David C. Denkenberger

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Nashville, TN 37209

Education:

University of Colorado at Boulder Boulder, CO
Ph.D. in **Civil Engineering** 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
· Alternate foods, heat exchangers

President/Founder
Summer 2006 – Present Denkenberger Inventing and Consulting, LLC
· 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)
· New York State Energy Development Authority: Microchannel Heat Recovery Ventilator for Vehicles: $50,000 (2012-2014)
· Blue Wave Energy, Orange Park, Florida. 2008. $5,000: Feasibility of Novel Energy Storage Devices
· Vestergaard Frandsen, Lausanne, Switzerland. 2006-2007. $20,000: Passive Solar Devices

Technical Consultant
Fall 2010 – Fall 2014 Ecova (Research and Policy Division), Durango, CO
· Lead effort on clothes dryer energy efficiency including proposal writing, laboratory oversight, project management, prototype design, and policy development
· Lead 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, 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 Matlab modeled 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)

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
· Engineering Design, Advanced HVAC

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)

Certification:

Engineering in Training: General Engineering: March 2006

Professional Membership:

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

Grants:

Pacific Gas & Electric: Small Network Equipment Energy Technology and Policy: $50,000 (2014)
Northwest Energy Efficiency Alliance: Clothes Dryer Restricted Duct Testing: $90,000 (2012-2013)
Pacific Gas & Electric: Prototyping Efficient Clothes Dryer: $180,000 (2012-2013)
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)

Honors:

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

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)

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

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· Northwest Energy Efficiency Alliance: heat pump versus electric resistance clothes dryer clothing wear and tear: $25,000 (2015)
· Appliance Standards Awareness Project: technology and policy for: computers, air and natural gas compressors, air conditioning and heat pumps, wine coolers, and portable cooling: $12,000 (2015)
· New York State Energy Development Authority: Microchannel Heat Recovery Ventilator for Vehicles: $50,000 (2012-2014)
· Blue Wave Energy, Orange Park, Florida. 2008. $5,000: Feasibility of Novel Energy Storage Devices
· Vestergaard Frandsen, Lausanne, Switzerland. 2006-2007. $20,000: Passive Solar Devices

Peer-Reviewed Publications (over 550 citations, h-index = 8):

1. "Productivity enhancements of compound parabolic concentrator tubular solar stills" *Renewable Energy,* forthcoming, T. Arunkumar, D.C. Denkenberger, Ravishankar Sathyamurthy, K. Vinothkumar, Amimul Ahsan.
2. "Effect of parabolic solar energy collectors for water distillation," *Desalination and Water Treatment*, forthcoming, T. Arunkumar, Amimul Ahsan, A.J.N. Khalifa, S. Shams, D. Denkenberger, R. Sathyamurthy.
3. "Aligning executive incentives with global public health goals," *Progress in Health Sciences*, Vol 5, No 2, 2015, J.M. Pearce and D.C. Denkenberger.
4. "Effect of heat removal on tubular solar desalting system" *Desalination*, forthcoming, T. Arunkumar, R. Velraj, D. Denkenberger, Ravishankar Sathyamurthy, K. Vinothkumar, Amimul Ahsan, K. Porkumaran.
5. "Educational Pathways to Remote Employment in Isolated Communities Journal of Human Security," *Journal of Human Security*, forthcoming, D. Denkenberger, J. Way and J. Pearce.
6. "Solar Photovoltaic Powered On-Site Ammonia Production for Nitrogen Fertilization" Solar Energy, *Solar Energy*, forthcoming, Z. Du, D. Denkenberger and J. Pearce.
7. "Experimental study on a parabolic concentrator assisted solar desalting system" *Energy Conversion and Management*, forthcoming, T. Arunkumar, D. Denkenberger, H. Tanaka, and R. Sathyamurthy.
8. "Resilience to Global Food Supply Catastrophes" *Environment, Systems and Decisions*, Vol 35, No 2, 301-313, 2015, S.D. Baum, D.C. Denkenberger, J.M. Pearce, A. Robock, R. Winkler.
9. "Feeding Everyone: Solving the Food Crisis in the Event of Global Catastrophes that Kill Crops or Obscure the Sun" *Futures*, Vol 72, 57-68, 2015, D.C. Denkenberger and J.M. Pearce.
10. "Isolated Refuges for Surviving Global Catastrophes" *Futures*, forthcoming, S.D. Baum, D.C. Denkenberger, J. Haqq-Misra.
11. "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.
12. "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.
13. "Towards Low-Cost Microchannel Heat Exchangers: Vehicle Heat Recovery Ventilator Prototype" Proceedings of the 10th International Conference on Heat Transfer, Fluid

Mechanics and Thermodynamics (HEFAT), July 2014, Orlando, FL, USA; D. Denkenberger, M. Parisi, J.M. Pearce.

