HVAC); air contaminant control; environmental pollution; safety in engineering design, engineering design methodology and analysis; product safety analysis.

Principal Consultant, **Skogen Engineering Group**, Madison, Wisconsin (August 2004-Present)

- Additional areas of expertise include: thermal fluid design; sensor and detector design; fuel systems; sound measurement and analysis; engineering statics and dynamics (stability analysis, mechanics of motion, etc.).

Professor, Department of Mechanical Engineering, Milwaukee School of Engineering
(On MSOE faculty since 2004, Full Professor Sept 2013 to Sept 2020)

- Coordinator for Engineering Design Experience for senior-level Mechanical Engineering students (An academic year-long curricular requirement for approximately 150 students per year).
- Courses taught include: Thermodynamics I, Thermodynamics II, Thermodynamics Applications*, Heat Transfer*, Fluid Mechanics, Advanced Energy Technologies**, Renewable Energy Utilization**, Internal Combustion Engines*, and Senior Design I, II, and III. (*course coordinator, **course creator and coordinator)
- Principal Investigator on several funded research projects (details are provided in the **Externally Funded Projects** section).
- Developed the Renewable Energy Systems Laboratory and the Advanced Energy Technologies Laboratory (funded from external sources).
- Faculty Advisor of the *SAE International* (formerly the *Society of Automotive Engineers*) student chapter at the Milwaukee School of Engineering (2004-2020; Awarded Honeywell Outstanding Collegiate Branch Award in 2011, 2012, 2014, 2017 and 2018 and the Award of Excellence in 2015 by SAE International).

Director of the Mechanical Engineering Program, Milwaukee School of Engineering (2014-2019)

- Directed a program of approximately 700 Mechanical Engineering students and 25 faculty (MSOE's largest degree program).
- Led the latest major revision of the Mechanical Engineering Program curriculum.
- Responsible for program planning, assessment, and accreditation.
- Coordinated the most recent successful ABET program accreditation (2019—on six-year cycle).

Affiliate Research Professor, Clean Technologies and Renewable Energy Research Center, Desert Research Institute, Reno, Nevada (2013-present)

- Areas of expertise include: building energy systems modeling, solar thermal system design/characterization/optimization, renewable energy systems integration and control, solar cooling.

Fellowships & Honors

Milwaukee School of Engineering Karl O. Werwath Engineering Research Award 2011
Sierra Nevada College Faculty Distinguished Achievement Award 2004
Society of Automotive Engineers Doctoral Scholar 2000-2001
University of California Earl C. Anthony Regents Fellow 1996-1997
Future Faculty Development Fellow, US Department of Education 1993-1994
Tau Beta Pi, The National Engineering Honor Society
Pi Tau Sigma, The National Mechanical Engineering Honor Society

Professional Associations and Activities

- Full Member, *American Society of Heating, Refrigerating, and Air Conditioning Engineers* (ASHRAE)
- Member, *American Society of Safety Professionals* (ASSP, formerly the *American Society of Safety Engineers*)
- Member, *SAE International* (formerly *Society of Automotive Engineers*)
- Invited reviewer for several technical conferences and publications including: *ASME Annual International Mechanical Engineering Congress and Exposition*, *ASME Energy Sustainability and Fuel Cell Conference*, *Optics and Lasers in Engineering*, *Applied Spectroscopy*, *CLEAN AIR - International Journal on Energy for a Clean Environment*, *Annual American Society of Engineering Education Conference and Exposition*
- Member of Research Committee for the *Mid-West Energy Research Consortium* (M-WERC) (2010-2015; the Committee distributed approximately \$600,000 for energy research every year)
- Member of Engineering Workforce Development Committee for the *Mid-West Energy Research Consortium* (M-WERC) (since 2011-2014)

- Member of Executive Board of the *American Society for Engineering Education Energy Conversion and Conservation Division* (2011-2013)
- Member of the Executive Board of the Society of Automotive Engineers (Milwaukee Section, 2004-2008)
- Member of the *SAE Faculty Advisors Committee* (since 2014)
- Member of the Steering Committee for *Milwaukee Shines* (a US DoE funded program), City of Milwaukee (2009-2016)
- Member of the *Solar Hot Water Business Council*, City of Milwaukee (2011-2016)

