TEODORA RUTAR SHUMAN, PH.D.

Professor and Chair, Mechanical Engineering Department, Seattle University

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EDUCATION

Doctor of Philosophy 2000
University of Washington, Seattle, Washington
Dissertation: "NOx and CO Formation in Lean-Premixed Methane-Air Combustion in a Jet-Stirred Reactor Operated at Elevated Pressure"

Master of Science, Mechanical Engineering, 1994
University of Washington, Seattle, Washington
Thesis: "Nitrous Oxide Destruction by Reburning in a Jet-Stirred Reactor"

Bachelor of Science, Mechanical Engineering, 1992
University of Belgrade, Belgrade, Yugoslavia

PROFESSIONAL EXPERIENCE

Department Chair 2012—2024
Seattle University, Mechanical Engineering

- PI on $1.86M NSF-RED grant "Revolutionizing a Mechanical Engineering Department through Industry Immersion and a Focus on Identity"
  - Oversaw change toward a collaborative faculty and student culture
  - Guided creation of an inclusive teaching and mentoring culture
  - Increased students' industry immersion and professional development
  - Managed resources, curriculum change, consultants, and evaluators
  - Implemented changes to annual performance reviews
  - Enabled pedagogical improvements for faculty
- Recognized the growing regional demand for BSME degrees and enabled the 100 percent increase in enrollment twice, before and after the pandemic
- Increased staffing and managed resources to respond to the doubling of the BSME student population
- Lead and collaboratively developed the first MSME program at Seattle U
- Lead marketing campaign for BSME and MSME enrollment management
- Managed and empowered professors and staff in two successful ABET accreditations and the ongoing assessment process
- Managed five separate budgets for the department and the grant
- Training: Chair as Transformative Leader, Chair's Community of Practice
- Organizer and active participant in the annual ASME MEED leadership summit

Professor 2017—present

Associate and Assistant Professor 2000—2017

Seattle University

- Senior Design Coordinator 2000—2011, 2015—2016, 2024-2025
- Paccar Professor 2007—2011, 2016—2018
- Taught 14 different courses and advised 13 senior design projects
- PI/co-PI on three NSF and six other external grants, totaling over $2.4 M
- Involved over 25 undergraduate students in research
- Co-authored 13 published journal articles, 22 peer-reviewed conference papers, and numerous other scholarly products
- Chair and member of several personnel and procedural committees
- Training: Richard Felder - Active Learning; Michael Prince - PBL

Affiliate Professor 2000—present

University of Washington, Mechanical Engineering Department

Engineering Co-op 1989, 1990

Energoprojekt, Belgrade, Yugoslavia

AWARDED EXTERNAL GRANTS AND FUNDING

1. Lauer, W., Shuman, T. and Abraham, S.: "Interdisciplinary Sustainability Course Module Development for Engineering Programs at Seattle University." *ASEE Engineering for One Planet*, 2024-2025, $8,000
2. Shuman, T.R., Cook, K., Han, Y-L., Mason, G., Turns, J.: "IUSE/PFE:RED: Revolutionizing Engineering Education through Industry Immersion and a Focus on Identity." *National Science Foundation 1730354, July 1, 2017 - September 30, 2023,* $1,861,527
3. Mason, G., Stipe, C., Cook, K., and Shuman, T: "Facilitating Problem-Based Learning with an Inverted Classroom" *National Science Foundation DUE-TUES*, DUE-1245455, *awarded September 12, 2013,* $171,306
4. Stipe (PI), Lauer, Shih, Shuman, Smith, and Stenbak M. J. (contributors), Murdock Charitable Trust: Purchase of Spectroscopy Instrumentation, 2013, $199,000
5. Shuman Rutar, T. "Rapid, low-energy settling of microalgae" *Solution Recovery Service*, Dexter, MI, 2010, $10,000
6. Shuman Rutar, T. "Electroporation Device for Algal Lipid Extraction" *Solution Recovery Service*, Dexter, MI, 2010, $10,000
7. Shuman Rutar, T. "Building Energy Retrofit" *Mt. Rainier National Park*, 2009, $8,000
8. Shuman Rutar, T. "Algal Lipid Extraction Device" The Boeing Co., 2008, $27,000
9. Rutar, T. and Malte, P. C. "Solar PV System Design for Mt. Rainier National Park at Sunrise" *University National Park Energy Partnership Program, UNPEPP*, 2008, $15,000
10. Rutar, T., Mason, G, and Adamson, J. "Creating a Learning Community in a Freshman Design Course through Curriculum Coordination." *National Science Foundation* award number DUE-0126776, July 2002-2004 for $108,804

PUBLICATIONS

PEER-REVIEWED JOURNAL ARTICLES (undergraduate students are underlined)

