

# PATRICK E. PHELAN

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## EDUCATION AND TRAINING

Tulane University, New Orleans, Louisiana, Mechanical Engineering, B.S., 1985  
Massachusetts Institute of Technology, Cambridge, Mechanical Engineering, M.S., 1987  
University of California, Berkeley, Mechanical Engineering, Ph.D., 1990  
Tokyo Institute of Technology, Tokyo, Japan, Post-Doctoral Fellow, 1990 - 1992

## RESEARCH AND PROFESSIONAL EXPERIENCE

Years	Position
1996 – present	ASU Asst., Assoc., and now Professor of Mechanical & Aerospace Engr
2016 - present	ASU Assistant Dean of Graduate Programs, Engineering
2016 - present	Assistant Director, <a href="#">ASU Industrial Assessment Center</a>
2020 - present	VBeck LLC, Chief Technical Officer
2020 – present	Section Editor-in-Chief, <a href="#">Energies</a> , Energy and Buildings
2015 – 10/2016	Co-Chair, International Expert Panel for the High-Ambient Testing Program
2012 – 7/2016	Manager, Emerging Technologies Program, DOE Building Tech. Office
2010 – 2012	Director, ASU Professional Science Master's in Solar Energy Engr & Comm
2008 – 2014	Associate Editor, <i>ASME Journal of Heat Transfer</i>
2008 – 2012	Graduate Program Chair, ASU Mechanical & Aerospace Engineering
2007 – 2008	Program Director, Thermal Transport Processes, NSF
2006 – 2012	Associate Director, ASU National Center of Excellence on SMART Innovations (SMART = Sustainable Materials & Renewable Technologies)
1997 – 2006	Director, ASU Industrial Assessment Center
Summer 2000	Motorola-ASU Faculty Fellow
1992 – 1995	University of Hawaii Asst. Professor of Mechanical Engineering
Summer 1994	Argonne National Laboratory (ANL) Summer Faculty Research Participant

## SAMPLE PUBLICATIONS ([GOOGLE SCHOLAR](#) H-INDEX = 51 AS OF JULY 2020)

- Bamasag, A., Alqahtani, T., Sinha, S., Ghaffour, N., & Phelan, P.E., 2020, “Experimental investigation of a solar-heated direct contact membrane distillation system using evacuated tube collectors,” *Desalination* **487**, pp. 114497.
- Alajmi, T., & Phelan, P.E., 2020, “Modeling and Forecasting End-Use Energy Consumption for Residential Buildings in Kuwait Using a Bottom-Up Approach,” *Energies* **13**, pp. 1981, <https://doi.org/10.3390/en13081981>.
- Phelan, P.E., Wang, N., Hu, M., & Roberts, J.D., 2020, “Sustainable, Healthy Buildings & Communities,” Guest Editorial for Special Issue of *Building and Environment* **174**, pp. 106806.
- Aldous, L., Phelan, P., Taylor, R., & Obeng, B., 2019, “PCT patent application for systems and

methods for a power-generating thermogalvanic brick,” pending PCT patent following the U.S. provisional patent application serial number 62/747,595 filed on October 18, 2019.

- Nazir, H., Batool, M., Bolivar Osorio, F.J., Isaza-Ruiz, M., Xu, X., Vignarooban, K., Phelan, P.E., & Kannan, A.M., 2019, “Recent developments in phase change materials for energy storage applications: A review,” *Int. Journal of Heat and Mass Transfer* **129**, pp. 491-523.
- Salvi, S.S., Bhalla, V., Taylor, R.A., Khullar, V., Otanicar, T.P., Phelan, P.E., & Tyagi, H., 2018, “Technological Advances to Maximize Solar Collector Energy Output: A Review,” *ASME Journal of Electronic Packaging* **140**, pp. 040802.
- Zhang, Z., Alelyani, S.M., Zhang, N., Zeng, C., Yuan, Y., & Phelan, P.E., 2018, “Thermodynamic Analysis of a Novel Sodium Hydroxide-Water Solution Absorption Refrigeration, Heating and Power System for Low-Temperature Heat Sources,” *Applied Energy* **222**, pp. 1-12.
- Wang, N., Phelan, P.E., Gonzalez, J., Harris, C., Henze, G.P., Hutchinson, R., Langevin, J., Lazarus, M.A., Nelson, B., Pyke, C., Roth, K., Rouse, D., Sawyer, K., & Selkowitz, S., 2017, “Ten questions concerning future buildings beyond zero energy and carbon neutrality,” *Building and Environment* **119**, pp. 169–182.
- Alelyani, S.M., Fette, N.W., Stechel, E.B., Doron, P., & Phelan, P.E., 2017, “Techno-economic analysis of combined ammonia-water absorption refrigeration and desalination,” *Energy Conversion and Management* **143**, pp. 493–504.
- Phelan, P.E. & Phelan, B.E., 2017, “Relationship between ambient temperature and mental health in the USA,” *Environments* **4**, pp. 71, DOI:10.3390/environments4040071
- Lee, S., Pandiyan, D., Seo, J.-S., Phelan, P.E., & Wu, C.-J., 2016, “Thermoelectric-based sustainable self-cooling for fine-grained processor hot spots,” *15th IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (ITHERM)*, pp. 847-856.
- Miner, M.J., Taylor, R.A., Jones, C., & Phelan, P.E., 2016, “Efficiency, Economics, and the Urban Heat Island,” *Environment and Urbanization*, DOI: 10.1177/0956247816655676, pp. 1 – 12.
- C. Harris, C., J. Langevin, J., A. Roth, A., P.E. Phelan, P.E., A. Parker, A., B. Ball, B., & L. Brackney, L., 2016, “Scout: An Impact Analysis Tool for Building Energy-Efficiency Technologies,” *ACEEE Summer Study on Energy Efficiency in Buildings*.
- Gunawan, A., Fette, N.W., & Phelan, P.E., 2015, “Thermogalvanic waste heat recovery system in automobiles,” PowerEnergy2015-49094, *Proc. of the ASME 2015 Power and Energy Conversion Conference*, San Diego, CA, June 28-July 2 (NOTE: This won the “Best Student Research Paper Award” for this conference.)
- Phelan, P.E., Kaloush, K., Miner, M., Golden, J., Phelan, B., Silva III, Humberto, & Taylor, R.A., 2015, “Urban Heat Island: Mechanisms, Implications, and Possible Remedies,” *Annual Review of Environment and Resources* **40**, pp. 285-307.
- Lee, S., Phelan, P.E., & Wu, C.-J., 2015, “Hot Spot Cooling and Harvesting Central Processing Unit Waste Heat Using Thermoelectric Modules,” *ASME Journal of Electronic Packaging* **137**, pp. 031010.