Professional/Research Experience

Summer of
2013

Visiting Research Professor, Clean Technologies and Renewable Energy Center, **Desert Research Institute**

Summers of
2005, 2006,
2007, 2008,
and 2009

Visiting Professor, Center for Building Performance and Diagnostics, **Carnegie Mellon University**

- Designed and implemented a building energy system supply system for the “Intelligent Workplace” on the Carnegie Mellon campus as part of the Department of Energy’s Advanced Building Efficiency Testbed Initiative
- Performed exhaust gas monitoring and analysis of a biodiesel fueled building energy supply system
- Performed thermodynamic modeling of the building energy supply systems of the “Intelligent Workplace.”

Summers of
2003 and 2004

Visiting Scientist, Division of Atmospheric Sciences, **Desert Research Institute**

- Characterized air pollutant emissions from vehicle exhaust, road dust, and woodburning in the Lake Tahoe basin (funded by the California Air Resources Board)
- Monitored air pollutant emissions from on-road motor vehicles in the Lake Tahoe basin (funded by the National Cooperative Highway Research Program, US DOT)
- Quantified the effect of motor vehicle emissions on Lake Tahoe clarity (funded by the California Air Resources Board)
- Assessed methodologies for motor vehicle emission factor determination

Summer ‘02

Visiting Scientist, Environmental Energy Technologies Division, **Lawrence Berkeley National Laboratory**

- Designed a laser diagnostic technique for measuring lead and other toxic metals in contaminated soils
- Studied the effect of advanced fuel formulations on air pollutant emissions engines

9/97 – 6/01

Graduate Researcher, Combustion Chemistry and Laser Diagnostics Laboratory, **Lawrence Berkeley National Laboratory**

- Conducted laser photofragmentation-fluorescence studies for detection of air pollutants in combustion systems
- Designed a novel, *in situ*, real-time emissions monitor for diesel particulate matter
- Studied the effect of fuel additives on emissions from engines
- Developed an optical method for the detection of ammonia, ammonium nitrate, and ammonium sulfate as applied to air pollution control in engines
- Detected toxic metals using laser techniques for control of power plant emissions
- Worked on a design team in the development of a polarized light scattering instrument to characterize emissions from diesel engines

- 9/96 – 9/97 *Graduate Researcher*, Department of Civil and Environmental Engineering, **U.C. Berkeley**
- Used geophysical methods to enhance hydrogeological characterization of environmentally contaminated sites
- 6/94 – 12/94 *Graduate Researcher*, Department of Physics, **Brown University**
- Designed a quality assurance device for general radiography at Rhode Island Hospital
- 9/91 – 7/93 *Graduate Research Assistant*, Department of Mechanical Engineering, **University of Minnesota**
- Designed and constructed a combustion chamber for optical measurements used for characterization of natural gas combustion
- 6/90 – 5/92 *Energy Engineer*, **Center for Energy and Environment**, Minneapolis, MN
- Field studies of energy performance of commercial and residential Heating, Ventilation, and Air Conditioning (HVAC) systems.

Additional Teaching and Related Experience

- Fall '08-Spring '13 *Associate Professor*, Department of Mechanical Engineering, **Milwaukee School of Engineering**
- Fall '04-Spring '08 *Assistant Professor*, Department of Mechanical Engineering, **Milwaukee School of Engineering**
- Fall '01-Spring '04 *Assistant Professor*, Environmental Engineering, Science and Policy, **Sierra Nevada College**
- Courses taught include Environmental Engineering, Alternative Energy Systems, Environmental Planning and Public Policy, and Mathematical Modeling
 - Awarded the Faculty Distinguished Achievement Award in 2004.
- Spring '03-Spring '04 *Co-Director*, Honors Program, **Sierra Nevada College**
- Coordinated changes to college Honors Program.
 - Oversaw progress of students toward reaching program objectives
- Spring '02-Spring '07 *Graduate Faculty*, Atmospheric Sciences Program, **University of Nevada, Reno**
- Spring '01 *Lecturer*, School of Public Health, **U.C. Berkeley**
- Taught a graduate course on “Engineering Control of Airborne Chemicals”
- Fall '96 *Graduate Student Instructor*, Department of Civil and Environmental Engineering, **U.C. Berkeley**
- Taught Fluid Mechanics
- Fall '94 *Teaching Assistant*, Physics Department, **Brown University**
- Taught Introductory Physics
- Fall '92,
Spring '93 *Teaching Assistant*, Department of Mechanical Engineering, **University of Minnesota**
- Taught Thermodynamics

