Nordica A. MacCarty, Ph.D.
Assistant Professor of Mechanical Engineering
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EDUCATION

Ph.D. Mechanical Engineering (GPA 4.0/4.0), Iowa State University, 2015

Dissertation: "Development and use of an integrated systems model to design technology strategies for energy services in rural developing communities"

Advisor: Dr. Kenneth Mark Bryden

M.S. Mechanical Engineering (GPA 4.0/4.0), Iowa State University, 2013

Thesis: "A zonal model to aid in the design of household biomass cookstoves"

Advisor: Dr. Kenneth Mark Bryden

B.S. Mechanical Engineering, minor in Business Administration (GPA core 3.78/4.0), Iowa State University, 2000

ACADEMIC EXPERIENCE

Assistant Professor, Mechanical Engineering, Oregon State University, 2015-present

National Science Foundation Graduate Research Fellow, Iowa State University, 2010-2015

National Merit Scholar, Iowa State University, 1996-2000

OTHER PROFESSIONAL EXPERIENCE

Laboratory Manager and International Consultant, Aprovecho Research Center, Cottage Grove OR, 2004–2010

Undergraduate Research Assistant, Ames Laboratory Center for Nondestructive Evaluation, Ames IA, 1999-2000

Technical Assistant, Wandling Engineering, P.C., Ames IA, 1999-2000

Corporate Engineering Intern, 3M Abrasive Systems Division, Ames IA, 1997-1999

HONORS and AWARDS

Impact Invention Award, Elevating Impact Summit, Portland Oregon, February 2017

National Science Foundation Graduate Research Fellowship, 2010-2015

National Merit Scholar, full merit scholarship to Iowa State University, 1996-2000

KEYNOTE and INVITED TALKS

Invited talk, "Ethnography in Engineering Design", ASME IDETC Engineering for Global Development Forum, Lightning talk and panel, August 27, 2018, Quebec City, Quebec.

Keynote, “Engineering for Global Good” OSU SWE Tea, Family weekend, Corvallis Oregon, May 2018.

Keynote, “Humanitarian Science and Engineering: Changing Lives and Improving the World with a STEM Degree”, Oregon State University Seniors Exploring Engineering Day for the Programs for Women and Science in Engineering and LSAMP Bridge, Corvallis, Oregon, January 2016.

Invited Talk, “Proposed Benchmarks for Biomass Cookstoves,” U.S. EPA Partnership for Clean Indoor Air Coordination and Partner Preparation Meeting, Bonn, Germany, October 2006.

Invited Talk, “Proposed Benchmarks for Improved Cooking Stoves,” International Meeting on Indoor Air Pollution, Fuel-Efficiency Stoves and Sustainable Development, Brasilia, Brazil, October 2006.

MEDIA

OSU Engineering Out Loud Podcast, “Clean Water for the Developing World”, Fall 2018, https://engineering.oregonstate.edu/s7-e4-clean-water-solution-developing-world

OSU Terra Magazine, Spring 2018, “To your health! OSU initiative targets a global water problem” http://terra.oregonstate.edu/2018/05/to-your-health/

OSU College of Engineering Momentum Newsletter, Clean Water Issue, Spring 2018 http://www.journalgraphicsdigitalpublications.com/epubs/OSUALUMNIASSOCIATIONINC/MomentumSpring2018/viewer/desktop/#page/10

OSU Engineering Out Loud Podcast, “Stoves and Sopes”, Winter 2017, http://engineering.oregonstate.edu/season-2-episode-3-stoves-sopes

OSU Advantage Accelerator Newsletter, “Not every idea has the potential to improve lives in the farthest corners of the world. Jen Ventrella’s invention does.” June 2017 http://advantage.oregonstate.edu/feature-story/not-every-idea-has-potential-improve-lives-farthest-corners-world-jen-ventrella%E2%80%99s

OSU School of MIME newsletter “A cleaner-burning stove for the developing world” Spring 2017, http://mime.oregonstate.edu/cleaner-burning-stove-developing-world

ACADEMIC AREAS OF SPECIALIZATION

Despite significant scientific and engineering advances in the 21st century, nearly 40% of the world’s population continues to have their most basic needs for energy, water, and livelihoods unmet. My goals are to integrate modern engineering tools with understanding from the social, environmental, and economic sciences to develop effective and appropriate solutions to meet these needs while providing students the opportunities do develop both their technical skillsets and cross-cultural understanding to help bridge the gap between design and reality.

