

David C. Denkenberger

Education:

University of Colorado at Boulder

Boulder, CO

Ph.D. in **Civil Engineering (effectively Architectural, but not available then)** August 2010

Building Systems Program: courses in distributed electrical generation, sustainable building design, energy policy, etc; thesis on a novel heat exchanger with broad applications

Princeton University

Princeton, NJ

M.S.E. in **Mechanical and Aerospace Engineering** May 2005

Emphasis in fluid mechanics; thesis on optimizing wind turbines

The Pennsylvania State University, Schreyer Honors College

University Park, PA

B.S. in **Engineering Science** May 2002

Interdisciplinary major stressing science and engineering fundamentals: firm basis in mechanics, materials, electromagnetism, thermodynamics, electrical engineering, computer science, and modern physics. Specialized courses: artificial neural networks, green engineering, technology-based entrepreneurship, and microelectromechanical systems (MEMS); thesis on compound parabolic concentrators for solar devices

Economics Minor

Including environmental economics and the economics of developing countries

Research Experience:

Assistant Professor

Fall 2015 – Present

Tennessee State University

- Energy efficiency and renewable energy

President/Founder

Summer 2006 – Present

Denkenberger Inventing and Consulting, LLC

- Research and consulting on energy efficiency and renewable energy

Technical Consultant

Fall 2010 – Fall 2014

Ecova (Research and Policy Division), Durango, CO

- Led effort on clothes dryer energy efficiency including proposal writing, laboratory oversight, project management, prototype design, and policy development
- Led effort on consumer and industrial battery charger system energy efficiency including building wiring loss, power factor, laboratory oversight, and policy development
- Assisted with other projects including computers, power factor for all electronics, small network equipment, variable speed drives, pools, net zero energy, and lighting

Ph.D. Research Assistant

Fall 2005 – Summer 2010

University of Colorado at Boulder

- Conceived of novel microchannel heat exchanger and manufacturing technique for high efficiency and low cost; prototyped, tested, and modeled in Matlab the heat exchanger

Masters Research Assistant

Fall 2002 - Summer 2005

Princeton University

- Developed computer code to optimize the rated speed of wind turbines when the turbine is part of an array, connected to a long transmission line, connected to a compressed air energy storage system, and affecting global climate (slowing wind down and adding turbulence)

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Undergraduate Summer Researcher

Summers 1999, 2000

Pennsylvania State University

- Conducted independent research projects dealing with photovoltaic concentrators and light emitting diodes, including patent and journal searches and computer modeling (40 hours per week)

Teaching Experience:

Assistant Professor

Fall 2015 – Present

Tennessee State University

- Courses include: Engineering Design, Advanced HVAC, Introduction HVAC, Green Buildings, Lighting and Power Design, Fundamentals of Engineering review, Freshman Engineering Seminar, Engineering Computer Graphics, and Mechanics of Materials.

SAT/GRE Test Preparation Instructor

Spring 2009-Summer 2010

Sherwood Test Prep, Boulder, CO

- Taught classes (three hours per week)

Math/Science/Economics/Engineering Tutor

Spring 2008, Fall 2009-Spring 2010

Boulder, CO

- Three hours per week

Earn-Learn Apprentice for the class Sustainable Building Design

Spring 2008

University of Colorado

- Graded, coordinated real-world design project, gave guest lecture (12 hours per week)

Introductory Engineering Course Lab Assistant / Teaching Intern

Semesters 1998 – 2002

Pennsylvania State University

- Assistant: Answered student questions in class and held office hours (total 6 hours per week)
- Intern (spring 1999): Gave several lectures, assisted preparing tests and grading (10 hours per week)

Teaching Assistant / Counselor for Pennsylvania Governor's School for the Sciences

Summers 1999, 2000

Carnegie Mellon University

- Graded and helped with physics homework and organized activities (60 hours per week)

Other Professional Experience:

Residence life co-director for Pennsylvania Governor's School for the Sciences

Summers 2001, 2002

Carnegie Mellon University

- Managed the teaching assistants / counselors, housing, and accounting (70 hours per week)

Applied Research Laboratory Intern

Summer 1998

Pennsylvania State University

- Prepared experiments, performed CAD and microscopy (40 hours per week)

Certifications:

Professional Engineer in Tennessee in Architectural Engineering: May 2017

Leadership in Energy and Environmental Design (LEED) Green Associate: July 2016

Professional Membership:

David C. Denkenberger

American Society of Heating, Refrigerating, and Air Conditioning Engineers: since December 2006

Funding Raised:

