PROF. RAJESH KUMAR

Professor, Department of Mechanical Engineering
Delhi Technological University, Bawana Road, Delhi-110042
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DOB: 01/01/1975

EXPERIENCE: 21 years of teaching and research

EMPLOYMENT TILL DATE:

- **PROFESSOR** (Delhi Technological University, New Delhi)-15 June 2015 to till date
- ASSOCIATE PROFESSOR (Delhi Technological University, New Delhi)-15 June 2012 to 14 June 2015.
- READER (MITS, Gwalior): 10 August 2010 to 11June 2012.
- LECTURER (Amity School of Engg. and Tech., New Delhi):1August 2000 to July 2010.

SPECIALIZATION: Refrigeration & Air- conditioning, Fluid Mechanics, Thermodynamics, Heat transfer, solar energy,

ACADEMIC QUALIFICATIONS: B.Tech.(Mech. Engg.), M.E.(Thermal Engg.), Ph.D. (Thermal Engg.)

RESEARCH PUBLICATIONS:
Published in International Journal = 45
International Conference = 30
ORCID ID=0000-0002-9839-6001

RESEARCH PAPERS PUBLISHED IN: **INTERNATIONAL JOURNALS**

1. Mohd Asjad Siddiqui, Abdul Khaliq, **Rajesh Kumar** "Thermodynamic and comparative analysis of ERC and ARC integrated wet-ethanol fueled HCCI engine for cogeneration of power and cooling ***ASME*- Journal of Thermal Science and Engineering Applications *(ASME, SCIE indexed)* (Published Online on June 29, 2021)**

2. Abdul Khaliq, Bandar A. Almohammadi, Mathkar A. Alharthi, **Rajesh Kumar,** Mohd Asjad Siddiqui "Investigation of a combined refrigeration and air conditioning system based on two-phase ejector driven by exhaust gases of natural gas fueled homogeneous charge compression ignition engine" **ASME-*JOURNAL OF ENERGY RESOURCES TECHNOLOGY* (ASME, SCIE indexed) (Accepted)**

3. Mohd Asjad Siddiqui, Abdul Khaliq, **Rajesh Kumar** "Proposal and analysis of a novel cooling-power cogeneration system driven by the exhaust gas heat of HCCI engine fuelled by wet-ethanol" **Energy, Volume 232, October 2021**,(**Elsevier, SCIE indexed**)

4. Faizan Khalid, **Rajesh Kumar** and Farrukh Khalid "Feasibility study of a new solar based trigeneration system for fresh water, cooling and electricity production" **International Journal of Energy Research (Accepted, July 2021) (John Wiley & Sons, SCIE indexed)**

5. Kaushalendra Kumar Singh, **Rajesh Kumar**, Anjana Gupta. "Multi-objective optimization of thermodynamic and economic performances of natural refrigerants for cascade refrigeration" Arabian Journal for Science and Engineering. **(Accepted, June 2021) (Springer, SCIE indexed)**

6. Kaushalendra Kumar Singh, Rajesh Kumar, Anjana Gupta "Comparative Exergetic, Economic and Exergoeconomic analysis of a hybrid cascade refrigeration system using ammonia-propane, propane-propylene and isobutane-propane refrigerant pairs", **Exergy – an international Journal (accepted, March 2021)(Inderscience, SCIE indexed) .**

7. Abdul Khaliq, Mathkar A Alharthi, Saeed Alqaed, Esmail Mokheimer, **Rajesh Kumar** "Analysis and Assessment of Tower Solar Collector Driven Trigeneration System" **Journal of Solar Energy Engineering**,142(5), 051003-10 , OCTOBER 2020**, Transactions of the ASME.**

8. Devendra Kumar Gupta, **Rajesh Kumar**, Naveen Kumar, "Performance analysis of PTC field based ejector organic Rankine cycle integrated with a triple pressure level vapor absorption system (EORTPAS)", Engineering Science and Technology, an International Journal **(ELSEVIER, SCIE indexed),** Available online 2 May 2019(2020).

