

**EDUCATION**

BS in Mechanical Engineering, The University of Tennessee at Knoxville

2019

**PROFESSIONAL EXPERIENCE****R&D Assistant Staff, Building Envelope Materials Research,*****Oak Ridge National Laboratory* 2020–Present**

Research interests include the development of novel concepts that utilize advanced materials and target optimal project-specific manufacturing techniques for application in building envelopes. Howard specializes in FEA, whole-building energy, and computational modeling as they apply to material performance (both thermal and mechanical) and energy savings. Howard's current research includes development of modular overclad panels, identification of facer properties to prevent insulative foam aging, and anisotropic thermal management system optimization and performance characterization.

**Post-Bachelor's Research Associate****2019–2020**

Contributed to projects related to reduction in peak demand and total building energy consumption. Utilized computational geometry models of closed-cell foams to determine the contribution of solid conduction to the overall effective thermal conductivity of insulation materials. Evaluated data from natural expose test facilities and validated anisotropic thermal management models with this data.

**PROFESSIONAL ORGANIZATIONS**

- Affiliate of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
- Member of American Society of Mechanical Engineers (ASME)

**PUBLICATIONS**

- Feng T, Francoeur M, Rai A, Hun D, Howard D, Desjarlais A, Shrestha, S. Gas, Solid, and Radiative Thermal Conductivities in Thermal Insulation Materials: A Comprehensive and Critical Revisit. *In Review by Journal*.
- Rai A, Feng T, Howard D, Shrestha S, et al. Conduction Heat Transfer Through Solid in Porous Materials: A Comparative Study by Finite-Element Simulations and Effective Medium Approximations. *Computational Thermal Sciences*.
- Shrestha S, Desjarlais A, Howard D, et al. On Climate Benefits and Building Energy Efficiency Gains from Improved Roofing Insulation in Cold Climates, as Quantified by New Modeling Tools. *IIBEC Interface*.

**PATENTS AND INVENTION DISCLOSURES**

- Shrestha S, Feng T, Howard D, et al. ORNL. ThermoPI: Thermal Conductivity Calculation Application for Porous Thermal Insulation Materials. US Invention disclosure 202104780.