Research Interests

My primary research interest is in the use of sensing, computational modeling, and interdisciplinary approaches to assist design and decision making in complex systems to meet basic human needs. My work in this area includes

- Development and commercialization of tools and systems to help cleantech and development projects to understand if their interventions are working through independent, inexpensive, external validation.
- The development of an extensible modeling and decision making framework that enables federated model integration across fields and areas that are traditionally regarded as separate. This framework supports energy system design and management that incorporates detailed models, real-world performance, and use-driven factors and supports the use of probabilistic algorithms and multi-objective optimization in decision making.
- In my doctoral research, this framework was applied to determine the most appropriate technologies to meet needs for thermal, luminous, mechanical, and electrical energy in an isolated developing village in order to provide the largest benefits in terms of health, climate, efficiency, cost, and quality of life.
- Master's research focused on design and analysis of heat transfer and combustion in the small energy systems. Included development of a validated zonal model for fluid flow and heat transfer for use during the conceptual design of a small biomass cookstove based on methodology and experimental data from the literature.

In the future I plan to extend this framework to enable the analysis of a number complex energy systems of various scales. I am particularly interested in understanding the connections between energy, society, and the environment.

Research Awards and Funding

MIME Strategic Innovation Grant, Distinguished Lecturer, Dr. Nathan Johnson from ASU, with K. Sharp and B. DuPont, Fall 2018, $600

ASME DED Family Support Micro Grant from the Committee for Broadening Participation of Underrepresented Groups, Summer 2018, $250

Venturewell Student Entrepreneurial Team Stage 2 Support, FUEL Sensor, PI, Spring 2018, $20,000

MIME Research Experience for Undergraduates funding, Clean Water for Low Resource Communities, Summer 2018, $3,000

OSU Venture Development Fund, Hardware Upgrades for the FUEL System, Winter 2018, $5,000.

National Science Foundation, I-corps: The Fuel, Usage, and Emissions Logger (FUEL) for energy efficient technology adoption and impact monitoring, PI, October 2017, $50,000

National Science Foundation, Engineering Systems Design: Novel Framework for Incorporating Consumer Preferences and Public Goals into Engineering Design Applied to Energy Technologies, PI, May 2017, $348,000

VentureWell Student Entrepreneurial Team Stage 1 Support, FUEL Sensor, PI, Summer 2017, $5,000

Undergraduate Research, Innovation, Scholarship and Creativity (URISC) funding, Laboratory and Field Testing of a High-Efficiency Water Pasteurization System for Developing Communities, Summer 2017, $4,000

MIME Strategic Innovation Grant, FUEL Sensor development, PI, Winter 2017, $10,000

MIME Strategic Innovation Grant, Combustion chamber material development, PI, Winter 2017, $5,000

VentureWell Student Entrepreneurial Team Support, High efficiency biomass fired water pasteurization system, PI, Winter 2017, $5,000

ESCO Foundation support of sensor prototype development, PI, January 2017, $7,000

Undergraduate Research Scholarship, and the Arts Engage Fellowship for mentorship of first-year undergraduate student Joshua Erkman, 2016, $1,250

National Science Foundation Graduate Research Fellowship, 2010-2013. $95,000 plus $31,500 cost of education allowance.

Teaching Interests

My background is in thermal-fluid sciences, engineering design, computational modeling and optimization. I particularly enjoy teaching heat transfer and engineering orientation courses. In addition to the development of hands-on project opportunities at the undergraduate level, have a particular interest in entrepreneurship, the design of energy systems for the developing world, and the use of engineering tools to address poverty and environmental issues in a multi-disciplinary context. I am also working to develop and lead interdisciplinary field courses and research experiences for undergraduate and graduate students.

Teaching Awards and Funding

VentureWell Faculty Grant for sustainable design innovation entitled "Innovating for Sustainable Household Energy", PI, July 2018-July 2021, $30,290

OSU Scaled Learning Innovation Grant, Technology and Creativity for Enhancing COE Orientation Courses, co-PI with David Nembhard (PI) and Jennifer Parham-Mocello, Fall 2018, $97,000

MIME Strategic Excellence Grant for Engineering Education, "Synthesis of Literature and Preliminary Study Design for Research in Humanitarian Engineering Education," co-PI with Kendra Sharp, Summer 2018, $10,420

OSU Women's Giving Circle, MIME 101: Hands-On Creative Activities to Increase Retention of First Year Engineering Students, PI, $9,797