9. Kaushalendra Kumar Singh, **Rajesh Kumar**, Anjana Gupta," Comparative energy, exergy and economic analysis of a cascade refrigeration system incorporated with flash tank (HTC) and a flash intercooler with indirect subcooler (LTC) using natural refrigerant couples, **Sustainable Energy Technologies and Assessments(Elsevier)**, Volume 39, 2020, 100716, https://doi.org/10.1016/j.seta.2020.100716.

10. Sanjay Sundriyal, Jitender Yadav, R.S. Walia , Vipin, and **Rajesh Kumar, "**Thermophysical-Based Modeling of Material Removal in Powder Mixed Near-Dry Electric Discharge Machining" **Journal of Materials Engineering and Performance(2020), springer. 1059-9495.**

11. Gaurav Krishnayatra, Sulekh Tokas, **Rajesh Kumar**," Numerical heat transfer analysis & predicting thermal performance of fins for a novel heat exchanger using machine learning" **Case Studies in Thermal Engineering(Elsevier**) vol. 21 (2020) 100706.

12. Abdul Khaliq, **Rajesh Kumar**, Esmail M.A. Mokheimer, "Investigation on a solar thermal power and ejector-absorption refrigeration system based on first and second law analyses", **Energy 164 (2018) 1030-1043.**

13. Abdul Khaliq, Esmail M.A. Mokheimer and **Rajesh Kumar**, "Energy and exergy analyses of a solar powered multi-effect cooling cycle", ***Int. J. Exergy****, 27(4), 2018*

14. U. Sahoo, R. Kumar, S.K. Singh, A.K. Tripathi, "Energy, exergy, economic analysis and optimization of polygeneration hybrid solar-biomass system", **Applied Thermal Engineering** 145 (2018) 685–692

15. U. Sahoo, R. Kumar, P C Pant, R. Chaudhary "Resource assessment for hybrid solar-biomass power plant and its thermodynamic evaluation in India" **Solar Energy, 139(2016), 47-57**

16. U. Sahoo, R. Kumar, P.C. Pant, R. Chaudhary "Development of an innovative polygeneration process in hybrid solar-biomass system for combined power, cooling and desalination" **Applied Thermal Engineering 120 (2017) 560–567**

17. U. Sahoo, R. Kumar, P C Pant, R. Chaudhary "Scope and sustainability of hybrid solar–biomass power plant with cooling, desalination in polygeneration process in India" **Renewable and sustainable energy reviews,51(2015), 304-316.**

18. Devendra Kumar Gupta, Rajesh Kumar, Naveen Kumar "Thermodynamic Evaluation of PTC Based Organic Rankine Cycle for Power & Cooling" **European Journal of Engineering Research and Science, 2(1), 2017, 1-7.**

19. Devendra Kumar Gupta, Rajesh Kumar, Naveen Kumar "First and Second Law Analysis of Solar Operated Combined Rankine and Ejector Refrigeration Cycle" **International Journal of Applied Solar Energy**, Vol. 50, No.2. 2014, pp. 113-121.

20. S K Agrawal, Rajesh Kumar, Abdul khaliq, P jayaswal "Energy and exergy analysis of a novel solar assisted cogeneration cycle for simultaneous heating and triple effect cooling applications" **Int. J. of Exergy,vol 18, no.3(2015), pp-275-296.**

21. U.Sahoo, R. Kumar, P. C. Pant, S. K. Singh and P. Saxena., Evaluation of Solar Thermal Technologies and Applications in India. Advances in Energy Research. Volume 21, Nova Publisher, Hauppauge NY 11788-3619, U.S.A. (Book Id: 6822 & Chapter Id: 31782).

22. Rajesh Kumar, Abdul Khaliq, P.B. Sharma(2013) "Energy and exergy analyses of a new waste heat driven cogeneration cycle for simultaneous cooling and heating applications" **ASHRAE Transactions , pp288-301**

23. Abdul Khaliq, Rajesh Kumar, Ibrahim Dincer and Farrukh Khalid (2013)'Energy and exergy analyses of a new triple-staged refrigeration cycle using solar heat source' **ASME Transaction, J. Sol. Energy Eng. 136(1) ,doi:10.1115/1.4024126.**

24. SK Agrawal, R Kumar, A Khaliq (2013) 'First and second law investigation of a new solar assisted thermodynamic cycle for triple effect refrigeration' **International Journal of Energy Research, Article first published online: 21 MAR 2013,DOI: 10.1002/er.3015.**