1. Han, Y-L., Cook, K., Turns, J., Mason, G., and Shuman, T. R., "Students' Experience of an Integrated Electrical Engineering and Data Acquisition Course in an Undergraduate Mechanical Engineering Curriculum" *IEEE Transactions on Education,* Vol. 65, Issue 3, August 2022, Pages 331-343, 10.1109/TE.2022.3178666
2. Han, Y-L., Cook, K., Mason, G., and Shuman, T. R., "Enhance engineering design education in the middle years with authentic engineering problems" *Journal of Mechanical Design, Transactions of the ASME*, Vol. 140, Issue 12, December 2018, 122001-122001-9
3. Cook, K.E., Han, Y-L., Shuman, T. R., and Mason, G., "Effects of Integrating Authentic Engineering Problem Centered Learning on Student Problem Solving" *International Journal of Engineering Education* Vol. 33, No. 1(A), 2017, Pages 272–282
4. Shuman, T.R., Mason, G., Han, Y.L., and Cook, K., "A novel approach to educating engineers: learning in an inverted classroom through problems designed by engineering professionals" *Journal of Applied Engineering Science,* Volume 14, Number 3, 2016, Pages 329-334
5. Shuman, T. R., Mason, G., Reeve, D., Schacht, A., Goodrich, A., Napan, K., and Quinn, J. "Low-Energy Input Continuous Flow Rapid Pre-Concentration of Microalgae through Electro-Coagulation-Flocculation" *Chemical Engineering Journal*, Volume 297, 2016, Pages 97-105
6. Shuman, T. Rutar, Mason, G., Marsolek, M., Lin, Y., Reeve, D., and Schacht, A. "An Ultra-Low Energy Method for Rapidly Pre-Concentrating Microalgae" *Bioresource Technology*, Volume 158, April 2014, Pages 217-224
7. Marsolek, M.D., Kendall, E., Thompson, P. L., and Shuman, T. R. "Thermal Pretreatment of Algae for Anaerobic Digestion." *Bioresource Technology*, Volume 151, January 2014, Pages 373-377
8. Mason, G., Rutar Shuman, T., and Cook, K. "Comparing Effectiveness of an Inverted Classroom Concept to Traditional Delivery in an Upper Division Engineering Course," *IEEE Transactions on Education,* Vol. 56, No. 4, November 2013
9. Rutar, T., Lee, J. C. Y., Dagaut, P., Malte, P.C., and Byrne, A. A. "NOx formation pathways in lean-premixed-prevapourized combustion of fuels with carbon-to-hydrogen ratio between 0.25 and 0.88" *Proceedings of the Institution of Mechanical Engineers Vol. 221 Part A: Journal of Power and Energy*, 2007
10. Rutar, T., and Mason, G. "A Learning Community of University Freshman Design, Freshman Graphics, and High School Technology Students - Description, Projects, and Assessment." *Journal of Engineering Education*, Vol. 94, No.2, pp. 245-254, April 2005
11. Rutar, T., and Malte, P. C. "NOx Formation in High-Pressure Jet-Stirred Reactors with Significance to Lean-Premixed Combustion Turbines." *Journal of Engineering for Gas Turbines and Power*, Vol. 124, No. 4, pp. 776-783, October 2002

12. Rutar, T., Malte, P. C., and Kramlich, J. C. "Investigation of NOx and CO Formation in Lean-Premixed, Methane-Air, High-Intensity, Confined Flames at Elevated Pressures." *Proceedings of the Combustion Institute*, Vol. 28, pp. 2435-2441, 2000
13. Safoutin, M. J., Atman, C. A., Adams, R., Rutar, T., Kramlich, J. C., Fridley, J. L. "A Design Attribute Framework for Course Planning and Learning Assessment." *IEEE Transactions on Education*, Vol. 43, pp. 188-199, May 2000
14. Rutar, T., Kramlich, J. C., Malte, P. C. and Glarborg, P. "Experimental and Modeling Study of N_2O Destruction by Reburning." *Combustion and Flame*, Vol. 107, pp. 453-463, 1996