Summer session grant to cover instructor travel expenses for HEST 299/599: Household Energy in Guatemala, Spring 2016, $3,000

Teaching Experience:

NEW COURSE DEVELOPMENT: Humanitarian Engineering, Science and Technology (HEST) 299/599 (now 241/541 and 242/542): Household Energy in Guatemala: Technology, Environment, and Society. Spring and Summer 2016, 2018. This course introduces students to the technical, social, and environmental issues surrounding needs for household energy in developing countries and investigates a variety of technological solutions to meet those needs in both theory and practice. It begins with a 1-credit on-campus seminar to provide relevant background and research questions for the field, followed by a 10-12-day faculty-led study abroad experience where students will participate in co-design, cookstove manufacturing, distribution, monitoring and evaluation, and surveys in rural households in conjunction with ongoing projects by partner organizations StoveTeam International and Link4.

ME 332 – Heat Transfer, Oregon State University, Fall 2018 – full curriculum development.

ME 450/550 – Applied Heat Transfer, Oregon State University, Winter 2016, 2017, 2018, 2019 – full curriculum development.

MIME 101 – Introduction to Mechanical, Industrial and Manufacturing Engineering, Oregon State University – co-instructor, significant contributions to content Fall 2015, 2016, 2017. Secured two grants to re-create the labs with hands-on Lego and Cosmo robotics projects in 2018.

ME 220 – Globalization and Sustainability, Iowa State University, GTA Spring 2014.

Other Teaching Experience – For a period of 5 years I routinely taught technical classes on biomass cookstove design and cookstove testing protocols to diverse international audiences in groups up to 250 participants in both structured classroom and informal hands-on settings.

Student Mentoring

Ph.D. Students

Current:

Liam Cassidy, anticipated 2023

Erin Peiffer, anticipated 2021

Thidarat Sawai, anticipated 2021

Mohammad Pakravan, anticipated 2019

M.S. Students

Current:

Jennifer Ventrella, dual with M.S. Applied Anthropology, anticipated 2019

Rajesh Oak, mechanical engineering, expected 2020

Graduated:

Nicholas Moses, dual M.S.M.E. with Applied Anthropology, 2018

Grace Burleson, dual M.S.M.E. with Applied Anthropology, 2018

Undergraduate Honors Students Mentoring/Committee

Current:

Duncan O'Boyle, honors college undergraduate thesis advisor, Mechanical Engineering, March, 2019.

Graduated:

Connor Parrott, honors college undergraduate thesis advisor, Mechanical Engineering, 2016-2017. Thesis title: Flow Cytometry

Adrian Hinkle, honors college undergraduate thesis committee member, Mechanical Engineering, 2016-2017. Thesis title: Communication Strategies for Latin American Engineers Without Borders Programs

Grace Burleson, honors college undergraduate thesis co-advisor, Mechanical Engineering, 2015-2016. Thesis title: Water treatment technologies for the developing world

Undergraduate Students

Ava (Connor) Butler, MIME Research Experience for Undergraduates for clean water for low-income populations, 2018

Nicolene Van Rooyen, MIME Strategic Innovation Grant for combustion chamber material characterization, 2017-2018.

Elizabeth Andreyka, OSU URISC grant for water pasteurization system, 2017-2018.

Elizabeth Andreyka and Joshua Johnson, Venturewell Student E-Team for water pasteurization system, 2017.

Joshua Erkman, first-year undergraduate research mentor, Industrial Engineering: Undergraduate Research Scholarship, and the Arts Engage Fellowship for mentorship, 2016.

Senior Capstone Projects

Senior Mechanical Engineering Capstone Project Sponsor and Advisor: Design of a chlorine concentration sensor for tracking efficacy of water chlorination systems in developing countries, sponsored by Green Empowerment: Victor Jonathan Oporta, Amer Abdulsalam Mahmoud Abdulla Almarzooqi, Nicholas Haupt, 2018.

Senior Mechanical Engineering Capstone Project Sponsor and Advisor: Design of a sensor-based monitoring kit for field research in humanitarian engineering: Judy Jiang, Hannah Mankle, Matthew Wiryawan, 2017-2018.

Senior Mechanical Engineering Capstone Project Sponsor and Advisor: Design of a thermoelectric generator for a biomass cookstove: Jeffrey Leslie, Edward Hynes, Faisal Alkhaldi, 2017

Senior Mechanical Engineering Capstone Project Advisor to flow cytometry group: Connor Parrott, Davis Raye, Tyler Vonderach, 2016-2017.