Pacific Gas & Electric: commercial clothes dryer technology and policy: \$200,000 (2017)

Pacific Gas & Electric: commercial clothes dryer technology and policy: \$400,000 (2015-2016)

Pacific Gas & Electric: battery charger energy technology and policy: \$14,000 (2015)

Northwest Energy Efficiency Alliance: heat pump versus electric resistance clothes dryer clothing wear and tear: \$25,000 (2015)

Appliance Standards Awareness Project: energy technology and policy for: computers, air and natural gas compressors, air conditioning and heat pumps, wine coolers, and portable cooling: \$12,000 (2015)

Pacific Gas & Electric: Small Network Equipment Energy Technology and Policy: \$50,000 (2014)

Pacific Gas & Electric: Prototyping Efficient Clothes Dryer: \$180,000 (2012-2013)

Northwest Energy Efficiency Alliance: Clothes Dryer Restricted Duct Testing: \$90,000 (2012-2013)

New York State Energy Development Authority: Microchannel Heat Recovery Ventilator for Vehicles: \$50,000 (2012-2014)

Collaborative Labeling and Appliance Standards Project: Clothes Dryers Testing: \$105,000 (2011-2012)

Natural Resources Defense Council: Clothes Dryers Testing and Test Procedure Development: \$60,000 (2011)

University of Colorado Technology Transfer Office Proof of Concept Grant: Microchannel Heat Exchanger: \$30,000 (2009-2010)

American Society of Heating, Refrigerating, and Air Conditioning Engineers Graduate Research Fellowship: \$10,000 (2008-2009)

Blue Wave Energy, Orange Park, Florida: Feasibility of Novel Energy Storage Devices: \$5,000 (2008)

Vestergaard Frandsen, Lausanne, Switzerland: Passive Solar Devices: \$20,000 (2006-2007)

National Science Foundation Graduate Research Fellowship: \$38,000 per year for three years (2003-2006)

Goldwater Scholarship: national undergraduate fellowship awarded to only 309 students (\$7500 per year for two years: 2000-2002)

Honors:

Pennsylvania State University Distinguished Alumnus

Marshal of Engineering Science Class of 2002, Pennsylvania State University

National Merit Scholarship (\$2000 in 1997 – 1998)

Consulting:

President/Founder of Denkenberger Inventing and Consulting, LLC: incorporated 2006

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Selected Peer-Reviewed Publications (out of 40) (over 1000 citations, h-index = 13):

1. "Performance Analysis of "V"- Type Solar Still with Tilt Wick and Effect of Wick Coverage," *Cogent Engineering*, forthcoming, P. Suneesh, R. Jayaprakash, S. Kumar, D. Denkenberger.
2. "Effects of Concentrator Type and Encapsulated Phase Change Material on the Performance of Different Solar Stills: An experimental approach," *Desalination and Water Treatment*, forthcoming, T. Arunkumar, R. Velraj, D. Denkenberger, R. Sathyamurthy, K. Vinothkumar, A. Ahsan.
3. "Performance Enhancement of Solar Still Through Efficient Heat Exchange Mechanism- A Review," *Applied Thermal Engineering*, Vol 114, 815–836, 2016, A. Kabeel, T. Arunkumar, D. Denkenberger, R. Sathyamurthy.
4. "Geospatial Analysis of Lake Water Quality Parameters in Selangor, Malaysia Using GIS," *Journal of Desalination and Water Purification*, forthcoming, A. Adeleke, A. Ahsan, N. Daud, A. Latiff, D. Denkenberger, D. Zawawi, F. Daud.
5. "Influence of Crescent Shaped Absorber in Water Desalting System," *Desalination*, Vol 398, 208–213, 2016, T. Arunkumar, R. Velraj, D. Denkenberger, R. Sathyamurthy.
6. "Augmentation of Distillate Yield in "V" Type Inclined Wick Solar Still with Cotton Gauze Cooling Under Regenerative Effect," *Cogent Engineering*, Vol 3, No 1, 2016, P. Suneesh, J. Paul, R. Jayaprakash, S. Kumar, D. Denkenberger.
7. "Productivity Enhancements of Compound Parabolic Concentrator Tubular Solar Stills," *Renewable Energy*, 88, 391-400, 2016, T. Arunkumar, D. Denkenberger, R. Sathyamurthy, K. Vinothkumar, A. Ahsan.
8. "Effect of Parabolic Solar Energy Collectors for Water Distillation," *Desalination and Water Treatment*, vol. 57, no. 45, 21234-21242, 2016, T. Arunkumar, A. Ahsan, A. Khalifa, S. Shams, D. Denkenberger, R. Sathyamurthy.
9. "Effect of Heat Removal on Tubular Solar Desalting System" *Desalination*, 379, 24-33, 2016, T. Arunkumar, R. Velraj, D. Denkenberger, R. Sathyamurthy, K. Vinothkumar, A. Ahsan, K. Porkumaran.
10. "Educational Pathways to Remote Employment in Isolated Communities Journal of Human Security," *Journal of Human Security*, 11.1, 34-44, 2015, D. Denkenberger, J. Way and J. Pearce.
11. "Solar Photovoltaic Powered On-Site Ammonia Production for Nitrogen Fertilization" *Solar Energy*, 122, 562-568, 2015, Z. Du, D. Denkenberger and J. Pearce.
12. "Experimental Study on a Parabolic Concentrator Assisted Solar Desalting System" *Energy Conversion and Management*, 105, 665-674, 2015, T. Arunkumar, D. Denkenberger, H. Tanaka, and R. Sathyamurthy.
13. "The Time is Ripe for Paying Attention to Clothes Drying Technology and Policy in Relation to Efficiency and Drying Time" *Proceedings of the American Council for an Energy-Efficient Economy: Summer Study*, August 2014, D. Denkenberger, C. Calwell, A. Pawashe, D. Thomsen, B. Spak, G. Fernstrom.
14. "Reviving the War of Currents: Opportunities to Save Energy with DC Distribution in Commercial Buildings" *Proceedings of the American Council for an Energy-Efficient Economy: Summer Study*, August 2014, S. Foster Porter, C. Mercier, P. May-Ostendorp, D. Denkenberger, P. Turnbull.
15. "Towards Low-Cost Microchannel Heat Exchangers: Vehicle Heat Recovery Ventilator Prototype" *Proceedings of the 10th International Conference on Heat Transfer, Fluid*