PEER-REVIEWED CONFERENCE PAPERS *(presenter's name is in italics)*

1. *Shuman, T. R.* "A project module in an upper-division Thermodynamics course that addresses EOP Systems Thinking" *Proceedings of 2025 ASEE Annual Conference and Exposition,* Montreal, Canada, 2025.
2. *Han, R.J.,* Guler, S., Litzler, E., Shuman, T. R., Cheville, A., Andrijcic, E., Mohan, S. " Creative Changemaking within Complex Institutional Contexts" *Proceedings of 2025 ASEE Annual Conference and Exposition,* Montreal, Canada, 2025.
3. Hamel, J., *Shuman, T.R.*, Kuder, K., Han, Y.-L., Cook, K. "One Program's Response to a Pilot Accreditation Criteria Concerning Diversity, Equity, and Inclusion," *Proceedings of the 2024 ASME IMECE, Portland, OR, 2024.* IMECE2024-145820
4. Han, Y.-L., Turns, J., Cook, K., Mason, G., & *Shuman, T.R*. "An "Inspiration Kit" for Building a Culture that Fosters Engineering Identity", *2024 ASEE Annual Conference and Exposition, Portland, OR, 2024*
5. Turns, J., *Cook, K. E.,* Shuman, T. R., Han, Y. -l., and Mason, G. "Designing a Toolkit for Dissemination," *2023 IEEE Frontiers in Education Conference (FIE)*, College Station, TX, USA, 2023, pp. 1-5, doi: 10.1109/FIE58773.2023.10342984
6. *Shuman, T. R.* "Online Labs and DEI in Introduction to Thermodynamics Course" *Proceedings of 2023 ASEE Annual Conference and Exposition,* Baltimore, MD, 2023, https://peer.asee.org/43785
7. *Han, Y.-L., Turns, J., Cook, K., Mason, G., & Shuman, T.R*. "Building a culture of "Engineering with Engineers"" *Proceedings of 2023 ASEE Annual Conference and Exposition*, Baltimore, MD, 2023, https://peer.asee.org/42659
8. *Turns, J.,* Han, Y.-L., Cook, K. E., Shuman, T.R., & Mason, G. "Work in progress: Creating effective prompts for "Teaming" sessions." *Proceedings of 2023 ASEE Annual Conference and Exposition*, Baltimore, MD, 2023, https://peer.asee.org/44197
9. *Shuman, T.R.,* Han, Y.L., Cook, K., Mason, G., Turns, J., "Revolutionizing Engineering Department by Changing It's Culture." *Proceedings of the 8th International Symposium on Industrial Engineering – SIE 2022*, **Plenary Session**, Belgrade, Serbia, September 29-30, 2022
10. Turns, J., *Han, Y.-L., Cook, K.,* Mason, G., and Shuman, T.R. (2022). "Work in progress: Designing a sustainable mechanism for discursively navigating change." *Proceedings of 2022 ASEE Annual Conference and Exposition*, Minneapolis, MN, 2022. https://peer.asee.org/41516

11. *Han, Y.-L., Cook, K.,* Mason, G., *Shuman, T.R.*, and Turns, J. (2022). "Cultivating a Culture to Foster Engineering Identity." *Proceedings of 2022 ASEE Annual Conference and Exposition,* Minneapolis, MN, 2022. https://peer.asee.org/41950
12. Hamel, J., Strebinger, C., Gilbertson, E., Han, Y.-L., *Cook, K.,* Mason, G., Shuman, T.R., and Turns, J. "Building Design Experience and a Greater Sense of Community through an Integrated Design Project" 2021 Frontiers in Education (FIE) Conference, Lincoln, NE, 2021
13. *Han, Y.-L., Cook, K., Mason, G.,* Shuman, T.R., and Turns, J. "Engineering with Engineers: Fostering Engineering Identity", *Proceedings of 2021 ASEE Annual Conference and Exposition*, virtual conference, 2021.
14. *Mason, G., Han, Y.-L., Cook, K.,* Hamel, J., Strebinger, C., Gilbertson, E., Shuman, T.R., and Turns, J. "Lessons Learned - Making the "New Reality" More Real: Adjusting a Hands-On Curriculum for Remote Learning", *Proceedings of 2021 ASEE Annual Conference and Exposition*, virtual conference, 2021.
15. *Han, Y.-L.,* Mason, G., Cook, K., Shuman, T.R., and Turns, J. "Integrating Electrical Engineering Fundamentals with Instrumentation and Data Acquisition in an Undergraduate Mechanical Engineering Curriculum" 2020 Frontiers in Education (FIE) Conference, Uppsala, Sweden: FIE, 2020, pp. 1-5, doi: 10.1109/FIE44824.2020.9274210.
16. *Han, Y.-L., Cook, K., Mason, G., Shuman, T.R., and Turns, J.* "Engineering with Engineers: Fostering Engineering Identity through Industry Immersion", *Proceedings of 2020 ASEE Annual Conference and Exposition*, virtual conference, 2020.
17. *Han, Y.-L., Cook, K., Mason, G., Shuman, T.R., and Turns, J.* "Engineering with Engineers: Revolutionizing a Mechanical Engineering Department through Industry Immersion and a Focus on Identity", *Proceedings of 2019 ASEE Annual Conference and Exposition*, Tampa, FL, 2019.
18. *Cook, K.,* Han, Y.-L., Mason, G., Shuman, T.R., & Turns, J. "Implicit Engineering Identity in the Mechanical Engineering Major", *Proceedings of 2019 ASEE Annual Conference and Exposition*, Tampa, FL, 2019.
19. *Han, Y., Cook, K. E., Shuman, T. R., and Mason, G., Turns, J.*, "Engineering with Engineers: Revolutionizing Engineering Education through Industry Immersion and a Focus on Identity", *Proceedings of the 2018 ASEE Annual Conference & Exposition*, 2018.
20. *Cook, K. E., Han, Y., Shuman, T. R., and Mason, G., Turns, J.*, "Engineering Identity across the Mechanical Engineering Major", *Proceedings of the 2018 ASEE Annual Conference & Exposition*, 2018.
21. *Cook, K. E., Han, Y.,* Mason, G., Shuman, T. R., and Turns, J., "Revolutionizing Engineering Education through Industry Immersion and a Focus on Identity" AERA 2018 Annual Meeting, New York City, NY, April 13-17, 2018.
22. Han, Y. L., Cook, K. E., Shuman, T. R., and Mason, G. S., "Development of Authentic Engineering Problems for Problem-Centered Learning", *Proceedings of the 2016 American Society of Engineering Education Annual Conference & Exposition*, 2016.
23. *Shuman, T.R.,* Mason, G., Han, Y.L., and Cook, K., "Facilitating Problem-Based Learning with an Inverted Classroom" *Proceedings of the 6th International*