Senior Mechanical Engineering Capstone Project Advisor to three groups: Alexander Muschler, Barea Eraqi, Beau Hansen; Bryan Calidonna, Joe Van Kleek, Brendon Allen; Braulio Vasquez, Moayed Alhuwaikim, Mohamed Jarbooa, 2016

Service

Engineers Without Borders, Oregon State Chapter, Faculty co-Advisor, 2018-present

Pi Tau Sigma, Mechanical Engineering Honor Society, Faculty Advisor, 2017-present

Engineers in Technical Humanitarian Opportunities of Service (ETHOS), Member (2000-present), Board of Directors (2014-present), Treasurer (2016-present).

IEEE Special Interest Group on Humanitarian Technology (SIGHT) Group Founder and Faculty Leader, 2018-present.

Grand Challenge Scholars Program Advisory Board, College of Engineering Leadership Program, December 2018-present.

Society of Women Engineers, Professional Development Planning Committee, November 2016-November 2017.

Green Empowerment, Technical Advisory Committee, September 2017-present.

Partners for Sustainable Schools, secretary of the Board of Directors and volunteer 2^{nd}-5^{th} grade classroom teacher, August 2013-August 2015.

Aprovecho Research Center, advisor and technical editor, August 2010-present.

Aprovecho Sustainability Educational Center, transition advisory board, December 2018-present.

TECHNICAL PUBLICATIONS

Bold font indicates the author was/is a student advisee. Mentoring advisees to become first authors is considered a measure of both research output and evidence of good mentorship in my field and at my institution.

Journal Publications

Submitted

1. J. Ventrella and N. MacCarty. Monitoring impacts of clean cookstoves and fuels with the Fuel, Usage, and Emissions Logger (FUEL): field testing and reporting capabilities. Submitted to Energy for Sustainable Development.
2. M. Pakravan, N. MacCarty. What motivates behavior change? Analysis of user intentions to adopt clean energy technologies in low resource settings using the Theory of Planned Behavior. Submitted to Energy Research and Social Science.
3. J. Ventrella, S. Zhang, N. MacCarty. Integrating rapid ethnographic techniques in design for development: a case study for design of a cookstove monitoring system. Submitted to *Design Studies*.
4. G.E. Burleson, C. M. Mays, N. D. Moses, K. V. Sharp, T. Navab-Daneshmand, N.A. MacCarty. Fuel efficiency and pathogen reduction of a community-based biomass-powered drinking water pasteurization technology. Submitted to *Environmental Engineering Science*.
5. G. Burleson, B. Tilt, K. Sharp, N. MacCarty Reinventing boiling: A rapid ethnographic and engineering evaluation of a high-efficiency thermal water treatment technology in Uganda. Submitted to *Energy Research and Social Science*.
6. N. Moses, N. MacCarty. What Makes a Cookstove Usable? Trials of a Usability Testing Protocol with Ethnographic Methods in Uganda, Guatemala, and the US. Submitted to *Energy Research and Social Science*.

Published

1. N. Moses, M. Pakravan, N. MacCarty. Development of a practical evaluation for cookstove usability. *Energy for Sustainable Development*. 48:154-163. 2019.
2. P. Stevenson, C. Mattson, KM Bryden, N. MacCarty. Toward a Universal Impact Metric for Engineered Products in Developing Countries. *Journal of Mechanical Design.* 140(4) :041404-041404-10. 2018.
3. S. Suram, N. MacCarty, and K.M. Bryden, "Engineering design analysis utilizing a cloud platform" *Advances in Engineering Software* 115:374-385. 2018.
4. D. Still, S. Bentson, N. Murray, N. MacCarty. Laboratory experiments regarding the use of filtration and retained heat to reduce particulate matter emissions from biomass cooking. *Energy for Sustainable Development.*42:129-135, 2018.
5. N. MacCarty and K.M. Bryden, "Costs and impacts of potential energy strategies for rural households in developing communities" *Energy* 138:1157-1174, 2017.
6. N. MacCarty and K.M. Bryden, "An integrated systems model for energy services in rural developing communities" *Energy* 113:536-557, 2016.
7. N. MacCarty and K.M. Bryden, "A generalized heat transfer model for shielded-fire household cookstoves" *Energy for Sustainable Development*, 33:96-107, 2016.