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- Mechanics and Thermodynamics* (HEFAT), July 2014, Orlando, FL, USA; D. Denkenberger, M. Parisi, J. Pearce.
16. "Effect of Air Flow on "V" Type Solar Still with Cotton Gauze Cooling," *Desalination*, 337, 1–5, 2014, P. Suneesh, R. Jayaprakash, T. Arunkumar, D. Denkenberger.
 17. "Battery Charger Systems: The Next Cross-cutting Policy Opportunity to Address Plug Load Energy Use," 7th International Conference on Energy Efficiency in Domestic Appliances and Lighting (EEDAL'13), 11-13 September 2013, Coimbra, Portugal; S. Foster Porter and D. Denkenberger.
 18. "The Augmentation of Distillate Yield by Using Concentrator Coupled Solar Still with Phase Change Material," *Desalination*, 314, 189–192, 2013, T. Arunkumar, D. Denkenberger, A. Ahsan, R. Jayaprakash.
 19. "Effect of Water and Air Flow on Concentric Tubular Solar Water Desalting System," *Applied Energy*, 103, 109–115, 2013, T. Arunkumar, R. Jayaprakash, A. Ahsan, D. Denkenberger, M. Okundamiya.
 20. "What Lurks Beneath: Energy Savings Opportunities from Better Testing and Technologies in Residential Clothes Dryers," *Proceedings of the American Council for an Energy-Efficient Economy: Summer Study*, August 2012, D. Denkenberger, S. Mau, C. Calwell, E. Wanless, and B. Trimboli.
 21. "Capturing Plug Load Energy Savings with a Wide Net: Horizontal Policy Lessons Learned and Future Opportunities," *Proceedings of the American Council for an Energy-Efficient Economy: Summer Study*, August 2012, S. Foster Porter, C. Calwell, J. Swofford, P. Walters, D. Denkenberger, and E. Lighthiser.
 22. "An Experimental Study on a Hemispherical Solar Still," *Desalination* 2012; 286, 342-348. T. Arunkumar, R. Jayaprakash, D. Denkenberger, A. Ahsan, M. Okundamiya, S. Kumar, H. Tanaka, H. Aybar.
 23. "Optimization of Specific Rating for Wind Turbine Arrays Coupled to Compressed Air Energy Storage," *Applied Energy*, S. Succar, D. Denkenberger, R. Williams, 96, 222–234, 2012.
 24. "Expanded Microchannel Heat Exchanger: Design, Fabrication, and Preliminary Experimental Test," *Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy*, D. Denkenberger, M. Brandemuehl, J. Pearce and J. Zhai, Vol 226, No 4, June 2012.
 25. "Baseload Wind Energy: Modeling the Competition between Gas Turbines and Compressed Air Energy Storage for Supplemental Generation," *Energy Policy* Vol 35, 1474-1492, 2007, J. Greenblatt, S. Succar, D. Denkenberger, R. Williams, and R. Socolow.
 26. "Compound Parabolic Concentrators for Solar Water Heat Pasteurization: Numerical Simulation," *Proceedings of the Solar Cookers International Conference* in Granada, Spain, July 12-16 2006, D. Denkenberger and J. Pearce.
 27. "Numerical Simulation of the Direct Application of Compound Parabolic Concentrators to a Single Effect Basin Solar Still," *Proceedings of the Solar Cookers International Conference* in Granada, Spain, July 12-16 2006, J. Pearce and D. Denkenberger.
 28. "The Influence of Large-Scale Wind-Power on Global Climate," *Proceedings of the National Academy of Sciences*, 2004, D. Keith, J. DeCarolis, D. Denkenberger, et al.