Symposium on Industrial Engineering – SIE 2015, **Plenary Session**, Belgrade, Serbia, September 24-25, 2015

24. *Mason, G.,* Cook, K., *Han, Y.L.,* and *Shuman, T. R.,* "Facilitating Problem-Based Learning with an Inverted Classroom" *Proceedings of the 2015 American Society of Engineering Education Annual Conference & Exposition*, 2015.
25. *Mason, G., Rutar Shuman, T.,* and Cook, K. "Inverting (Flipping) Classrooms – Advantages and Challenges." *Proceedings of the 2013 American Society of Engineering Education Annual Conference & Exposition*, 2013. **ME Division Best Paper award.**
26. *Rutar Shuman, T.* and Mason, G., "Novel Approach to Conducting Labs in an Introduction to Thermodynamics Course." *Proceedings of the 2012 American Society of Engineering Education Annual Conference & Exposition*, 2012. **PIC 3 and ECC Division Best Paper award.**
27. *Rutar Shuman, T.* and Mason, G., "Description of Three Algae-Related Interdisciplinary Senior Design Projects in Mechanical Engineering and Their Impact on Students." *Proceedings of the 2011 American Society of Engineering Education Annual Conference & Exposition*, 2011. **ECC Division 2nd Best Paper award.**
28. *Rutar, T.* and Shuman, B., "A Module Oriented Project Management Approach to Undergraduate Design Projects." *Proceedings of the 2011 American Society of Engineering Education Annual Conference & Exposition*, 2011
29. *Rutar, T.* and Mason, G., "Design of Experiments in Introduction to Thermodynamics Course." *Proceedings of the 2011 American Society of Engineering Education Annual Conference & Exposition*, 2011
30. Rutar, T. and *Mason, G.,* "Three Freshman Team Design Projects." *Proceedings of the 2005 American Society of Engineering Education Annual Conference & Exposition*, 2005
31. Rutar, T. and Mason, G., "Assessing Student Design Team Performance in a Learning Community of University Freshman and High School Students." *Proceedings of the 2004 American Society of Engineering Education Annual Conference & Exposition*, 2004
32. Mason, G. and Rutar, T., "Creating a Learning Community in a Freshman Design Course with a Senior High-School Class and a Freshman Graphics Class." *Proceedings of the 2002 American Society of Engineering Education Annual Conference & Exposition*, 2002
33. Davis, D., Trevisan, M., McKenzie, L., Beyerlein, S., Daniels, P., Rutar, T., Thompson, P., and Gentili, K., "Practices for Quality Implementation of the TIDEE' Design Team Readiness Assessment'." *Proceedings of the 2002 American Society of Engineering Education Annual Conference & Exposition*, 2002
34. Rutar T., and *Malte, P. C.* "NOx Formation in High-Pressure Jet-Stirred Reactors with Significance to Lean-Premixed Combustion Turbines." Presented at the *46th ASME International Gas Turbine and Aeroengine Technical Congress, Exposition, and Users Symposium, New Orleans, Louisiana,* June 2001

35. *Rutar, T.* and Mason, G., "Short-Term Course Assessment, Improvement, and Verification Feedback Loop." *Proceedings of the 2001 American Society of Engineering Education Annual Conference & Exposition*, 2001
36. Rutar, T., Horning, D. C., Lee, J. C. Y., and *Malte, P. C.* "NOx Dependency on Residence Time and Inlet Temperature for Lean-Premixed Combustion in Jet-Stirred Reactors." Presented at the *43rd ASME Gas Turbine and Aeroengine Congress, Exhibition and Users Symposium in Stockholm, Sweden*, June 2-5, 1998
37. *Rutar, T.,* Martin, S. M., Nicol, D. G., Malte, P. C. and Pratt, D. T. "Effects of Incomplete Premixing on NO_x Formation at Temperature and Pressure Conditions of LP Combustion Turbines." Presented at the *42nd ASME Gas Turbine and Aeroengine Congress and Exhibition in Orlando, Florida,* June 2-5, 1997
38. *Nicol, D. G.,* Rutar, T., Martin, S. M., Malte, P. C. and Pratt, D. T. "Chemical Reactor Modeling Applied to the Prediction of Pollutant Emissions from an LP Combustor." Presented at the 33rd AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit in Seattle, Washington, July 7-9, 1997