Peer-Reviewed Publications and Conference Proceedings

Energy Systems Related

1. C. Damm, W. Zloza, S. Stafl, B. Radlinger, and B. Abushakra, “**Development of a Web-based Decision Tool for Selection of Distributed Energy Resources and Systems (DERS) for Moving College and Corporate Campuses toward Net-Zero Energy,**” *2017 ASEE Annual Conference and Exposition*, Columbus, OH, June 25-28, 2017.
2. B. Abushakra, D. Shiltz, J. Woo, A. Nasiri, and C. Damm, “**Baselining the Energy Consumption of an Existing College Campus in a Feasibility Study of Achieving a Net-Zero Energy (NZE) Goal**”. *2015 Architectural Engineering Institute (AEI) Conference Proceedings*, ASCE, Milwaukee, WI, March 24-27, 2015.

3. C. Damm, E. Strobach, C. Robbins, A. Broch, R. Turner, and S. Hoekman, “**Development of the Renewable Energy Deployment and Display (REDD) Facility at the Desert Research Institute,**” *ASME 2014 8th International Conference on Energy Sustainability*, Boston, MA, June 30 - July 2, 2014.
4. C. Damm, A. Hjortland, S. Drozek, R. Enot, K. Rode, B. Jackson, and B. Steffes, “**Design, Installation, and Performance Characterization of a Laboratory Scale Solar Thermal System for Experiments in Solar Energy Utilization,**” *2012 ASME International Mechanical Engineering Congress and Exposition*, Houston, TX, November 9-15, 2012.
6. C.Damm, B. Steffes, J. Flotterud, J. Pfaff, M. Duffy, and M. Kaiser, “**A Micro-Combined Heat and Power Laboratory for Experiments in Applied Thermodynamics,**” *2011 ASME International Mechanical Engineering Congress and Exposition*, Denver, CO, November 11-17, 2011.
7. F. Betz, C. Damm, D. Archer, and B. Goodwin, “**Biodiesel-fueled Engine Generator with Heat Recovery,**” *ASME 2008 2nd International Conference on Energy Sustainability*, Jacksonville, FL, August 10-14, 2008.
8. B. Egan, S. Dechant, and C. Damm, “**Building as a Power Plant: Modeling and Selection of a Combined Heat and Power System for an Advanced Commercial Building,**” *114th ASEE Annual Conference and Exposition*, Honolulu, Hawaii, June 24-27 (2007).

Combustion/Air Contaminants/Pollution Related

9. A.W. Gertler, H.D. Kuhns, M. Abu-Allaban, C.J. Damm, J. Gillies, V. Etyemezian, R. Clayton, and D. Proffitt, “**A Case Study of the Impact of Winter Road Sand/Salt and Street Sweeping on Road Dust Re-Entrainment,**” *Atmospheric Environment* v. 40, pp. 5976-5985 (2006).
10. J. Choi, C. Damm, N. O’Donovan, R. Sawyer, C. Koshland and D. Lucas, “**Detection of Lead in Soil with Excimer Laser Fragmentation Fluorescence Spectroscopy**” *Applied Spectroscopy*, v. 59, n. 2, pp. 258-261 (2005).
11. C. J. Damm, D. Lucas, R. F. Sawyer, and C. P. Koshland, “**Characterization Of Diesel Particulate Matter With Excimer Laser Fragmentation Fluorescence Spectroscopy,**” *Proceedings of the Combustion Institute* 29, 2767-2774 (2002), presented at the 29th *International Symposium on Combustion*, Sapporo, Japan, July 21-26, 2002.
12. C.J. Damm, D. Lucas, R.F. Sawyer, and C.P. Koshland, “**Real-time Measurement of Combustion Generated Particles with Photofragmentation-Fluorescence,**” *Applied Spectroscopy*, v. 55, n. 11, pp. 1478-1482 (2001).
13. C.J. Damm, D. Lucas, R.F. Sawyer, and C.P. Koshland, “**Excimer Laser Fragmentation Fluorescence Spectroscopy as a Method for Monitoring Ammonium Nitrate and Ammonium Sulfate Particles,**” *Chemosphere*, v. 42, n. 5, pp. 655-661 (2001).
14. S.G. Buckley, C.J. Damm, W.M. Vitovec, L.A. Sgro, R.F. Sawyer, C.P. Koshland, and D. Lucas, “**Ammonia Detection and Monitoring with Fragmentation-Fluorescence,**” *Applied Optics*, v. 37, n. 36, pp. 8382 -8391 (1998).