- Haywood, A., Sherbeck, J., Phelan, P.E., Varsamopoulos, G., & Gupta, S.K.S., 2015, “The Relationship Among CPU Utilization, Temperature, and Thermal Power for Waste Heat Utilization,” *Energy Conversion and Management* **95**, pp. 297-303.
- Gunawan, A., Li, H., Lin, C.-H., Buttry, D.A., Mujica, V., Taylor, R.A., Prasher, R.S., & Phelan, P.E., 2014, “The amplifying effect of natural convection on power generation of thermogalvanic cells,” *International Journal of Heat and Mass Transfer* **78**, pp. 423 – 434.
- Phelan, P.E., Otanicar, T.P., Taylor, R.A., & Tyagi, H., 2013, “Trends and Opportunities in Direct-Absorption Solar Thermal Collectors,” *ASME Journal of Thermal Science & Engineering Applications* **5**, pp. 021003.
- Gunawan, A., Lin, C.-H., Buttry, D.A., Mujica, V., Taylor, R.A., Prasher, R.S., & Phelan, P.E., 2013, “Liquid Thermoelectrics: Review of Recent and Limited New Data of Thermogalvanic Cell Experiments,” *Nanoscale and Microscale Thermophysical Engineering* **17**, pp. 304-323.
- Taylor, R., Coulombe, S., Otanicar, T., Phelan, P.E., Gunawan, A., Lv, W., Rosengarten, G., Prasher, R.S., & Tyagi, H., 2013, “Small Particles, Big Impacts: A Review of the Diverse Applications of Nanofluids,” *Journal of Applied Physics* **113**, pp. 011301.
- Otanicar, T., Taylor, R.A., & Phelan, P.E., 2012, “Prospects for Solar Cooling—An Economic and Environmental Assessment,” *Solar Energy* **86**, pp. 1287 – 1299.
- Lin, C.-H., Gunawan, A., Phelan, P.E., Buttry, D.A., Mujica, V., Taylor, R.A., Prasher, R., 2012, “Optimization of cell configuration for maximizing performance of a Cu/Cu<sup>2+</sup> aqueous thermogalvanic cell,” IMECE2012-88796, *Proc. of the ASME 2012 International Mechanical Engineering Congress & Exposition*, Houston, TX, Nov 9-15.
- Otanicar, T., Chowdhury, I., Phelan, P.E., & Prasher, R.S., 2010, “Parametric Analysis of a Coupled Photovoltaic/Thermal Concentrating Solar Collector for Electricity Generation,” *Journal of Applied Physics* **108**, pp. 114907.
- Phelan, P.E., Bhattacharya, P., & Prasher, R.S., 2005, “Nanofluids for Heat Transfer Applications,” *Annual Reviews of Heat Transfer* **14**, pp. 255 – 275.

## **SYNERGISTIC ACTIVITIES**

- Served as the Manager of the Emerging Technologies Program, US Department of Energy Building Technologies Office, from 2012 – 2016.
- Established a new Professional Science Master’s Degree in Solar Energy Engineering & Commercialization, with NSF support and ASU colleagues, and served as the Founding Director.
- Served as the Director of the Thermal Transport Processes Program at the National Science Foundation from 2006 – 2008.
- Engaged numerous undergraduate students in research and outreach activities, both in the laboratory and in the DOE-sponsored *Industrial Assessment Center*. I have supervised or co-supervised 20 PhD students, 52 master’s students, and 17 undergraduate honor’s students.