INVITED PUBLICATIONS AND PRESENTATIONS

1. *Panelist*, "Faculty Development Division Panel on NSF RED Proposals", *2025 ASEE Annual Conference and Exposition,* Montreal, Canada, 2025.
2. *Shuman, T.R.,* "Changing a Culture to Bolster a Department" National Science Foundation Revolutionizing Engineering Departments (NSF RED) Consortium Meeting, **Keynote Speaker**, Alexandria, VA, September 10-12, 2024
3. *Shuman, T.R.,* ""Engineering with Engineers"–how to build a new culture?" *ASME International Mechanical Engineering Education Leadership Summit (ASME MEED)*, Atlanta, GA, March 18-21, 2024
4. *Shuman, T.R.,* Han, Y.L., Cook, K., Mason, G., Turns, J., "Revolutionizing Engineering Department by Changing Its Culture." *Proceedings of the 8th International Symposium on Industrial Engineering – SIE 2022*, **Plenary Session**, Belgrade, Serbia, September 29-30, 2022
5. *Shuman, T.R.,* "Engineering with Engineers," *ASME International Mechanical Engineering Education Leadership Summit (ASME MEED)*, **Plenary session**, Virtual, March 10-11, 2022
6. *Shuman, T.R.,* "Engineering Identity in the Engineering Profession from College to the Engineering Practice." *Konferencija Integrisanje rodne ravnopravnosti u projekte iz oblasti inženjerstva*, Virtual event, Savez inženjera i tehničara Srbije, Belgrade, Serbia, October 28, 2021
7. *Shuman, T.R. et al.* panelist for post-secondary educators, at National Science Teaching Association's *STEM20: Virtual* event, July 27-30, 2020, https://my.nsta.org/event/stem20-virtual-event, accessed January 5, 2020
8. *Shuman, T.R.*, Han, Y.-L., Cook, K., Mason, G., Turns, J. "Update on NSF Revolutionizing Engineering Departments grantees" *ASME International Mechanical Engineering Education Leadership Summit (ASME MEED)*, New Orleans, LA, March 21-23, 2019

9. *Rutar Shuman, T.,* Mason, G., and Kathleen Cook, "Experimental Design in Thermodynamics Lab. Inverting the Classroom in a Control Systems Course." Seminar, *Faculty of Mechanical Engineering, University of Belgrade, Serbia*, December 16, 2014
10. *Mason, G*., Shuman, T, Cook, K. "Experiences with Inverting a Classroom", webinar speaker, sponsored by PTC, 2014. Invited speaker.
11. *Rutar Shuman, T*. and *Mason, G.,* "Novel Approach to Conducting Labs in an Introduction to Thermodynamics Course." **Main Plenary II, *ASEE Annual Conference***, Atlanta, GA, June 25, 2013
12. *Rutar Shuman, T*. "Low-Energy Consumption and Rapid Settling of Microalgae," Mechanical Engineering Energy Seminar, *University of Washington*, Seattle, WA, May 18, 2011
13. *Rutar Shuman, T.* "Low Energy Consumption and Rapid Dewatering of Microalgae" presented at *Second Conference on Sustainability for the Pacific Northwest Region*, Seattle, WA, April 29-May 1, 2011
14. *Rutar Shuman, T*. "Algae to Fuel Processing and Oil Extraction" presented at *First Conference on Sustainability for the Pacific Northwest Region*, Seattle, WA, March 25-26, 2010
15. *Rutar Shuman, T.* "Challenges Facing Engineering Education" SIE 2009, *4th* ***International Symposium of Industrial Engineering*** **– Plenary Session** speaker, Belgrade University, Belgrade, Serbia, December 10-11, 2009
16. *Rutar Shuman, T.* "Sustainable Algal Fuel Production – Projects at Seattle University" presented at *Puget Sound AIChE* (American Institute of Chemical Engineers), October 13, 2009.
17. *Rutar Shuman, T.* "Algae senior design project at Seattle University," presented at *Northwest Biodiesel Network* meeting, October 28, 2008
18. Rutar, T., and Mason, G. "A Learning Community of University Freshman Design, Freshman Graphics, and High School Technology Students - Description, Projects, and Assessment; article summary and reflective essay on lessons learned." *Annals of Research on Engineering Education*, Vol. 2, No. 1, Winter 2006
19. *Mason, G., Rutar, T., and Adamson, J.* "Creating a Learning Community in a Freshman Design Course through Curriculum Coordination." Keynote address at WCERTE Conference, Seattle, WA, April 2004
20. *Rutar, T., Mason, G.,* and Adamson, J. "Creation of a Learning Community through Curriculum Coordination – Phase Two." NSF Grantee Poster Session presentation at the *2003 American Society of Engineering Education Annual Conference & Exposition*, Nashville, TN, 2003

WORKSHOPS

1. *Shuman, T.* "Revolutionizing an Engineering Department by Changing Its Culture," *Workshop at 2024 ASEE Annual Conference and Exposition, Portland, OR, 2024*
2. *Shuman, T.* "Revolutionizing an Engineering Department by Changing Its Culture," *AAAS-IUSE online workshop*, May 9, 2023, https://aaas-iuse.org/event/transform-

your-department-culture-helpful-examples-for-inspiring-change/, accessed July 3, 2023