8. N. MacCarty and K.M. Bryden, "A unified set of experimental data for cylindrical, natural draft, shielded single pot wood-fired cookstoves" *Energy for Sustainable Development*, 26:62-71, 2015.
9. N. MacCarty and K.M. Bryden, "Modeling of Household Biomass Cookstoves: A Review," *Energy for Sustainable Development,* 26:1-13, 2015.
10. N. MacCarty, D. Still, and D. Ogle, "Fuel Use and Emissions Performance of Fifty Cooking Stoves in the Laboratory and Related Benchmarks of Performance," *Energy for Sustainable Development*, 14(3):161-171, 2010.
11. C.A. Roden, T.C. Bond, S. Conway, A.B.O. Pinel, N. MacCarty, and D. Still, "Laboratory and Field Investigations of Particulate and Carbon Monoxide Emissions from Traditional and Improved Cookstoves," *Atmospheric Environment* 43:1170-1181, 2009.
12. N. MacCarty, D. Ogle, and D. Still, "A laboratory comparison of the global warming impact of five major types of biomass cooking stoves," *Energy for Sustainable Development*, 12(2):56-65, 2008.
13. E.A.T. Yuntenwi, N. MacCarty, D. Still, and E. Jurgen, "Laboratory study of the effects of moisture content on heat transfer and combustion efficiency of three biomass cook stoves," *Energy for Sustainable Development*, 12(2):66-77, 2008.
14. Bailis, R., Ogle, D., MacCarty, N., Still, D., Smith, K.R., Edwards, R. 2007. The Water Boiling Test, Version 3.0. Technical report, University of California, Berkeley. pciaonline.org/node/1048.

Published Technical Reports – Author or Co-Author

1. D. Still, N. MacCarty, D. Ogle, T. Bond, K.M. Bryden. *Test Results of Cookstove Performance*, US EPA, Washington D.C., 2012.

Peer Reviewed Conference Proceedings

1. J. Ventrella, S. Zhang, N. MacCarty. A Mixed-Method Approach: Design of a Novel Sensor System to Measure Cookstove Usage and Fuel Consumption. *IEEE 2018 Global Humanitarian Technology Conference*, IEEE GHTC 2018, San Jose, CA October 2018.
2. M. Pakravan, K. Laughlin, N. MacCarty. Survey based behavior and impact assessment. A case study of improved cookstove adoption in rural Honduras. *IEEE 2018 Global Humanitarian Technology Conference*, IEEE GHTC 2018, San Jose, CA October 2018.
3. Burleson G, MacCarty N, Tilt B, Sharp K. "A Mixed-Method Approach to the Evaluation of a Novel Water Treatment Technology in Eastern Uganda" *Proceedings of the ASME 2018 International Design Engineering Technical Conference & Computers and Information in Engineering Conference, IDETC/CIE 2018*, Quebec City, Canada August 2018. DETC2017-85596.
4. Ventrella J, MacCarty N. "In-Field Evaluation of an Integrated Sensor System to Measure Fuel Consumption and Cookstove Use in Rural Households" *Proceedings of the ASME 2018 International Design Engineering Technical Conference & Computers and Information in Engineering Conference, IDETC/CIE 2018*, Quebec City, Canada August 2018. DETC2017-85697.
5. Moses N, MacCarty N. "A Practical Evaluation for Cookstove Usability" *Proceedings of the ASME 2018 International Design Engineering Technical Conference & Computers and*

Information in Engineering Conference, IDETC/CIE 2018, Quebec City, Canada August 2018. DETC2017-85728.