Selected Other Publications (Out of 38):

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1. "Commercial Tumble Dryers, Response to Draft Staff Proposal and Stakeholder Comments." S. Foster Porter, D. Denkenberger and E. Jerome, Docket #17-AAER-01 for the California Energy Commission, September 2016.
2. "Energy Efficiency Test Procedure for Commercial Tumble Dryers," S. Foster Porter, D. Denkenberger, E. Elliott, E. Jerome and M. Hunt, Docket #17-AAER-01 for the California Energy Commission, June 2017.
3. "Commercial Tumble Dryers, Codes and Standards Enhancement (CASE) Initiative for PY 2016: Title 20 Standards Development, Analysis and Test Procedure Proposal for Commercial Tumble Dryers." S. Foster Porter and D. Denkenberger, Docket #12-AAER-2D for the California Energy Commission, December 2016.
4. Optimizing Wind Turbines for Arrays, Storage, and Transmission Lines: The Missing Links between Wind Turbines and the Larger System, D. Denkenberger, Lap Lambert Academic Publishing, 84 pages, Saarbrücken, Germany, 2016, ISBN: 978-3-659-95535-8.
5. "Super Efficient Dryer Testing and Analysis" Prepared for the Northwest Energy Efficiency Alliance by D. Thomsen, D. Denkenberger, and J. Colett, 2015.
6. "Microchannel Heat Recovery Ventilator for Ground Vehicles," Prepared for the New York State Energy Research and Development Authority (NYSERDA) by D. Denkenberger and J. Pearce, 2014.
7. "A Call to Action for More Efficient Clothes Dryers: U.S. Consumers Missing out on \$4 Billion in Annual Savings" Prepared for the Natural Resources Defense Council, N. Horowitz, C. Calwell, D. Denkenberger, B. Spak, 2014.
8. "Emerging Technology Dryer Testing" Prepared for the Northwest Energy Efficiency Alliance by D. Denkenberger, C. Calwell, B. Trimboli, D. Driscoll, 2013.
9. "Analysis of Standards Proposal for Small Network Equipment: Codes and Standards Enhancement (CASE) Initiative," G. Hardy, D. Denkenberger, J. Swofford, S. Foster Porter, K. Dayem, and D. Driscoll, 2013.
10. "Analysis of Potential Energy Savings from Heat Pump Clothes Dryers in North America," D. Denkenberger, C. Calwell, N. Beck, B. Trimboli, D. Driscoll, C. Billingsley, C. Wold, and C. Granda. Ecova for The Collaborative Labeling Appliance Standards Project, 2013.
11. "DC Distribution Market, Benefits, and Opportunities Residential and Commercial Buildings," D. Denkenberger, D. Driscoll, E. Lighthiser, P. May-Ostendorp, B. Trimboli, P. Walters, Ecova for Pacific Gas & Electric, October 2012.
12. "Pools and Hot Tubs: Don't Drown in your Utility Bills," D. Denkenberger, D. Houghton, and B. Preston, Ecova for National Rural Electric Co-op Association, October 2012.
13. "Power Factor Correction: An Energy Efficiency Perspective," Asia-Pacific Partnership Project G3A, 2011. D. Denkenberger, E. Lighthiser.
14. "Battery Chargers: Getting Energized About Efficiency," Asia-Pacific Partnership Project G3A, 2011. D. Denkenberger, E. Lighthiser.
15. "Power Scaling in Proportion to Data Processing," Asia-Pacific Partnership Project G2, 2011. C. Calwell, J. Swofford, M. Krick, E. Wanless, and D. Denkenberger.
16. "Residential Clothes Dryers: A Closer Look at Energy Efficiency Test Procedures and Savings Opportunities," (and technical addendum) Report for Natural Resources Defense Council, November 9, 2011. D. Denkenberger, S. Mau, C. Calwell, and E. Wanless.
17. *Low-cost high-effectiveness microchannel heat exchanger: Fabrication, modeling, and validation*. Dissertation, University of Colorado at Boulder, 2010, D. Denkenberger.
18. "Found in Translation: A New Language for Energy Efficiency Retrofits," *The Journal of Policy Engagement*, Vol 1, No 2, 9-13, May 2009, J. Pearce, T. Carpenter, and D. Denkenberger.