2. *Cook, K., Han, Y.-L., Turns, J., Shuman, T.R., & Mason, G.* "The Sustainability of Change: A Process and Framework" Workshop at 2023 ASEE Annual Conference and Exposition, Baltimore, MD, 2023
3. *Cook, K., Shuman, T.R., Mason, G., Han, Y.-L., & Turns, J., "Will the change last? That's the question. Workshop presented at the Revolutionizing Engineering Departments (RED) Conference, Sep. 21-23, 2022, Arlington, VA: REDCON.*
4. *Han, Y.-L., Cook, K. E., & Turns, J. "*Will the change last? That's the question.*" workshop presented at the 2022 Frontiers in Education (FIE) Conference, Uppsala, Sweden: IEEE, 2022*
5. *Cook, K.,* Han, Y.L., Turns, J., Mason, G., and Shuman, T.R. "Sustaining and Transforming the Organization" NSF RED Monthly Meeting, Virtual, November 17, 2022
6. *Cook, K., Han, Y.L., Turns, J*., Mason, G., and Shuman, T.R. "Sustaining and Transforming the Organization" NSF RED Consortium Meeting, Crystal City, VA, September21-23, 2022
7. *Cook, K., Han, Y.*-L., Mason, G., Shuman, T.R., Turns, J. "Implicit Association Test (IAT) - Measuring the unconscious mind" *NSF RED grantees Workshop,* Alexandria, VA, November 4-5, 2019.
8. *Shuman, T.R., Han, Y.L., Cook, K., and Mason, G.* "Improving Your Heat Transfer Course Using Problems Supplied by Engineering Professionals and a Flipped Classroom" workshop given at 2016 American Society of Engineering Education Annual Conference & Exposition, New Orleans, LA, 2016
9. *Mason, G.*, Cook, K., and Han, Y.L., "Improving Your Course Using an Inverted Classroom" at Seattle University, Seattle WA 2016

PEER-REVIEWED CONFERENCE ABSTRACTS (undergraduate students are underlined)

1. Teodora Rutar Shuman, Ben Loveless, Jeremy Bjelajac, and Peter Griff "Continuous-flow Electro-Coagulation-Flocculation for rapid and ultra-low energy pre-concentration of microalgae", *2017 Algae Biomass Summit*, Salt Lake City, UT, October 29 - November 1, 2017.
2. Teodora Rutar Shuman, Anthony Rock, Ben Loveless, and Jeremy Bjelajac, "Continuous-flow method for pre-concentrating microalgae with flow rates up to 5 L/min and energy inputs as low as 0.05 kWh/m3 of processed algal slurry", *2016 Algae Biomass Summit*, Phoenix, AZ, October 25th, 2016.
3. *Rutar Shuman, T.,* and Mason, G., "Rapid and Ultra-low Energy-use Pre-Concentrating of Microalgae" *2014 Algae Biomass Summit,* San Diego, CA, September 29-October 2, 2014
4. *Rutar Shuman, T*., Lin, Y., Bowman, C., Kurtz, V., Pawlak, G. D., "Microalgal Cell Vitality After Ultra-Low Energy Input Rapid Dewatering Process" *2012 Algae Biomass Summit,* Denver, CO, September 24-27, 2012

5. *Rutar Shuman, T.,* Mason, G., and Hudson, M., "Rapid Microalgae Concentration and Settling In Low-Energy Use Batch and Continuous Flow Systems" *1st International Conference on Algal Biomass, Biofuels & Bioproducts*, St. Louis, MO, July 17-20, 2011
6. *Marsolek, M.,* Kendall, E., Thompson, P., and Rutar Shuman, T., "The Impact of Thermal Pretreatment on Biogas Yields from Anaerobic Digestion of Algae." *1st International Conference on Algal Biomass, Biofuels & Bioproducts*, St. Louis, MO, July 17-20, 2011
7. *Rutar Shuman, T.,* Hudson, M., Mason, G., and students: Bratzel, Beach, Chang, De Vitis, and Umagat, "Settling of Microalgae Using Low Energy Input" *2010 Algae Biomass Summit,* Phoenix, AZ, September 27-30, 2010
8. *Rutar Shuman, T.,* Hudson, M., Jackels, S., and students: Bratzel, Mayther, Woolsey, Taitano, Shikuma, and Dayringer, "Algae Lipid Extractor Designs" *2009 Algae Biomass Summit,* San Diego, CA, October 7-9, 2009
9. *Rutar Shuman, T.*, Hudson, M., and students: Tyler, Krumwied, Rodgers, Haryono, Carson, Lum, Reha, Dietzen, and Ahmad, "Photobioreactor Design- Capstone Design Project" *2008 Algae Biomass Summit,* Seattle, WA, October 23-24, 2008