25. Abdul Khaliq, Basant Agrawal and Rajesh Kumar (2012) 'First and second law investigation of waste heat based combined power and ejector–absorption refrigeration cycle" **Int Journal of Refrigeration, 35 , pp.88-97 .**

26. Rajesh Kumar and Abdul Khaliq,(2011) "Exergy Analysis of Waste Heat Recovery Based Ejector Vapor Compression Refrigeration system" **Int. J Energy Institute, 84(4),192-199 (Switzerland).**

27. Khaliq, A., and Kumar, R. (2009) "Exergy analysis of an Industrial Waste Heat Recovery Based Combined Compression Absorption Refrigeration Cycle," In Refrigeration :Theory, Technology and Applications, Nova Science Publishers, Inc., ISBN: 978-1-61668-930-8.

28. Khaliq, A., Kumar, R., and Dincer, I., (2009) "Performance Analysis of an Industrial Waste Heat Recovery Based Trigeneration System," **Int. J. of Energy Research, 33, pp.737-744.**

29. Abdul Khaliq, Rajesh Kumar and I. Dincer (2009) 'Exergy analysis of an industrial waste heat recovery based cogeneration cycle for combined power generation and refrigeration system' **Trans. of ASME-Journal of Energy Resource Technology, JUNE 2009, Vol. 131, pp. 1-7 (USA).**

30. Abdul Khaliq and Rajesh Kumar (2008) 'Thermodynamic performance assessment of gas turbine trigeneration system for combined heat cold and power production' Trans. of ASME-Journal of Engineering for Gas Turbines and Power, Vol.130, pp.1-4 (USA).

31. Abdul Khaliq and Rajesh Kumar (2008) 'Exergy analysis of double effect vapor absorption refrigeration system' International Journal of Energy Research, Vol.32, pp.161-174 (UK).

32. Abdul Khaliq and Rajesh Kumar (2007) 'Exergetic analysis of solar powered absorption refrigeration system using LiBr-H2O and NH3-H2O as working fluids', International Journal of Exergy, Vol. 4, No. 1, pp. 38-53 (Switzerland).

33. Abdul Khaliq and Rajesh Kumar (2005) 'Finite-time heat-transfer analysis and ecological optimization of an endoreversible and regenerated gas turbine power cycle', Applied Energy – An International Journal, Vol. 81, pp. 73-84 (Netherland).

34. U. Sahoo, S.K. Singh, R.Kumar, P.C.Pant, I.Barbate. "Performance study of an inclined Flat Plate type Solar Water Distillation System". Renewable: wind, water and solar 2016;3:2-5.

35. U.Sahoo, S.K.Singh, R.Kumar, P. Kumar. "Mathematical Modelling of Portable Solar Water Heating System". Journal of Technology Innovations in Renewable Energy 2015;4: 91-95.

36. U.Sahoo, S.K.Singh, R.Kumar, P.Kumar, "Experimental study of Portable Solar Water heating system". International Journal of Renewable Energy Development 2015;7:107-112.

37. Ravindra Kannojiya and **Rajesh Kumar,** Performance Evaluation of Absorption Refrigeration Systems Using Intelligent Optimization Techniques: A Review**,** International Journal of Mechanical and Production Engineering Research and Development (IJMPERD) ISSN (P): 2249–6890; ISSN (E): 2249–8001 Vol. 9, Issue 5, Oct 2019, 961–972 **(Published) (Scopus Indexed Journal)**

38. Ravindra Kannojiya and **Rajesh Kumar**, Thermoeconomic Evaluation & Intelligent Optimization of Solar-thermal Driven Single-Effect LiBr-H_2O Absorption Refrigeration System, Publisher TJPRC. **(Accepted)** (**Scopus Indexed Journal)**

39. Ravindra Kannojiya and **Rajesh Kumar**, Intelligent Optimization of Solar Operated Double-Effect LiBr-H_2O Absorption Refrigeration System, Publisher IJMPERD, TJPRC. **(Accepted) (Scopus Indexed Journal)**