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19. "Accelerating Applied Sustainability by Utilizing Return on Investment for Energy Conservation Measures," *International Journal of Energy, Environment and Economics*, Vol 17 No 1, 61-80, J. Pearce, D. Denkenberger, and H. Zielonka.
20. "Energy Conservation Measures as Investments," in Spadoni, Giacomo, editor, Energy Conservation: New Research, Nova Science Publishers: Hauppauge, NY, 67-85, 2009. ISBN: 978-1-60692-231-6, J. Pearce, D. Denkenberger, and H. Zielonka.
21. "An Integrated Optimization of Large-Scale Wind with Variable Rating Coupled to Compressed Air Energy Storage," *Proceedings of AWEA Windpower 2006*, Pittsburgh, PA, June, 2006, S. Succar, D. Denkenberger, J. Greenblatt, and R. Williams.
22. *Optimal wind turbine rated speed taking into account array effects, the larger system, and climate impacts*. Master's Thesis, Princeton University, 2005, D. Denkenberger.
23. "Optimal Wind Turbine Rated Speed Taking into account Array Effects and Capacity Factor," *Proceedings of the 2004 Electric Power Conference*, Baltimore, Maryland, March 2004, D. Denkenberger.
24. "Toward Optimization of a Wind/Compressed Air Energy Storage (CAES) power system," *Proceedings of the 2004 Electric Power Conference*, Baltimore, Maryland, March 2004, S. Succar, D. Denkenberger, J. Greenblatt, and R. Williams.
25. "Optimization Of Compound Parabolic Concentrators For Solar Cells, Cooking, And Water Pasteurization." Baccalaureate Thesis, Department of Engineering Science and Mechanics, The Pennsylvania State University, The Schreyer Honors College, 2001, D. Denkenberger.
26. "Optimization of Compound Parabolic Concentrators for Solar Cells, Cooking, and Water Pasteurization." *Proceedings of The National Conference on Undergraduate Research*, Lexington, Kentucky, March 2001, D. Denkenberger.
27. "Revenue-Neutral Taxation Policy which Encourages Economical and Environmentally Beneficial Products." Innovations and Materials for Green Engineering 185-202 (2001), D. Denkenberger.

Patent Disclosures:

1. "High Effectiveness Microchannel Polymer Heat Exchanger," Invention disclosure to University of Colorado at Boulder, September 2008, D. Denkenberger. (Now patented, and licensed to Academic Technology Ventures, who formed a startup company based on the technology).
2. "Method for Mitigating Barriers in the Acquisition of Products and Services with High Upfront Costs and Low Total Ownership Costs," Provisional patent application submitted to the U.S. Patent Office September 2001, D. Denkenberger, S. Bilen, A. Shindyapin.
3. "Compound Parabolic Concentrators Applied to Light Emitting Diodes." Invention disclosure to the Pennsylvania State University, June 2000, D. Denkenberger.
4. Eight more disclosures that are not yet public

Selected External Presentations (Out of 70):

1. "High Efficiency Low Cost Microchannel Heat Exchanger Commercialization," to Magna (automotive supplier), Online, May 2017.
2. "High Efficiency Low Cost Microchannel Heat Exchanger Commercialization," to Tenneco (vehicle part manufacturer), Online, September 2016.