CONFERENCE POSTERS, PAPERS, AND PRESENTATIONS

1. *Shuman, T.* "Engineering with Engineers – A Cultural Transformation," *WCERTE Conference*, Tacoma Community College, May 5, 2023
2. Han, Y.-L., Berger, E., Briody, E., Cook, K., Mason, G., Morrison, E., Shuman, T.R., Turns, J., and Wirtz, E. "Revolutionizing Mechanical Engineering Departments", *ASME International Mechanical Engineering Congress and Exposition*, Pittsburg, PA, 2018.
3. Han, Y.-L., Cook, K., Mason, G., Shuman, T.R., Turns, J. "How Seattle University Plans to Revolutionize Engineering Through Industry Immersion", *Investment Casting Institute 65th Technical Conference and Exposition*, Kansas City, MO, 2018.
4. *Cook, K. E., Han, Y.,* Mason, G., Shuman, T. R., and Turns, J., "Revolutionizing Engineering Education through Industry Immersion and a Focus on Identity" *AERA 2018 Annual Meeting*, New York City, NY, April 13-17, 2018.
5. *Bean, J. C.,* and *Rutar, T.* "Teaching Proposal Writing to Engineering Students: A Writing Center/Engineering Collaboration." *Proceedings of the Second European Association for the Teaching of Academic Writing (EATAW) Conference*, Budapest, June 2003
6. *Rutar Shuman, T.* and Malte, P. C. "Experimental Measurements of NOx and CO in a Jet-Stirred Reactor at Pressures of 3.0, 4.7 and 6.5 atm and Variable Residence Times." Presented at the WSS/CI conference at University of Washington, Seattle, WA, October 26 and 27, 1998
7. *Rutar Shuman, T.,* Nicol, D. G., Lee, J. C. Y., and Malte, P. C. "NOx Behavior in Lean-Premixed Combustion." Work-in-progress poster at 27th International Symposium on Combustion, Boulder, CO, Combustion Institute, August 2-7, 1998
8. Rutar, T., Martin, S. M., Nicol, D. G., Malte, P. C. and Pratt, D. T. "An Engineering Modeling Study of NO_x Dependency on Incomplete Premixing at Gas Turbine Engine Conditions." Presented at the WSS/CI Spring Meeting at SANDIA National

Laboratories, Livermore, CA, April 15 and 16, 1997

9. *Rutar, T.,* Kramlich, J. C., Malte, P. C. and Glarborg, P. "Experimental and Modeling Study of N_2O Destruction by Reburning." Presented at the WSS/CI conference at Stanford University, October 30 and 31, 1995
10. *Rutar, T.,* Kramlich, J. C., Malte, P. C. and Glarborg, P. "N_2O Destruction by Reburning." Work-in-progress poster at 25th International Symposium on Combustion, Irvine, CA, Combustion Institute, 1994

TEACHING

Seattle University 2000—present

Courses taught:

MEGR 1000 *Introduction to Mechanical Engineering,* MEGR 181 *Innovative Design,* CEEGR 3310 *Fluid Mechanics,* MEGR 3210 *Thermodynamics;* MEGR 3220 *Thermodynamics II,* MEGR 3890 *Integrated Engineering Design Project 3,* MEGR 4210 *Applied Thermodynamics,* MEGR 426 *HVAC,* MEGR 491 *Fuel Cells,* MEGR 492, 493 *Energy and Environment,* MEGR 4870, 4880, 4890 *Engineering Design I, II, III,* MEGR 2980/498 *Directed Research*

Faculty advisor for senior design projects:

St. James Cathedral-Energy Audit and Retrofit Recommendations 2011—2012
St. James Cathedral, Seattle, WA

Low Energy Consumption Device for Rapid Settling of Microalgae 2010—2011
Solution Recovery Services Energy, Dexter, MI

Building Energy Efficiency Retrofit 2009—2010
Mt. Rainier National Park

Electroporation of Algae – Design and Testing 2009—2010
Solution Recovery Services Energy, Dexter, MI
Provisional patent submitted

Photovoltaic System Design and Energy Audit for Sunrise at Mt. Rainier National Park 2008—2009
University National Park Energy Partnership Program

Algae Oil Extractor 2008—2009
Boeing

Photobioreactor Design for Algal Production 2006—2007
Bioalgene, LLC

Passive Cab Extender 2005—2006
Kenworth Truck Company, Kirkland, WA
US patent application submitted

Fan Shroud Design 2004—2005
Kenworth Truck Company, Kirkland, WA
US patent application submitted

Fuel Concentration Measurements in Experimental Pulse Detonation Engine 2003—2004
Pratt & Whitney Seattle Aerosciences Center, Bellevue,WA

Finite Element Simulation of Ultrasound Probe Temperature Rise 2002—2003
Siemens Medical Solutions, Issaquah, WA
Dynamic Cab Extender: Design, Construction, and Testing 2001—2002
Kenworth Truck Company, Kirkland, WA
US patent number 6846035
Alternative Power for Remote USCG Communication Stations 2000—2001
US Coast Guard, Seattle, WA

University of Washington 1992—1999
Instructor: ENGR 100 *Intro. to Eng. Design*; ME 333 *Intro. to Fluid Mechanics*
Teaching Assistant: *Graduate Gas Dynamics, Intro. to Eng. Design, Solar Energy, Thermodynamics 1* and *2, Turbomachinery, Heat Transfer* and *Mech. of Materials*