40. **Sunil Kumar Sinha**, Naveen Kumar, (2019) Utilization of Blends of Biodiesel and Higher Alcohols in Small Capacity Diesel Engine, DOI: 10.4271/2019-01-0580(Publisher: SAE Technical Paper 2019-01-0580, Scopus indexed)

41. **Sunil Kumar Sinha**, Naveen Kumar, Rajesh Kumar (2019) Characterization of the Physicochemical Property of Blend of Butanol and Octanol with Biodiesel, *DOI:10.35940/ijitee.L3083.1081219. (Publisher: IJITEE, Scopus indexed)*

42. **Sunil Kumar Sinha**, Naveen Kumar, Rajesh Kumar (2019) Performance emission of n-octanol- biodiesel blend in diesel engine, DOI:.35940/ijrte.D7406.118419 (Publisher: IJRTE, Scopus indexed)

43. Vijay Shekhar Sharma, **Rajesh Kumar,** "Cellulose as Thermal Insulation and Its Comparative study with EPS Insulation". Solid State Technology, PennWell Publishing Co. (SCOPUS JOURNAL, 2020)

44. *Gaurav Krishnayatra*, Sulekh Tokas, **Rajesh Kumar,** "Numerical heat transfer analysis & predicting thermal performance of fins for a novel heat exchanger using machine learning". ***Case Studies in Thermal Engineering, Elsevier (SCIE)***, 2020.

45. *Gaurav Krishnayatra*, Sulekh Tokas, **Rajesh Kumar,** Mohd. Zunaid, "Parametric study of natural convection showing effects of geometry, number and orientation of fins on a finned tube system: a numerical approach", ***Journal of Thermal Engineering (ESCI)***, Yildiz University Press

46. *Gaurav Krishnayatra*, **Rajesh Kumar ,:** "Convective Heat Transfer Analysis of Longitudinal Fins on Horizontal Hollow Cylinder ", International Journal of Mechanical and Production Engineering (IJMPE), 7 (11), 32-37, 2019

RESEARCH PAPERS PUBLISHED IN: **INTERNATIONAL CONFERENCES:**

1. Kaushalendra Kumar Singh, **Rajesh Kumar**, Anjana Gupta. Multi-objective optimization of an ammonia based multi-stage vapour compression refrigeration system with flash intercooler cum sub-cooler. *Paper presented at*: 3rd International conference on Computational and Experimental Methods in Mechanical Engineering; 2021 Feb 11-13; Greater Noida, India.

2. Kaushalendra Kumar Singh, **Rajesh Kumar**, Anjana Gupta. Multi-objective optimization of cascade refrigeration system using NH_3-CO_2 and NH_3-N_2O refrigerant pairs. *Paper presented at*: 3rd International conference on Computational and Experimental Methods in Mechanical Engineering; 2021 Feb 11-13; Greater Noida, India.

3. Mohd Asjad Siddiqui, Abdul Khaliq, **Rajesh Kumar.** Thermodynamic analysis of exhaust waste heat recovery from turbocharged HCCI engine fueled by wet-ethanol using an Absorption

Refrigeration Cycle (ARC), *Paper presented at*: 1st International conference on Technology Innovation in Mechanical Engineering; 2021 May 10-11; Bhopal, India.

4. Mohd Asjad Siddiqui, Abdul Khaliq, **Rajesh Kumar.** Thermodynamic investigations of a turbocharged homogeneous charge compression ignition (HCCI) engine running on wet-ethanol, *Paper presented at*: 1st International conference on Technology Innovation in Mechanical Engineering; 2021 May 10-11; Bhopal, India.

5. Gaurav Krishnayatra, Sulekh Tokas, **Rajesh Kumar**, and Mohd. Zunaid, " 3 Dimensional CFD analysis of Laminar Flow Natural Convection of Hollor Cylinder with Annular Fins", **Proceedings of 5th World Congress of Mechanical Chemical & Materials Engg. (SCOPUS)**, 2019