14. "Effect of air flow on "V" type solar still with cotton gauze cooling," *Desalination*, 337, 1–5, 2014, P.U. Suneesh, R. Jayaprakash, T. Arunkumar, D. Denkenberger.
15. "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.
16. "The Augmentation of Distillate Yield by Using Concentrator Coupled Solar Still with Phase Change Material," *Desalination*, 314, 189–192, 2013, T. Arunkumar, D. Denkenberger, Amimul Ahsan, R. Jayaprakash.
17. "Effect of Water and Air Flow on Concentric Tubular Solar Water Desalting System," *Applied Energy*, 103, 109–115, 2013, T. Arunkumar, R. Jayaprakash, Amimul Ahsan, D. Denkenberger, M.S. Okundamiya.
18. "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.
19. "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.
20. "An Experimental Study on a Hemispherical Solar Still," *Desalination* 2012; 286, 342-348. T. Arunkumar, R. Jayaprakash, D. Denkenberger, A. Ahsan, M.S. Okundamiya, S. Kumar, H. Tanaka, H.S. Aybar.
21. "Optimization of Specific Rating for Wind Turbine Arrays Coupled to Compressed Air Energy Storage," *Applied Energy*, S. Succar, D. C. Denkenberger, R. H. Williams, 96, 222–234, 2012.
22. "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. C. Denkenberger, M. J. Brandemuehl, J. M. Pearce and J. Zhai, Vol 226, No. 4, June 2012.
23. "Baseload Wind Energy: Modeling the Competition between Gas Turbines and Compressed Air Energy Storage for Supplemental Generation," *Energy Policy* Vol 35, p. 1474-1492, 2007, J. B. Greenblatt, S. Succar, D. Denkenberger, R. H. Williams, and R. H. Socolow.
24. "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.C. Denkenberger and J.M. Pearce.
25. "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.M. Pearce and D.C. Denkenberger.
26. "The Influence of Large-Scale Wind-Power on Global Climate," *Proceedings of the National Academy of Sciences*, 2004, D.W. Keith, J.F. DeCarolis, D.C. Denkenberger, et al.

Other Publications:

1. "Super Efficient Dryer Testing and Analysis" Prepared for the Northwest Energy Efficiency Alliance by D. Thomsen, D. Denkenberger, and J. Colett, 2015.

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2. “Feeding Everyone No Matter What” D. Denkenberger, Future of Life Institute webpage, February 2015.
3. “Feeding Everyone” D. Denkenberger, Talon (Aztec, NM News), Vol 23, No. 03, January 2015.
4. “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.
5. “Life After Global Catastrophe: How Do We Feed Everyone?” J. Pearce and D. Denkenberger, SciTechConnect, November 2014.
6. “10 ways to feed ourselves after a global agricultural collapse,” J. Pearce and D. Denkenberger, Elsevier Connect, December 2014.
7. Feeding Everyone No Matter What: Managing Food Security After Global Catastrophe Elsevier, 2014, D.C. Denkenberger and J. M. Pearce.
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. “Found in Translation: A New Language for Energy Efficiency Retrofits,” *The Journal of Policy Engagement,* Vol 1, No 2, pp. 9-13, May 2009, J. Pearce, T. Carpenter, and D. Denkenberger.
18. "Accelerating Applied Sustainability by Utilizing Return on Investment for Energy Conservation Measures," *International Journal of Energy, Environment and Economics*, Vol 17 No 1, pp. 61-80, J. Pearce, D. Denkenberger, and H. Zielonka.
19. "Energy Conservation Measures as Investments," in Spadoni, Giacomo, editor, Energy Conservation: New Research, Nova Science Publishers: Hauppauge, NY, pp. 67-85, 2009. ISBN: 978-1-60692-231-6, J. Pearce, D. Denkenberger, and H. Zielonka.
20. "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.

21. "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.
22. "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.
23. "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.
24. "Revenue-Neutral Taxation Policy which Encourages Economical and Environmentally Beneficial Products." Innovations and Materials for Green Engineering pp. 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 provisionally patented).
2. "Method for Mitigating Barriers in the Acquisition of Products and Services with High Upfront Costs and Low Total Ownership Costs," Provisional Patent 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.

External Presentations:

1. "Alternative Food Production: Human Nutrition from Inedible Materials," Ellen MacArthur Foundation Disruptive Innovation Festival (online), co-presenter with J. Greenblatt, November 2015.
2. "Extreme Food System Shock" Second International Conference on Global Food Security, Ithaca, NY, October, 2015.
3. "Extreme Food System Shock" Cornell Alliance for Science, Ithaca, NY, October, 2015.
4. "Battery Charger Test Procedure and Standard Improvement Opportunities," Presentation to the Department of Energy meeting on Battery Chargers, Washington, DC, September 2015.
5. "Tennessee State University Seminar: Research, Teaching, and Service" Nashville, TN, April 2015.
6. "Feeding Everyone No Matter What: Managing Food Security after Global Catastrophe" Building Systems Program seminar, Boulder, CO, December 2014.
7. "Feeding Everyone: Solving the Food Crisis in Event of Global Catastrophes that Kill Crops or Obscure the Sun" Society for Risk Analysis Annual Meeting, Denver, CO, December 2014.
8. "Clothes Dryer Test Procedure Improvement Opportunities," Presentation to the Department of Energy meeting on Test Procedures for Residential Clothes Dryers, Washington, DC, November 2014.
9. "Feeding Everyone: Solving the Food Crisis in Event of Global Catastrophes that Kill Crops or Obscure the Sun" Blue Marble Space Institute of Science, online, November 2014.