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3. "Commercial Clothes Dryers Test Procedure Project Update," Presentation to the California Energy Commission and Southern California Gas Company, online, co-presenter with S. Foster Porter, E. Jerome and E. Elliot, May 26, 2016.
4. "Commercial Clothes Dryers Test Procedure Update," Presentation to the California Energy Commission and Pacific Gas and Electric, San Ramon, CA, co-presenter with S. Foster Porter, April 13, 2016.
5. "Commercial Clothes Dryers Test Procedure Update," Presentation to the California Energy Commission, online, co-presenter with E. Elliot and S. Foster Porter, March 30, 2016.
6. "Commercial Clothes Dryers Test Procedure Update," Presentation to the California Energy Commission, online, co-presenter with E. Elliot and S. Foster Porter, March 8, 2016.
7. "Commercial Clothes Dryers Test Procedure Update," Presentation to the California Energy Commission, online, co-presenter with E. Elliot and S. Foster Porter, January 28, 2016.
8. "Commercial Clothes Dryer Energy Efficiency," Presentation to Pacific Gas and Electric, San Ramon, CA, co-presenter with S. Foster Porter, January 6, 2016.
9. "Commercial Clothes Dryer Energy Efficiency," Presentation to the California Energy Commission, Sacramento, CA, co-presenter with S. Foster Porter, January 5, 2016.
10. "Battery Charger Test Procedure and Standard Improvement Opportunities," Presentation to the Department of Energy meeting on Battery Chargers, Washington, DC, September 2015.
11. "Clothes Dryer Test Procedure Improvement Opportunities," Presentation to the Department of Energy meeting on Test Procedures for Residential Clothes Dryers, Washington, DC, November 2014.
12. "The Time is Ripe for Paying Attention to Clothes Drying Technology and Policy in Relation to Efficiency and Drying Time," American Council for an Energy-Efficient Economy: Summer Study, August 2014, Pacific Grove, CA, USA.
13. "Towards Low-Cost Microchannel Heat Exchangers: Vehicle Heat Recovery Ventilator Prototype," 10th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT), July 2014, Orlando, FL, USA.
14. "Small Network Equipment Tear-Down Investigation," Online Presentation for the California Energy Commission, June 2014.
15. "Applicability of DOE Battery Charger Test Procedure to Wireless Devices," Online Presentation for Natural Resources Canada, April 2014.
16. "Towards Low-Cost, High-Effectiveness Microchannel Expanded Heat Exchangers," Online Presentation for University of Maryland AHX Consortium Meeting, March 2013.
17. "Emerging Technology Award Dryer Testing," Given remotely to Pacific Gas and Electric, June 2013.
18. "Emerging Technology in Dryers," *Efficiency Connections Northwest*, Spokane, WA, October 2012.
19. "What Lurks Beneath: Energy Savings Opportunities from Better Testing and Technologies in Residential Clothes Dryers," *American Council for an Energy-Efficient Economy: Summer Study*, Pacific Grove, CA, August 2012.
20. "Possible Heat Pump Dryer Configurations," *American Council for an Energy-Efficient Economy: Summer Study*, Pacific Grove, CA, August 2012.
21. "Energy Efficiency Opportunities with Nickel Batteries," Presentation to the Department of Energy meeting on Energy Conservation Standards for Battery Chargers and External Power Supplies, Washington, DC, May 2012.
22. "Overview of Title 20 California Efficiency Standards for Battery Charger Systems and Implications for UPAMD," Universal Power Adapter for Mobile Devices (UPAMD)

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- Working Group of the Institute of Electrical and Electronics Engineers, S. Foster Porter and D. Denkenberger, February 2012.
23. "The Importance of Test Procedures and Efficiency Metrics for Securing Cost Effective Energy Savings from Clothes Dryers," Super Efficient Clothes Dryer Summit, Washington, DC, September 2011.
 24. "High Efficiency Low Cost Microchannel Heat Exchanger Commercialization," to SUTIMCO (University patent development company), Durango, CO, and Santa Ana, CA (phone), April 2011.
 25. "Compound Parabolic Concentrators for Solar Water Heat Pasteurization," Presentation to the company Vestergaard Frandsen, Laussane, Switzerland, August 2006.
 26. "Compound Parabolic Concentrators for Solar Water Heat Pasteurization: Numerical Simulation," Solar Cookers International Conference in Granada, Spain, July 2006.
 27. "Numerical Simulation of the Direct Application of Compound Parabolic Concentrators to a Single Effect Basin Solar Still," Solar Cookers International Conference in Granada, Spain, July 2006.
 28. "'Derating' of Wind Turbines to Reduce Cost of Energy in Large Arrays with Long-Distance Transmission," (Poster) American Wind Energy Association Conference, Pittsburgh, Pennsylvania, June 2006.
 29. "Optimal Wind Turbine Rated Speed Taking into Account Array Effects and the Larger System," National Renewable Energy Laboratory, National Wind Technology Center, Boulder, CO, January 2006.
 30. "Wind Turbine Rated Speed Optimization and Future Work," Building Systems Program seminar, Boulder, CO, March 2005.
 31. "Optimal Wind Turbine Rated Speed Taking into account Array Effects and Capacity Factor," 2004 Electric Power Conference, Baltimore, Maryland, March 2004.
 32. "Optimization of Compound Parabolic Concentrators for Solar Cells, Cooking, and Water Pasteurization," The National Conference on Undergraduate Research, Lexington, Kentucky, March 2001.