Fluid Mechanics Related

15. M. Anderson, D. Shiltz, and C. Damm, “**Development of a Fluids Laboratory Experience in Dimensional Analysis and Similitude Applied to Vortex Shedding from a Cylinder in Cross-flow,**” *2013 ASME International Mechanical Engineering Congress and Exposition*, San Diego, CA, November 15-21, 2013.

A Selection of Invited Talks/Guest Lectures

1. *Milwaukee Area Technical College, HVAC Technician Associate Degree Program, “Inspection, Maintenance, and Safety of Gas-Fired Appliances,”* (1 week of HVAC2-144-200 course, *Service and Troubleshooting*), Oak Creek, WI, February 19, 2020.
2. *SAE A6-Aerospace Actuation, Control and Fluid Power Systems Annual Meeting, “Engineering Leadership Development in the SAE Chapter at MSOE,”* Milwaukee, WI, May 7, 2013.
3. *RiverEdge Science for Everyone Lecture Series, “Solar Energy Utilization,”* Cedarburg, WI, March 15, 2011.
4. *Quarterly Meeting of the Executive Committee of the Wisconsin Energy Research Consortium, “Energy Engineering in MSOE’s Mechanical Engineering Department,”* Milwaukee, WI, January 2011.

5. *2009 Renewable Energy Summit*, “**A Carbon Dioxide Emissions Assessment of Biofuels for the Transportation Sector**,” Milwaukee, WI, March 25, 2009.
6. *US Department of Energy-National Energy Technology Lab Symposium, Energy in Today’s Global Economy*, “**Energy Research Activities and Lab Development at the Milwaukee School of Engineering**,” Milwaukee, Wisconsin, October 9, 2008.
7. *RiverEdge Speaks Out Lecture Series*, “**Are Biofuels a Good Energy Choice?**” Mequon, WI, August 19, 2008.
8. *2008 Renewable Energy Summit*, “**Developing and Teaching a New Advanced Energy Technologies Course at the Milwaukee School of Engineering**,” Milwaukee, WI, March 13, 2008.
9. *2008 Renewable Energy Summit*, “**Green Engineering at the Milwaukee School of Engineering**,” Milwaukee, WI, March 14, 2008.
10. *Wisconsin Association of Energy Engineers Monthly Meeting*, “**Green Engineering at the Milwaukee School of Engineering**,” Milwaukee, WI, January 23, 2008.
11. *Hybridfest 2007*, “**Well-to-Wheel Emissions from Motor Vehicles with Alternative Propulsion Systems**,” Madison, WI, July 22, 2007.
12. *16th Annual Keep Greater Milwaukee Beautiful Environmental Business Seminar—Global Warming: Strategies for Wisconsin*, “**Plug-in Hybrids Using Renewable Energy—A Primer**,” Milwaukee, WI, May 11, 2007.
13. *6th Annual Green Colleges Workshop*, “**MSOE’s (Solar Electric) PV System**,” Milwaukee, WI, April 20, 2007.
14. *4th Annual Green Vehicle Workshop*, “**Carbon Dioxide Emissions from Passenger Motor Vehicles with Alternative Powertrain Systems**,” Milwaukee, WI, March 30, 2007.
15. Keynote Address at the Society of Automotive Engineer’s *Emissions: The Engineering Challenge* Technical Lecture Series, “**Well-to-Wheel Emissions from Motor Vehicles: A Discussion of the Performance of Alternative Propulsion Systems**,” Discovery World Digital Theater, Milwaukee, WI, January 24, 2007.