SERVICE

Professional:

Proposal Reviewer, *NSF - DUE* 2000, 2009, 2024
WCERTE Representative 2017—present
Reviewer, *ASEE Annual Conference* 2010—present
Co-organizer, *ASME International Mechanical Engineering Education Leadership Summit (ASME MEED)*, Virtual, March 10-11, 2022 2022
Seattle U representative at Pacific Northwest Cooperative Ecosystem Studies Unit 2017—2019
Division Chair, *ASEE Energy Conversion and Conservation Division* 2016—2017
Program Chair, *2015 ASEE Annual Conference, ECC Division* 2014—2015
Officer, *ASEE Energy Conversion and Conservation Division* 2012—2017
Nomination committee member, *ASME Ben C. Sparks Medal* 2015
Radio-show participant *"Setting the Course for Women in Engineering"* http://www.blogtalkradio.com/edutalk2/2015/03/20/setting-the-course-for-women-in-engineering-from-the-stem-ed-coalition, March 20, 2015 2015
Proposal Reviewer, *NSF-GRFP* 2014—2015
Award Committee Member, *ASEE Sharon A. Keillor Award for Women in Engineering Education* 2010—2012
PhD thesis committee member, *University of Washington* 2011—2013
MS thesis committee member, *University of Washington* 2003, 2004, 2008
Reviewer, *Chemical Engineering Journal*, Elsevier, IF=5.3 2014
Reviewer, *Proceedings of the Institution of Mechanical Engineers, Part A, Journal of Power and Energy* 2007—2011
Paper Reviewer, *ASME/IGTI Turbo Expo* 1997, 1998, 2001, 2002
Reviewer, *Journal of Engineering for Gas Turbines and Power* 2000, 2001
Scientific Committee, *Journal of Engineering Management and Competitiveness* 2011—present
Scientific Committee, *5th International Symposium of Industrial Engineering 2012*, June 14-15, 2012, Belgrade, Serbia 2012

Executive Committee Member, *WSSCI* 2001—2003

Seattle University:

Faculty Handbook Revision Committee, member 2019—2021
Billodue Maker Space Advisory group, member 2019—2021
Chair, MSME Program development 2017—2018
Faculty Reviewer of Academic Assessment Reports for the Office of the Provost 2015, 2016
Facilitator, Provost Celebration of Faculty Scholarship 2014
Faculty Handbook Revision Committee member 2007
Summer in Seattle Freshman Orientation program, lecturer 2006, 2007
New Faculty Institute, planning committee member 2005—2006
Summer Faculty Fellowship Committee, member 2004—2006
Board of Trustees meeting, Seattle University 2004
Senior Synthesis Committee, Seattle University 2003

College of Science and Engineering, Seattle University:

CSE UCOR Task Force, member 2025
CSE Bannan Chair Review Committee, member 2024
College Personnel Committee, member 2009—2011, 2019—2022
Boeing diversity grant committee, member 2017—2021
Subcommittee for APR reviews, member 2018
Ad-hoc EXCO committee, member 2015, 2018
Substantial assistance to College Development Officer 2015—present
Chair, Master of Science in Mechanical Eng. program development 2015—2016
Co-chair, Master of Eng. in Systems Engineering, program design, development and hiring committee 2013—2015
Clare Boothe Luce Faculty Planning committee, member 2012—2016
Puget Sound Engineering Council Mentor Day for students, organizer 2000—2006
Local Community College visits 2001—2004
TIDEE assessment coordinator and grader 2001—2004

Mechanical Engineering Department, Seattle University:

Chair, faculty and staff hiring committees 2012—present
Mechanical Engineering Department Seminar organizer Chair or member, ABET accreditation assistance or leader 2005—present
Department (ME,CEE,CSE) Personnel Committees 2006—2012
2009—present
ASHRAE student chapter advisor; three awarded scholarships 2009—2012
Found paying sponsors for six mech. eng. senior design projects 2008—2010
Assisted in developing Project Management lectures/workshops 2009—2010
SciEng, ME, and Syst. Eng. Advisory board meeting presentations 2002—present
Faculty search committees, member 2003, 2004

Department Chair search committee, member 2000
ASME Advisor 2000—2001
Acting Chair for Department of Mechanical Engineering Summer 2000

OUTREACH

Lake Washington School District's Career and Technical Education Program Advisory Committee member 2014—present
Represented SU at Engineering and Computer Science night, Lake Washington Highschool 2014—2020
Refugee Women Alliance (ReWA) Board Member 2014—2018

AWARDS

Dean's Award for demonstrated leadership and tireless commitment to excellence to Department of Mechanical Engineering, College of Science and Engineering, Seattle University 2019
Dean's Outstanding Teaching Award for Teaching Assistant for 1998 College of Engineering, University of Washington 1998
Society of Women Engineers: Outstanding Female Graduate Student Award 1997

MEMBERSHIPS

ASEE member 2000—present
Algal Biomass Organization member 2009—present
ASME member 2018—present
The Combustion Institute member 1996—2009