6. Pakravan M, MacCarty N. "Evaluating user intention for uptake of clean technologies using the theory of planned behavior" *Proceedings of the ASME 2018 International Design Engineering Technical Conference & Computers and Information in Engineering Conference, IDETC/CIE 2018*, Quebec City, Canada August 2018. DETC2017-85992.
7. MacCarty N, Burleson G, Moses N, Mulkey T, Johnson J, Andreyka E, Ogle D, Colgan F, Creighton A, Carter T, Andreatta D. Design and Testing of a high-efficiency rapid throughput community-scale water pasteurization system. *Proceedings of the ASME 2017 International Design Engineering Technical Conference & Computers and Information in Engineering Conference, IDETC/CIE 2017*, Cleveland, OH August 2017. DETC2017-67830.
8. Stevenson P, Mattson C, Bryden KM, MacCarty N. Toward a Universal Impact Metric for Engineered Products in Developing Countries. *Proceedings of the ASME 2017 International Design Engineering Technical Conference & Computers and Information in Engineering Conference, IDETC/CIE 2017*, Cleveland, OH August 2017. DETC2017-67584.
9. N. MacCarty, K.M. Bryden, "Investigating the effects of design choice and application of energy technologies in rural developing households using an integrated systems model," *Proceedings of the ASME 2016 International Design Engineering Technical Conference & Computers and Information in Engineering Conference, IDETC/CIE 2016*, Charlotte, NC August 2016. DETC2016-59574. Acceptance rate: 78%.
10. N. MacCarty, K.M. Bryden, "Modeling technology strategies for thermal energy services in rural developing communities," *Proceedings of the ASME 2015 International Design Engineering Technical Conference & Computers and Information in Engineering Conference, IDETC/CIE 2015*, Boston, MA August 2015. DETC2015-46806. [with distinction] Acceptance rate: 68%.
11. N. MacCarty, K.M. Bryden, "Components of a framework for the design of energy services for villages in developing countries," *Proceedings of the ASME 2014 International Design Engineering Technical Conference & Computers and Information in Engineering Conference, IDETC/CIE 2014*, Buffalo, NY August 2014. DETC2014-34687. Acceptance rate: 71%.
12. N. MacCarty, K.M. Bryden, "A Heat Transfer Model for the Conceptual Design of a Biomass Cookstove for Developing Countries," *Proceedings of the ASME 2013 International Design Engineering Technical Conference & Computers and Information in Engineering Conference, IDETC/CIE 2013*, Portland, OR August 2013. DETC2013-12650. Acceptance rate: 82%.

Trade Journals and Popular Press

1. N. MacCarty, Guest Editor, "Stove Testing Protocols, Facilities, and Standards Development," Partnership for Clean Indoor Air Bulletin, October, 2009.

RECENT TECHNICAL PRESENTATIONS

Conference and Technical Meeting Presentations (in addition to those above)

1. C. Mays, G. Burleson, T. Navab-Daneshmand, K. Sharp, and N. MacCarty. "Microbiological Testing of a Community-Based , Biomass-Fueled Water Pasteurizer and

Procedures for Cleaning Household Water Transport Containers" Water & Health Conference, North Carolina State University. Fall, 2018.

2. G. Burleson, T. Navab-Daneshmand, K. Sharp, and N. MacCarty. "Microbiological Testing of a Community-Based , Biomass-Fueled Water Pasteurizer and Procedures for Cleaning Household Water Transport Containers" Clean and Sustainable Water Technology Initiative workshop, Oregon State University. August 6-7, 2018.
3. J. Ventrella and N. MacCarty, "Low power sensor for direct measurement of cookstove and solid fuel use: field trial testing" Engineers in Technical Humanitarian Opportunities of Service (ETHOS) Conference, January 2018, Kirkland, WA.
4. M. Pakravan and N. MacCarty, "Use of behavior surveys to evaluate user decisions regarding cookstove adoption in Honduras and Uganda" Engineers in Technical Humanitarian Opportunities of Service (ETHOS) Conference, January 2018, Kirkland, WA.
5. N. Moses and N. MacCarty, "Understanding and Measuring Cookstove Usability" Engineers in Technical Humanitarian Opportunities of Service (ETHOS) Conference, January 2018, Kirkland, WA.
6. G. Burleson and N. MacCarty, "Evaluation of the InStove Water Purifier Using a Mixed Methods Approach" Engineers in Technical Humanitarian Opportunities of Service (ETHOS) Conference, January 2018, Kirkland, WA.
7. N. MacCarty, "Poster: High Efficiency Biomass Water Pasteurization" National Academies of Science, Engineering, and Medicine: Arab-American Frontiers Symposium, November 2017, Rabat, Morocco.
8. N. MacCarty, "Humanitarian Engineering at Oregon State." Presented at the 2017 HEARTH conference, Cottage Grove, OR August 2017.
9. N. MacCarty, "Engineering systems modeling and decision-based design tools and their applications for village energy," presented at the 2016 International Conference on Engineers in Technical and Humanitarian Opportunities for Service, Seattle, WA January 2016.
10. N. MacCarty, K.M. Bryden, "A Holistic Assessment of Village Energy," presented at the 2015 International Conference on Engineers in Technical and Humanitarian Opportunities for Service, Seattle, WA January 2015.
11. N. MacCarty, K.M. Bryden, "A Heat Transfer Model for Conceptual Design of Biomass Cookstoves," presented at the 2013 International Conference on Engineers in Technical and Humanitarian Opportunities for Service, Seattle, WA January 2013.
12. N. MacCarty, K.M. Bryden, "Computational Modeling of Biomass Stoves: A Literature Review," presented at the 2012 International Conference on Engineers in Technical and Humanitarian Opportunities for Service, Seattle, WA January 2012.
13. N. MacCarty, G. Lanza, K. Heising, "Regional Testing Centers," presented at the 2010 International Conference on Engineers in Technical and Humanitarian Opportunities for Service, Seattle, WA January 2010.
14. N. MacCarty, J. Cedar, "The Side-Feed Fan Stove," presented at the 2010 International Conference on Engineers in Technical and Humanitarian Opportunities for Service, Seattle, WA January 2010.