Externally Funded Projects

Since joining the MSOE faculty in 2004, Dr. Damm has authored or co-authored successful proposals for external grants totaling **\$4,686,000**. Of this sum, **\$726,000** was allocated for direct support of Dr. Damm’s activities involving undergraduate students.

Co-Principal Investigator, “Developing a Model of an NZE (Net Zero Energy) Campus in a Micro Grid Environment.” Collaborators: Dr. Bass Abushakra (PI, MSOE), Jeong Woo (co-PI, MSOE), and Adel Nasiri (co-PI, UWM). Funded by *Mid-West Energy Research Consortium* (mWERC). Award amount: \$75,000. Dr. Damm’s portion: \$19,600 (01/15/2014).

“Performance Characterization and Optimization of Integrated Renewable Energy and Efficient Building Energy Supply Systems,” Support for Summer Research, \$10K, *Desert Research Institute*, (2/21/2013)

“Advanced Microgrid Test Facilities in Milwaukee and Madison,” (a collaboration with UW-Madison, UW-Milwaukee, and Marquette University), funded by the *Wisconsin Energy Research Consortium*, \$100k, (1/19/2012)

Principal Investigator on “Solar Thermal Engineering Experimentation at MSOE,” funded by *We Energies*, \$18k (4/6/2011)

Principal Investigator on “Solar Thermal Energy Education, Design, and Implementation on MSOE Dormitory,” *Focus on Energy* Grant 36702/13805, \$18k (2/21/2011)

Principal Investigator on “The Design and Testing of Laboratory Scale Solar Energy Systems at MSOE,” funded by *We Energies*, \$12k (2/21/2011)

Principal Investigator on *Fluid Power Institute* Project #52301 “Applied Mechanical Incorporated Rooftop and Unit Efficiency Testing,” Four undergraduate ME students and one graduate MSE student were involved with the project, \$35k (9/1/2011)

Principal Investigator, partnered with the City of Milwaukee Office of Sustainability on a *US Department of Energy Solar America Cities Grant* that funded the installation of a solar hot water system for the MLH Dormitory on the MSOE campus. The total award amount was \$660k, a portion of which was used for the MSOE project titled, "Solar Water Heating Demonstration Projects and Best Practices Manual," Dr. Damm's portion: \$50k, (4/10/10)

Co-Principal Investigator on "New Energy Storage Technologies and Power Converter Topologies for Wind Turbines" funded by the *Southeastern Wisconsin Energy Technology Research Consortium (SWETRC)* \$85k, Dr. Damm's portion \$26k. (11/23/2009)

Principal Investigator on Fluid Power Institute Project #51203 (proprietary). Three undergraduate ME students were involved on this project, \$34k, (Summer/Fall 2007)

Co-Principal Investigator on "Measurement of Air Pollutant Emissions from Biodiesel Derived from Different Feedstocks" funded by *Pennsylvania Infrastructure Technology Alliance*, \$30k, (12/1/06)

Principal Investigator on "Solar Photovoltaic Applied Research" project funded by *We Energies* and *Wisconsin Focus on Energy*, \$133k (11/12/06)

Co-Principal Investigator on *US Department of Energy Advanced Building Efficiency Testbed Initiative*, a collaboration with Carnegie Mellon University, Texas A&M, and the University of Maryland. Funding \$950k in FY 2004, \$750k in FY 2005, \$990k for FY 2006, and \$750k for FY 2007. Total Funding: \$3.44M, Dr. Damm's portion: \$278k (2004-2007)

Principal Investigator on "Advanced Energy Technologies Laboratory Development," *A.O. Smith Corporation*, \$37k, (3/10/06)

Conference Papers and Presentations (not peer-reviewed)

