


Kedar Prashant Shete


EDUCATION


PhD in Mechanical Engineering University of Massachusetts Amherst	Cumulative GPA: 3.840 Dec 2022
MS in Mechanical Engineering University of Massachusetts Amherst	Cumulative GPA: 3.771 September 2019
Bachelor of Engineering in Mechanical Engineering Birla Institute of Technology and Science-Pilani, India	August 2014



WORK EXPERIENCE

Assistant Director Feb 2023 - current
Centre for Energy Efficiency and Renewable Energy
University of Massachusetts Amherst



Graduate Research Assistant Sep 2019 - Jan 2023
Center for Energy Efficiency and Renewable Energy (CEERE) 
University of Massachusetts Amherst
Project: Experimental and Numerical Studies of Latent Heat Thermal Energy Storage (LHTES)


- Designed, built and tested a LHTES heat exchanger of capacity 200 Wh under varying operating conditions. Testing rig has flow control within $\pm 0.01\%$, automated data acquisition and SCR controlled 3 phase heater for precise temperature control of ± 0.1 C. Time lapse images of heat exchanger were analyzed with OpenCV (Python) and Unsupervised Machine Learning techniques to calculate melted fraction .

Graduate Researcher Feb 2021 - Aug 2021
National Renewable Energy Laboratory (NREL) 
Projects: Characterization of Thermal Resistances of PCM based Thermal Energy Storage (TES), Effect of convection on heat transfer rates in LHTES.

- Published article 'Measuring the Maximum Capacity and Thermal Resistances in Phase-Change Thermal Storage Devices', Journal of Energy Storage, 2022 
- Built and tested two rectangular LHTES devices to measure heat transfer rates vs time as device is discharged (melted).
- Verified experimentally that heat transfer rate is constant for a significant period, and melted fraction varies linearly with time, as predicted in earlier model 

Lead Engineer Sep 2017 - Jan 2023
Industrial Assessment Center (IAC)
University of Massachusetts Amherst
Responsibility: Assessing industrial facilities and identifying measures of saving or producing additional energy, estimating expenses for implementation, writing reports in collaboration with IAC team and facility engineering teams. Some typical recommendations include Combined Heat and Power, Variable Speed Drives (VSD/VFD) on pumps/motors, HVAC control algorithms for temperature and humidity to optimize comfort and energy use, Solar PV, Water turbines, Heat recovery from Air Compressors, LED Lighting, Installing Heat Pumps, Chiller setpoint optimization.

- Achieved more than \$1 million annually for customers, through implemented recommendations from visits I conducted. Center wide savings of over \$82 million are achieved 
- Saved more than 99 million MMBTU's in energy through implemented recommendations.
- Lead Student for center, led and conducted 34 energy assessments
- Presenter for invited talk "Heat Pumps in Water Treatment Plants" for IAC Lead Webinar, see link here 

Graduate Research Assistant Oct 2016 - Dec 2018
Turbulence Simulation Laboratory 
University of Massachusetts Amherst
Project: Isosurface Area in Homogeneous Isotropic Turbulence (HIT) as a function of Reynolds and Schmidt Numbers

- Calculated(for the first time in published literature) the isosurface statistics for 28 different DNS datasets ranging from Taylor Reynolds Number 24 to 633 and Schmidt number 0.1 to 7, obtained a power law scaling with Péclet number,

published in Journal of Fluid Mechanics, see [📄](#).

Senior Mechanical Engineer

Mar 2016 - Jul 2016

Thermax Ltd.

Responsibility: Design an air-cooled condenser using Heat Transfer Research, Inc. (HTRI) and heat transfer correlations

- Created an alternative design procedure for air-cooled condensers using published heat transfer correlations and HTRI software, validated method using site data for 50 different site installations.
- Diversified company offerings in air-cooled condensers beyond the range of in-house software to include 10 more designs (3 additional fin pitch and tube inclinations).

Application Engineer

Jun 2014 - Sep 2015

SKF India Ltd.

Responsibility: Design bearing systems for original equipment manufacturers (OEM's)

- Achievement award for successful improvement in energy efficiency of Ring Frame Spinning Machines at Arvind Mills, 2014, see [🌟](#)
- Designed bearing systems for crushers, vibrating screens, conveyors, motor and pump systems, transmission boxes, gearboxes
- Solved chronic bearing failure issues by conducting root cause failure analysis (RCFA)

Undergraduate Researcher

Jan 2014 - Aug 2014

Birla Institute of Technology and Science-Pilani, India

Projects: Exploring the effects of novel distributor plate geometries on multiphase flow in Circulating Fluidized Bed (CFB) risers and heat recovery using fins from Cyclone Separators

- Optimized distributor plate design to minimize pressure drop and maximize mixing of flow in a CFB riser, published in ASME Power and Energy 2016, see [📄](#).