Internal Presentations:

1. "Food and Engineering Projects," Research symposium at Tennessee State University, Nashville, TN, September 2015.
2. "Energy Savings from Research and Policy," Given to hundreds of Ecova employees remotely, June 2013.
3. "Emerging Technology in Dryers," Ecova, Spokane, WA, October 2012.
4. "The Economics of Progressive Efficiency," Ecova, Durango, CO, April 2011.
5. "Introduction to Statistics," Ecova, Durango, CO, October 2011.
6. "Cost Effectiveness," Ecova, Durango, CO, July 2011.
7. "Are We Missing Energy Savings in Clothes Dryers?" Ecova, Durango, CO, November 2010.
8. "High Efficiency Low Cost Microchannel Heat Exchanger Commercialization," University of Colorado Technology Transfer Office, Boulder, CO, July 2010.
9. "High Efficiency Low Cost Microchannel Heat Exchanger," Dissertation Defense, Boulder, CO, July 2010.
10. "Food: The Environmental Connections," Building Systems Program seminar, Boulder, CO, October 2009.

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11. "High Efficiency Low Cost Microchannel Heat Exchanger," University of Colorado Technology Transfer Office, Boulder, CO, May 2009.
12. "Transportation and Urban Planning," Building Systems Program seminar, Boulder, CO, February 2009.
13. "Introduction to Phoenics," Computational Fluid Dynamics guest lecture, Boulder, CO, January 2009.
14. "Costs and Land Use of Buildings," Sustainable Building Design guest lecture, Boulder, CO, April 2008.
15. "Global Warming, Poverty, and Rainforests," Building Systems Program seminar, Boulder, CO, February 2008.
16. "Environmental Orders of Magnitude," Building Systems Program seminar, Boulder, CO, December 2007.
17. "Humans Being Natural is Bad for Nature," Building Systems Program seminar, Boulder, CO, November 2007.
18. "A Fresh Look at Preventing Climate Change," Institute of Arctic and Alpine Research talk, Boulder, CO, September 2007.
19. "A Fresh Look at Preventing Climate Change," Building Systems Program seminar, Boulder, CO, April 2007.
20. "Transportation and Urban Planning," Building Systems Program seminar, Boulder, CO, November 2006.
21. "Environmental Orders of Magnitude," Building Systems Program seminar, Boulder, CO, April 2006.
22. "Global Warming, Poverty, and Rainforests," Building Systems Program seminar, Boulder, CO, September 2005.
23. "Some Economics of Global Warming," Carbon Mitigation Initiative talk, Princeton, New Jersey, June 2005.
24. "Introduction to Wind Turbine Technology and Climate Impacts," Carbon Mitigation Initiative talk, Princeton, New Jersey, March 2004.
25. "Optimizing Compound Parabolic Concentrators for Solar Cells, Solar Cookers, and Solar Water Pasteurizers," Undergraduate Research (Poster), University Park, Pennsylvania, April 2001.
26. "Optimizing Compound Parabolic Concentrators for Solar Cells, Solar Cookers, and Solar Water Pasteurizers," Undergraduate Thesis Defense, University Park, Pennsylvania, April 2001.

Computer Skills:

Computer Aided Drawing: IronCad, Silverscreen, Autodesk Inventor

Computer languages: Matlab, Fortran, Pascal

Other software: Phoenics (Computational Fluid Dynamics), eQUEST (Building Energy Modeling), Dragon NaturallySpeaking, Vision (finance), GoTo, Skype, Analytica (probabilistic modeling), Microsoft Word, Excel, Power Point, Outlook, and SharePoint

Time management: use time efficiency tricks and have trained colleagues

Reviewer:

David C. Denkenberger

Journal reviewer:

1. *International Conference on Building Energy and Environment*
2. *Applied Thermal Engineering*
3. *International Journal for Service Learning in Engineering*
4. *Environmental Science and Technology*
5. *Consortium: A Journal of Crossdisciplinary Inquiry*
6. *Water and Environment Journal*
7. *Energy Efficiency Journal*
8. *Journal of Renewable and Sustainable Energy*
9. *American Council for an Energy-Efficient Economy Summer Study*
10. *International Journal of Energy and Environmental Engineering*
11. *International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics*
12. *ASME International Mechanical Engineering Congress & Exposition*
13. *Journal of Mechanical Engineering Science*
14. *Futures*
15. *Applied Energy*
16. *International Journal of Energy Research*
17. *Materials and Design*
18. *Solutions Journal*
19. *International Journal of Science and Technology*
20. *Tenside Surfactants Detergents*
21. *Computers & Chemical Engineering*
22. *Heat Transfer Engineering*
23. *Energy for Sustainable Development*
24. *Resource-Efficient Technologies*
25. *Proceedings of the Institution of Mechanical Engineers, Part A, Journal of Power and Energy*
26. *Engineering*
27. *Desalination*
28. *Journal of Cleaner Production*
29. *Energy*
30. *HardwareX*
31. *Energy Conversion and Management*

Proposal reviewer:

1. U.S. Department of Energy

Selected Service:

Moderator for the 2nd International Conference on Food Security and Sustainability: Two sessions in San Diego, CA: June 2017

Fluid/Thermal Science PhD Committee: Helped plan the course requirements for a new emphasis: Spring 2017

STEM Expo Volunteer: Evaluated projects for middle and high school students: April 2016

Science Olympiad Volunteer: Wind turbine project for middle and high school students: March 2016 and March 2017

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Wikipedia editor: Heat exchangers

Chair for Heat Exchanger and Heat Pipe Sessions: International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT), 14-16 July 2014, Orlando, FL, USA

Pennsylvania Governor's School for the Sciences featured alumnus (Spring 2014): helped raise funds

Society of Automotive Engineers Hybrid J2894 Task Force (2012-2014): helped develop test procedure for electric highway vehicles

Personal research: conceive of and analyze over 1000 ideas for inventions as well as theories

Mentoring: an undergraduate student at the University of Colorado at Boulder (2009), two graduate students (now professors) in India (2011-present), and research students at Tennessee State University: one graduate student 2015-present, two undergraduates fall 2015, two undergraduates spring 2016, one undergraduate spring-summer 2017

Unitarian Universalist Young Adult Group (Fall 2006 – Summer 2015)

- Co-coordinated bimonthly events

Advisor to Hydrogen Fuel Cell Vehicle Middle School Competition (Spring 2007)

Building Systems Program Seminar Coordinator (Spring 2007 – Fall 2007)

- Organized weekly guests for the seminar

Unitarian Universalist Student Organization (Fall 1997 – Spring 2002)

- President January 1999 – May 2002: organized weekly meetings and activities and acted as a liaison to local and regional church organizations

- Secretary Fall 1998: Maintained web page and wrote correspondence

Tau Beta Pi Engineering Honors Society (Fall 1999 – Spring 2002): service projects including Habitat for Humanity and Special Olympics

Society of Engineering Science (Fall 1999 – Spring 2002): mustered student support for the course Green Engineering

Eco Action (Fall 1997 – Spring 2001): attended seminars, helped with recycling, highway clean-up, letter writing, and tree planting

Intramural tennis (Fall 1997 – Spring 1999): singles finalist, doubles finalist, doubles champion

Selected service Presentations

1. "An Inventor's Story," Keynote address at Camp Invent, Durango, CO, June 2011.
2. "A Fresh Look at Preventing Climate Change," Unitarian Universalist Church of Boulder, Boulder, CO, January 2010.
3. "A Perspective on the Environment that will Blow You Away," Unitarian Universalist Church of Boulder, Boulder, CO, December 2009.
4. "Will We Run Out of Resources?" Unitarian Universalist Church of Boulder, Boulder, CO, December 2009.
5. "Climate Change," Guest lecture to Estes Park Middle School, Estes Park, CO, May 2008.

David C. Denkenberger

6. "Aid, Trade, and Immigration: Solutions for Global Poverty," Unitarian Universalist Church of Boulder, Boulder, CO, November 2007.
7. "The Philosophy of Solar Water Pasteurizers," Unitarian Universalist Congregation of Princeton, Princeton, New Jersey, August 2004.

Research Advising

1. T. Rajaseenivasan, PhD student, Anna University, Chennai, India
2. D. Deborah Cole, master's, Tennessee State University, Nashville, USA
3. Michael Griswold, undergraduate, Tennessee State University, Nashville, USA
4. Mohamed Abdelkhalik, undergraduate, Tennessee State University, Nashville, USA
5. Ryan Black, undergraduate, Tennessee State University, Nashville, USA