1. B. Steffes, C. Chapman, B. Jackson, D. Neumann, N. Weber, and C. Damm, "**Design and Modeling of Combined Heat and Power Systems for Sustainable Urban Agriculture and Aquaculture,**" *2012 Green Energy Summit*, Milwaukee, WI, March 7-10, 2012.
2. A. Hjortland, S. Drozek, R. Enot, K. Rode, and C. Damm, "**Solar Energy Experiments and Modeling for Engineers,**" *2011 Green Energy Summit*, Milwaukee, WI, March 9-11, 2011.
3. A. Zelhofer, M. Peterson, N. Hanson, M. Ajax, T. Henke, and C. Damm, "**Supermileage: Student Project Vehicle at MSOE,**" *2011 Green Energy Summit*, Milwaukee, WI, March 9-11, 2011.
4. D. Neumann, C. Damm, and A. Nasiri, "**Power Smoothing for Wind Turbine Gearbox Stress Reduction,**" *2010 Green Energy Summit*, Milwaukee, WI, March 26-28, 2010.
5. A. Carlson, R. Lampe, W. Carnell and C. Damm, "**Hydraulic Regenerative Braking,**" *2009 Renewable Energy Summit*, Milwaukee, WI, March 25-27, 2009.
6. S. Krause, A. Zelhofer*, and C. Damm, "**Importance of Applied Green Education—The Supermileage Vehicle Challenge,**" *2009 Renewable Energy Summit*, Milwaukee, WI, March 25-27, 2009.
7. D. Archer, F. Betz, C. Damm, and J. Wiss, "**A Biodiesel-fueled CHP System for a Building Energy Supply,**" *4th Annual Advanced Stationary Reciprocating Engines Conference*, Downey, CA, September 18-19, 2007.
8. A. McMillen, G. Wrate, C. Damm, and C. Diggelman, "**Optimizing the Performance of a Photovoltaic Array by Evaluating Site-Specific Parameters,**" *Center for Alternative Energy and Technology 2007 Alternative Energy Symposium*, Chicago, IL, August 9-10, 2007.
9. Gertler, A., H. Kuhns, J. Gillies, C. Damm, M. Abu-Allaban, R. Clayton, and D. Proffitt, "**Road Dust Re-entrainment: The Impact of Winter Road Sand/Salt and Street Sweeping on Emissions,**" *Environmental Nuisances: Noise, Odour and Fugitive Dust Conference*, Mississauga, Ontario, Canada, May 9-11, 2005.
10. Etyemezian, V., A. Gertler, J. Gillies, H. Kuhns, C. Damm, C. Denney*, and J. Skotnik*, "**Methods To Assess Road Dust Resuspension and Results of Recent Studies,**" *15th CRC On-Road Vehicle Emissions Workshop*, San Diego, CA, April 4-6, 2005.