15. N. MacCarty, "Aprovecho Research This Year," presented at the 2008 International Conference on Engineers in Technical and Humanitarian Opportunities for Service, Seattle, WA January 2008.

16. N. MacCarty, "Results of Stove Testing for Global Warming Potential," presented at the 2007 International Conference on Engineers in Technical and Humanitarian Opportunities for Service, Seattle, WA January 2007.

17. D. Still and N. MacCarty, "Benchmark Testing Procedure and Results of Stove Testing," presented at the 2007 International Conference on Engineers in Technical and Humanitarian Opportunities for Service, Seattle, WA January 2007.

18. D. Andreatta and N. MacCarty, "The Effects of Carbon Monoxide and Particulate Matter on the Human Body," presented at the 2006 International Conference on Engineers in Technical and Humanitarian Opportunities for Service, Seattle, WA January 2006.

19. N. MacCarty, "Advanced Studies in Appropriate Technology Laboratory," presented at the 2006 International Conference on Engineers in Technical and Humanitarian Opportunities for Service, Seattle, WA January 2006.

Other Presentations

1. N. MacCarty, "Engineering for Global Good", Keynote, OSU SWE Tea, Family weekend, May 2018.

2. N. MacCarty, "Designing Household Energy Systems for Developing Countries," Invited Talk, Engineers Without Borders Student Chapter Meeting, Oregon State University, January 2016.

3. N. MacCarty, "Designing Household Energy Systems for Developing Countries," Distinguished Speaker, ASHRAE Student Chapter Meeting, Oregon State University, November 2015.

4. N. MacCarty, "Engineering: A path with purpose," Invited Talk, Program for Women and Minorities in Engineering Orientation, Oregon State University, September 2015.

5. N. MacCarty, "Designing Household Energy Systems for Developing Countries," Invited Talk, Design Research Seminar, Oregon State University, November 2015

6. N. MacCarty, "Ethics for Village Energy," NSF & National Institute for Ethics Energy and Society Seminar on Ethics in US Energy Supply, Arizona State University, April 2013.

WORKSHOPS/PANELS PRESENTED at INTERNATIONAL CONFERENCES and MEETINGS

1. N. MacCarty, Invited Panelist, ASME IDETC Engineering for Global Development Lightning talk and panel, August 27, 2018, Quebec City, Quebec.

2. N. MacCarty, "Partnerships in International Development" Invited Panelist, Household Energy and Renewable Technology for Humanity (HEARTH) Conference, Cottage Grove, OR, August, 2017.

3. N. MacCarty, "Founders Panel" Invited Panelist, Stove Summit, Cottage Grove, OR, August, 2016.

4. N. MacCarty, "Moving up the biomass ladder and cleaner fuel pathways," Invited Panelist, Engineers in Technical and Humanitarian Opportunities for Service (ETHOS), Seattle, WA January, 2016.

5. N. MacCarty, "Regional Testing Centers," Invited Panelist, Engineers in Technical and Humanitarian Opportunities for Service (ETHOS), Seattle, WA January 2010.
6. N. MacCarty, "Design Principles for Wood Burning Cookstoves," Partnership for Clean Indoor Air Forum, Kampala, Uganda, March, 2009.
7. N. MacCarty, "Stove Test Library," Partnership for Clean Indoor Air Forum, Kampala, Uganda, March, 2009.
8. N. MacCarty, "The Water Boiling Test," Partnership for Clean Indoor Air Forum, Kampala, Uganda, March, 2009.
9. N. MacCarty, "The Controlled Cooking Test," Partnership for Clean Indoor Air Forum, Kampala, Uganda, March, 2009.