GRANTS AND AWARDS

- Advanced Leadership Computing Facility (ALCF), Argonne National Lab [🌟](#) for FY2023, 1.2 million core hours, Principal Investigator, FY 2022 to 2023.
- National Renewable Energy Laboratory, Eagle [🔗](#), 22.8 million core hours (1,902,900 Allocation Units), Co-Principal Lead, FY 2022 to 2023.
- National Renewable Energy Laboratory, Eagle [🔗](#), 11.9 million core hours (1,190,022 Allocation Units), Co-Principal Lead, FY 2021 to 2022.
- Awarded \$25,000 for Excellence in Applied Energy Engineering Research 2020 for project proposal entitled "Design of Latent Thermal Energy Storage Heat Exchangers for Combined Heat and Power Plants" , see [🌟](#), 2020

PUBLICATIONS

Journal

- Allison Mahvi, **Kedar Prashant Shete**, Adewale Odukumaiya, Jason Woods, Measuring the maximum capacity and thermal resistances in phase-change thermal storage devices, Journal of Energy Storage, Nov 2022 [📄](#)
- **Kedar Prashant Shete**, David J. Boucher, James J. Riley, Steve de Bruyn Kops, Effect of the presence of inertial-convective and viscous-convective subranges on the statistics of a passive scalar in Homogeneous Isotropic Turbulence at high Reynolds number, Physical Review Fluids, Jan 2022 [📄](#)
- **Kedar Prashant Shete**, Steve de Bruyn Kops, Dragoljub (Beka) Kosanovic, A first principles framework to predict the transient performance of latent heat thermal energy storage, Journal of Energy Storage, 2021 [📄](#)
- **Kedar Prashant Shete**, Steve de Bruyn Kops, Area of scalar isosurfaces in Isotropic Homogeneous Turbulence as a function of Reynolds and Schmidt numbers, Journal of Fluid Mechanics, 2019 [📄](#)
- **Kedar Prashant Shete**, Steve de Bruyn Kops, Irene Dujovne, Dragoljub (Beka) Kosanovic, Characteristics of performance curves of a thermal battery under varying operating conditions, Journal of Energy Storage, in preparation
- **Kedar Prashant Shete**, Dragoljub (Beka) Kosanovic, Steve de Bruyn Kops, Towards higher order methods for melting and solidification flows for thermal energy storage, Applied Mathematical Modelling, in preparation

Referred Conferences

- **Kedar Prashant Shete**, Meet Kalola, Mahesh Dasar, R.S. Patil Effect of Novel Swirling Perforated Distributor on Fluid Dynamic Characteristics of Circulating Fluidized Bed Riser, ASME Power and Energy Conference 2016, June 2016, [📄](#)

- **Kedar Prashant Shete**, P. A. Kulkarni, and R.S. Patil, Computational Studies on Effects of Novel Geometries of Distributor Plates on Fluid Dynamics Characteristics of Circulating Fluidized Bed Riser in 5th International Conference on Fluid Mechanics and Fluid Power (FMFP 2014) (pg-199), 2014, [📄](#)
- P. A. Kulkarni, **Kedar Prashant Shete**, S. Jogdankar, and R.S. Patil, Effect of Barrel Wall Fin of the Cyclone Separator on Fluid Dynamic Characteristics in 5th International Conference on Fluid Mechanics and Fluid Power (FMFP 2014) (pg-103), 2014, [📄](#)

Invited Talks

- **Kedar Prashant Shete**, A first principles framework to predict the transient performance of latent heat thermal energy storage, 2nd Forum of Revolutions in Renewable Energy in 21st Century (FOREN-2022) March 21, 2022
- **Kedar Prashant Shete** and Allison Mahvi, Effect of Cycling Degradation on the Performance of Composite PCM based LHTES, Invited Talk, NetEnergy, Denver CO, June 2021
- **Kedar Prashant Shete**, Latent Heat Thermal Energy Storage for Demand Reduction, 2021 Industrial Assessment Center Directors Meeting, Chicago, IL, August 30, 2021
- **Kedar Prashant Shete**, Feasibility Study of Heat Pumps in Water Treatment Plants, Industrial Assessment Center Lead Meeting, October 14, 2021

Conference

- **Kedar Prashant Shete**, Esha Mujumdar, Steve de Bruyn Kops, Dragoljub (Beka) Kosanovic, The effect of Rayleigh number on the temporal variation of the Nusselt number for buoyancy driven melting in a rectangular LHTES device, APS Division of Fluid Dynamics Meeting, G14.00001, 2022
- **Kedar Prashant Shete**, David Boucher, James Riley, Steve de Bruyn Kops, The effect of the presence of inertial-convective and viscous-convective subranges on the statistics of a passive scalar in Homogeneous Isotropic Turbulence in air and water, APS Division of Fluid Dynamics Meeting, P22. 011, 2021
- **Kedar Prashant Shete**, Steve de Bruyn Kops, Area of scalar isosurfaces in homogeneous isotropic turbulence, APS Division of Fluid Dynamics Meeting, H19. 005, 2019