16. C.J. Damm, H.D. Kuhns and A.W. Gertler, “**An Assessment of Motor Vehicle Particulate Matter Emissions Measurements,**” *13th International Scientific Symposium on Transport and Air Pollution*, Boulder, Colorado, September 13-15 (2004).
17. H. Kuhns, C. Damm, J. Gillies, M. Abu-Allaban, R. Clayton, D. Proffitt, and A. Gertler, “**The Impact of Winter Road Sand/Salt and Street Sweeping on Road Dust Re-Entrainment,**” *13th International Scientific Symposium on Transport and Air Pollution*, Boulder, Colorado, September 13-15 (2004).
18. C.J. Damm, A. S. (Ed) Cheng, R. W. Dibble, D. Lucas, R.F. Sawyer, and C.P. Koshland, “**The Effect of Low Sulfur Diesel, Oxygenate-in-Diesel Blends, and Fischer-Tropsch Diesel on Particulate Matter Emissions from a Compression-Ignition Engine,**” *8th International Congress on Toxic Combustion Byproducts*, Umea, Sweden, June 17-19 (2003).
19. C.J. Damm, A. S. (Ed) Cheng, R. W. Dibble, D. Lucas, R.F. Sawyer, and C.P. Koshland, “**Particulate Matter Emissions Monitoring from a Compression-Ignition Engine Fueled with Low Sulfur Diesel, Oxygenate-in-Diesel Blends, and Fischer-Tropsch Diesel,**” *Third Joint Meeting of the U.S. Sections of The Combustion Institute*, Chicago, IL, March 16-19, 2003.
20. C.J. Damm, D. Lucas, R.F. Sawyer, and C.P. Koshland, “**Characterization of Diesel Particulate Matter with Photofragmentation Fluorescence,**” Paper 01F-11, *Combustion Institute Western States Fall Meeting*, Salt Lake City, Utah, October 15-16, 2001.
21. C.J. Damm, A. S. (Ed) Cheng, R. W. Dibble, D. Lucas, R.F. Sawyer, and C.P. Koshland, “**Photofragmentation-fluorescence Measurement of Particulate Emissions from a Diesel Engine Fueled by Oxygenate-in-Diesel and Fischer-Tropsch Diesel Blends,**” *7th International Congress on Toxic Combustion Byproducts*, Research Triangle Park, North Carolina, June 4-6, 2001.
22. C.J. Damm, D. Lucas, R.F. Sawyer, and C.P. Koshland, “**Monitoring Particulate Matter with Photofragmentation-fluorescence,**” *SAE Spring 2001 Fuels and Lubricants Meeting*, Orlando, Florida, May 7-9, 2001.
23. C.J. Damm, D. Lucas, R.F. Sawyer, and C.P. Koshland, “**Monitoring Diesel Particulate Matter with Photofragmentation-fluorescence,**” *2nd Joint Meeting of the U.S. Sections of the Combustion Institute*, Oakland, CA, March 25-28, 2001.
24. C.J. Damm, A. S. (Ed) Cheng, R. W. Dibble, D. Lucas, R.F. Sawyer, and C.P. Koshland, “**The Effect of Oxygenate-in-Diesel Blends and Fischer-Tropsch Diesel on Particulate Matter Emissions from a Compression-Ignition Engine,**” *2nd Joint Meeting of the U.S. Sections of the Combustion Institute*, Oakland, CA, March 25-28, 2001.
25. C.J. Damm, D. Lucas, R.F. Sawyer, and C.P. Koshland, “**Measurement of Combustion Generated Particles with Excimer Laser Fragmentation Fluorescence Spectroscopy,**” Paper 00S-6, *Combustion Institute Western States Spring Meeting*, Golden, CO, March 13-14, 2000.
26. C.J. Damm, D. Lucas, R.F. Sawyer, and C.P. Koshland, “**Excimer Laser Fragmentation Fluorescence Spectroscopy as a Method for Monitoring Ammonium Nitrate and Ammonium Sulfate Particle Concentrations,**” *6th International Congress on Toxic Combustion Byproducts*, Karlsruhe, Germany, June 27-30, 1999.
27. S.G. Buckley, C.J. Damm, W. Vitovec, L.A. Sgro, R.F. Sawyer, C.P. Koshland, and D. Lucas “**Ammonia Detection Using Photofragmentation-Fluorescence,**” Paper 98S-18, *Combustion Institute Western States Spring Meeting*, Berkeley, CA, March 23-24, 1998.
28. D.L. Bohac, T.S. Dunsworth, L.S. Shen and C.J. Damm*, “**The Energy Penalty of Sub-Slab Depressurization Radon Mitigation Systems,**” *1992 International Symposium on Radon and Radon Reduction Technology*, Minneapolis, MN, Sept. 22-25, 1992.

Notable Technical Reports

In addition to the published reports listed below, Dr. Damm has authored **45 technical reports since 2004** for clients of his consulting practice in the following areas: thermal fluid design, energy systems, sound measurement and analysis, environmental pollution, air contaminant control for a safe workplace, combustion and products of incomplete combustion, air pollution dispersion modeling, fuel systems, natural gas explosions, product safety analysis, engineering statics and dynamics.

1. B. Abushakra, J. Woo, C. Damm, D. Shiltz, S. Staffl, W. Zloza, and A. Nasiri, “**Developing a Model of a Net Zero Energy Campus in a Distributed Energy Resources and Systems (DERS) Environment,**” report for the *Mid-West Energy Research Consortium (MWERC)*, August 2015.
2. C. Damm, A. Hjortland, S. Drozek, K. Rode, and R. Enot, “**The Design and Testing of Laboratory Scale Solar Technology,**” report for *We Energies*, September 14, 2011.
3. C. Damm, T. Wanke, and K. Burgess, Fluid Power Institute Report #52103 “**Applied Mechanical Incorporated Rooftop and Unit Efficiency Testing,**” June 17, 2011.
4. A. Nasiri, C. Damm, and N. Demerdash, “**New Energy Storage Technologies and Power Converter Topologies for Wind Turbines,**” report for 2010 *Southeastern Wisconsin Energy Technology Research Consortium*, August 15, 2010.
5. H. Kuhns, J. Chow, V. Etyemezian, D. Trimble, S. Kohl, M. McClaren, M. Abu-Allaban, J. Gillies, A. Gertler, C. Damm, C. Denney, C. Gallery, and J. Skotnik, “**Lake Tahoe Particulate Matter Source Characterization Study,**” report for the California Air Resources Board (2004).
6. D.L. Bohac, L.S. Shen, T.S. Dunsworth, and C.J. Damm, “**Radon Mitigation Cost Penalty Research Project,**” Report TR91-4-SF, Minnesota Building Research Center, University of Minnesota, Minneapolis, MN, 1991.