EXTENSION/OUTREACH ACTIVITIES

Technical Advisory Committee, Green Empowerment, 2017-present.

Technical editor and advisor to Aprovecho Research Center, 2012-present.

Advisory board member, Aprovecho Sustainability Education Center, 2018-present.

Presentations to local organizations such as Rotary clubs and university students on design, testing, and modeling of biomass cookstoves for developing countries, 2005–2014.

PATENTS

1. **MacCarty N**, Ventrella J, Walter K. "Low power remote logging weight, air quality, and temperature sensor and method of use." Provisional Patent, January 2018.
2. D.K. Hsu, D.J. Barnard, J.J. Peters, and **N. Hudelson**, "Non-destructive inspections and the display of inspection results." US Patent #6327921, December, 2001.

PROFESSIONAL ACTIVITIES

Professional Conference Leadership Activities

Symposium Chair, ASME International Design Engineering Technical Conference & Computers and Information in Engineering Conference (IDETC/CIE) -- Design Automation Conference – DAC-9, Design for the Developing World, Cincinnati, OH, 2017

Symposium Chair, ASME International Design Engineering Technical Conference & Computers and Information in Engineering Conference (IDETC/CIE) -- Design Automation Conference – DAC-9, Design for the Developing World, Charlotte, NC, 2016

HEARTH Stove Summit, August 2016-present. Planning.

Board of Directors and Planning, Engineers in Technical and Humanitarian Opportunities of Service International Conference, 2014-present.

Professional Journal Activities

Associate Editor, *Energy for Sustainable Development*, October 2015-present.

Professional Societies

Society of Women Engineers, Member, 2015-present.

American Society of Mechanical Engineers (ASME), Member 2013-present.

Institute of Electrical and Electronics Engineers (IEEE), Member 2017-present.

ISO (International Organization for Standardization) Technical Committee TC/285 on Clean Cookstoves and Clean Cooking Solutions, Member, 2014-present.

Engineers in Technical and Humanitarian Opportunities of Service, Member 2000-Present; Board of Directors, 2014-present, Treasurer, 2015-present.

Review and Advisory Panels

ANSI U.S. Technical Advisory Group to ISO/TC 285, Clean cookstoves and clean cooking solutions, Member, 2013-present.

Panelist, Partnership for Clean Indoor Air, Testing protocol and benchmarks for biomass cookstoves, 2005-2010.

Recent Peer Reviewer Activities

Journals

Energy for Sustainable Development, 2008-present

Environmental Science & Technology, 2017-present

ASME Journal of Mechanical Design, 2016-present

Renewable Energy, 2016-present

Development Engineering, 2017-present

Science of the Total Environment, 2016-present

Energies, 2016-present

Biomass and Bioenergy, 2017-present

Energy Research and Social Science, 2018-present

Conferences

ASME 43rd ASME International Design Engineering Technical Conference & Computers and Information in Engineering Conference (IDETC/CIE) -- Design Automation Conference, Quebec City, Ontario, 2018

ASME 43rd ASME International Design Engineering Technical Conference & Computers and Information in Engineering Conference (IDETC/CIE) -- Design Automation Conference, Cincinnati, OH, 2017

21st International Conference on Engineering Design (ICED17) – Vancouver, Canada, 2017

ASME 42nd ASME International Design Engineering Technical Conference & Computers and Information in Engineering Conference (IDETC/CIE) -- Design Automation Conference, Charlotte, NC, 2016

ASME International Mechanical Engineering Congress and Exposition, Houston, TX, 2015

ASME 41st ASME International Design Engineering Technical Conference & Computers and Information in Engineering Conference (IDETC/CIE) -- Design Automation Conference, Boston, MA, 2015

ASME 40th ASME International Design Engineering Technical Conference & Computers and Information in Engineering Conference (IDETC/CIE) -- Design Automation Conference, Buffalo, NY, 2014

ASME 39th ASME International Design Engineering Technical Conference & Computers and Information in Engineering Conference (IDETC/CIE) -- Design Automation Conference, Portland, OR, 2013

Proposals

Netherlands Foundation for Fundamental Research on Matter

OTHER ACTIVITIES

OSU Advantage Accelerator: Accelerate, Winter 2017; Launch, Summer 2017

Partners for Sustainable Schools, volunteer teacher and secretary of the board of directors, August 2013-2015.

National Science Foundation/National Institute for Energy Ethics and Society "Ethics in US Energy Policy" Seminar, Arizona State University, 2013

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