10. "Feeding Everyone: Solving the Food Crisis in Event of Global Catastrophes that Kill Crops or Obscure the Sun" Lawrence Berkeley National Lab, Berkeley, CA, August 2014.
11. "Feeding Everyone: Solving the Food Crisis in Event of Global Catastrophes that Kill Crops or Obscure the Sun" Global Systemic Risk Group at Princeton University, Princeton, NJ, August 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. "Feeding Everyone: Solving the Food Crisis in Event of Global Catastrophes that Kill the Sun or Crops," Online Presentation for the Global Catastrophic Risk Institute, August 2013.
18. "Feeding Everyone: Solving the Food Crisis in Event of Global Catastrophes that Kill the Sun or Crops," Sandia National Laboratory, Albuquerque, NM, August 2013.
19. "Feeding Everyone: Solving the Food Crisis in Event of Global Catastrophes that Kill the Sun or Crops," Los Alamos National Laboratory, Los Alamos, NM, July 2013.
20. "Emerging Technology Award Dryer Testing," Given remotely to Pacific Gas and Electric, June 2013.
21. "Buildings and Industrial Energy," National Renewable Energy Laboratory, Washington, DC, January, 2013.
22. "Emerging Technology in Dryers," *Efficiency Connections Northwest*, Spokane, WA, October 2012.
23. "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.
24. "Possible Heat Pump Dryer Configurations," *American Council for an Energy-Efficient Economy: Summer Study*, Pacific Grove, CA, August 2012.
25. "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.
26. "Overview of Title 20 California Efficiency Standards for Battery Charger Systems and Implications for UPAMD," Universal Power Adapter for Mobile Devices (UPAMD) Working Group of the Institute of Electrical and Electronics Engineers, S. Foster Porter and D. Denkenberger, February 2012.
27. "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.
28. "High Efficiency Low Cost Microchannel Heat Exchanger Commercialization," to SUTIMCO (University patent development company), Durango, CO, and Santa Ana, California (phone), April 2011.
29. "Energy Components and Systems," Ecova, Durango, CO, September 2010.

30. "Building-Systems-Relevant Research," United Technologies Research Center, East Hartford, Connecticut, September 2010.
31. "Ocean-Energy-Relevant Research," National Wind Technology Center, Boulder, CO, September 2010.
32. "Heat Exchangers and Buildings," National Renewable Energy Laboratory, Golden, CO, July 2010.
33. "Appropriate Technology," University of Kansas Teaching Seminar, Lawrence, Kansas, April 2010.
34. "Heat Exchangers and Renewable Energy," University of Kansas Research Seminar, Lawrence, Kansas, April 2010.
35. "Heat Exchangers and Renewable Energy," Missouri University of Science and Technology Seminar, Rolla, Missouri, March 2010.
36. "Compound Parabolic Concentrators for Solar Water Heat Pasteurization," Presentation to the company Vestergaard Frandsen, Laussane, Switzerland, August 2006.
37. "Compound Parabolic Concentrators for Solar Water Heat Pasteurization: Numerical Simulation," Solar Cookers International Conference in Granada, Spain, July 2006.
38. "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.
39. "'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.
40. "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.
41. "Wind Turbine Rated Speed Optimization and Future Work," Building Systems Program seminar, Boulder, CO, March 2005.
42. "Optimal Wind Turbine Rated Speed Taking into account Array Effects and Capacity Factor," 2004 Electric Power Conference, Baltimore, Maryland, March 2004.
43. "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.
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

Computer languages: Matlab, Fortran, Pascal

Other software: Phoenics (computational fluid dynamics), eQUEST (building energy modeling), Chrome, Dragon NaturallySpeaking, Vision (finance), GoToMeeting, Microsoft Word, Excel, Power Point, Outlook, Internet Explorer, Lync, and SharePoint, Analytica (probabilistic modeling)

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Time management: use time efficiency tricks and have trained colleagues

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*

Service:

Wikipedia editor: Heat exchangers and global catastrophic risks.

Guest editor for special issue in: International Journal of Energy and Power Engineering, 2015.

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.

Global Catastrophic Risk Institute Research Associate (summer 2013 to present): support an integrated assessment of global catastrophic risks; led monthly Global Catastrophic Risk Reducers meetings in spring 2014

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) and two graduate students in India (2011-present)

Unitarian Universalist Young Adult Group (Fall 2006 – present)
· Co-coordinated bimonthly events

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

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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

Service Presentations

1. "New Backup Food Solutions for Catastrophes" Presentation to American Preppers Network (webinar), January 2015.
2. "How the World Could Come to an End in the Twenty-first Century, and How to Prevent It" Life Long Learning at Fort Lewis College, Durango, CO, November 2014.
3. "Preventing Armageddon," Unitarian Universalist fellowship of Durango, Durango, CO, December 2013.
4. "An Inventor's Story," Keynote address at Camp Invent, Durango, CO, June 2011.
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