Notable Conference Poster Presentations

1. C. Scanlon and C. Damm “**MSOE’s Supermileage Vehicle Project,**” *2013 Sustainability Summit*, Milwaukee, WI, March 6-8, 2013.
2. M. Krause, C. Dostal, C. Nitz, C. Scanlon, and C. Damm, “**Milwaukee School of Engineering’s SAE Design Project: The Supermileage Vehicle Team,**” *2012 Green Energy Summit*, Milwaukee, WI, March 7-10, 2012.
3. M. Chang, H. Kuhns, J. Chow, J. Watson, N. Nussbaum, C. Damm, C. Gallery, C. Denney, and J. Skotnik, “**Characterization of Emissions from Vehicle Exhaust and Road Dust in Lake Tahoe, NV,**” *American Association for Aerosol Research 2003 Annual Conference*, Anaheim, California, October 20-24, 2003.
4. D. Lucas, C.J. Damm, R.F. Sawyer, and C.P. Koshland, “**Photofragmentation Fluorescence Spectroscopy for Real-time Monitoring of Diesel Particulate Emissions,**” *11th Gordon Research Conference on Laser Diagnostics for Combustion Research*, South Hadley, Massachusetts, July 1-6, 2001.
5. C.J. Damm, D. Lucas, R.F. Sawyer, and C.P. Koshland, “**Laser Monitoring of Toxic Airborne Pollutants,**” *Annual NIEHS/EPA Basic Research and Training Meeting*, Berkeley, CA, January 30, 2001.
6. C.J. Damm, D. Lucas, R.F. Sawyer, and C.P. Koshland, “**Real-time Measurement of Combustion Generated Particles with Photofragmentation-Fluorescence Spectroscopy,**” *28th International Symposium on Combustion*, Edinburgh, Scotland, July 30–August 4, 2000.
7. S.G. Buckley, C.J. Damm, W.M. Vitovec, L.A. Sgro, R.F. Sawyer, C.P. Koshland, and D. Lucas, “**Ammonia Detection and Monitoring Using Photofragmentation-Fluorescence,**” *27th International Symposium on Combustion*, Boulder, CO, Aug. 2-7, 1998.

University Service

Milwaukee School of Engineering—

Faculty Senate (2018-2020)

Director of the Mechanical Engineering Program (2014-2019)

Member of the Council on Academic Planning (2015-2019)

Member of the Program Director’s Council (2017-2019)

-Chair of the Strategic Initiatives Working Group

Member of the Strategic Planning Committee (2017)

-Co-chair of the Scholarly Activities/Research Task Force

Chair of the Mechanical Engineering Program Committee (2014-2019)

Chair of the Mechanical Engineering Department Energy Committee (2011-2014)

Chair of the Mechanical Engineering Department Promotion Committee (2014-15)

Faculty Advisor of the student chapter of SAE International (2004-Present, Awarded Honeywell

Outstanding Collegiate Branch Award in 2011, 2012, 2014, 2017, 2018 and the Award of Excellence in 2015 by SAE International)

Faculty Advisor for Society of Automotive Engineers Supermileage Vehicle Team (2008-2020)

Faculty Search Committee (Chair 2018, Chair 2017, 2016, Chair 2014, 2012, 2010, 2009)

Departmental Peer Review Committee Chair (2016, 2013, 2012, 2011, 2007)

University Scholars (honors program) Committee (2010)

Ad-hoc Committee on Renewable Energy (2005-2008)

Women Recruitment Sub-committee (co-chair) (2008-2009)

Mechanical Engineering Department Energy Committee (2004-2020)

Mechanical Engineering Program Academic Advisor (2005-2020)