RESEARCH GUIDANCE

Details of Ph.D students			
S.No.	**Name**	**Title of thesis**	**status**
1	Surendra Agrawal	ENERGY AND EXERGY ANALYSIS OF SOLAR THERMAL DRIVEN MULTIPLE OUTPUT THERMODYNAMIC CYCLE	**Awarded in RGPV Bhopal(2017)**
2	Umakant Sahoo	DESIGN AND OPTIMIZATION OF POLYGENERATION PROCESS IN HYBRID SOLAR THERMAL POWER PLANT FOR COOLING & DESALINATION"	**Awarded in DTU Delhi(2017)**
3	Devendra Kumar Gupta	THERMODYNAMIC ANALYSIS OF SOLAR OPERATED COMBINED POWER AND EJECTOR REFRIGERATION CYCLE USING ECOFRIENDLY REFRIGERANTS	**Awarded in DTU, Delhi (2018)**
4	R. Kannojia	PERFORMANCE ANALYSIS OF SOLAR-THERMAL DRIVEN ADVANCED REFRIGERATION SYSTEMS USING INTELLIGENT TECHNIQUES	**Awarded in DTU, Delhi (2020)**
5	Sunil Kumar Sinha	Study on use of Renewable Fuels in a Compression Ignition Engine	**Awarded in DTU Delhi(2020)**
6	Kaushlendra Kumar Singh	PERFORMANCE ANALYSIS AND MULTI OBJECTIVE OPTIMIZATION OF MULTI STAGE VAPOUR COMPRESSION REFRIGERATION SYSTEMS	**work completed (2021)**

7	Mohd Asjad Siddiqui	ENERGY AND EXERGY RECOVERY FROM WET-ETHANOL FUELLED HCCI ENGINE FOR PERFORMANCE ENHANCEMENT AND AIR CONDITIONING	**work completed (2021)**
8	Mayank Singhal	INVESTIGATION OF THERMOPHYSICAL ASPECTS OF INFRARED DETECTOR CRYOCHAMBER WITH CRYOCOOLING	Registered in DTU Delhi(2017)
9	Prabhat Ranjan	THERMAL ANALYSIS AND CHARACTERIZATION OF FGM COATING USING HVOF FOR CYLINDER LINER OF I.C. ENGINE	Registered in DTU Delhi(2016)
10	JAYESH KUMAR	THERMODYNAMIC MODELING AND EXPERIMENTAL INVESTIGATION OF PCM BASED LHTES SYSTEM WITH EMBEDDED HEAT PIPES FOR THERMAL CHARGING PERFORMANCE ENHANCEMENT	Registered in DTU Delhi(2018)
11	Yogendra Singh	DESIGN AND EXPERIMENTAL INVESTIGATION OF AN INNOVATIVE SOLAR DRYER-CUM-SPACE HEATING SYSTEM USING THERMAL ENERGY STORAGE	Registered in DTU Delhi(2018)
12	SACHIN RANA	CFD MODELLING FOR SHAPE OPTIMIZATION OF PHASE CHANGE MATERIAL (PCM) HEAT EXCHANGER IN DOMESTIC SOLAR WATER HEATING SYSTEM	Registered in DTU Delhi(2018)
13	Faizan Khalid	Thermodynamic analysis of solar based polygeneration system for a residential community	Registered in DTU Delhi(2019)

Details of M.Tech. students			
S.No.	**Name**	**Title of thesis**	**status**
1	Rohit Goyal	Thermodynamic analysis of waste heat based operated steam ejector refrigeration system	Completed(2014)
2	Rahul Singh	Thermodynamic analysis of diesel engine exhaust heat operated NH_3-H_2O refrigeration system	completed(2014)
3	Mahendra Pandey	Exergy analysis of Power plant	completed(2014)
4	Santosh Kumar	Design and Simulation of Portable Solar Distillation System and Domestic hot water in Co-generation Process	completed(2015)
5	Saurabh	Thermodynamic analysis of Air conditioning system using waste heat of steel plant	completed(2015)
6	Mayank Kumar	CFD analysis of two phase flow inside a horizontal tube	completed(2015)

7	Chandra Shekharsom	Thermodynamic analysis of power generation using waste heat of cement and steel plant	completed(2016)
8	Sajal Gupta	Evaluation of Energy and Exergy Performance of a Cryogenic Air Separation Plant for generating Liquid Oxygen : A Case Study	completed(2016)
9	KanavVij	Designing of Mechanism for Multi-Axis Sun Tracking System	completed(2016)
10	Sachin	MODELLING OF TRIPLE PRESSURE-REHEAT AND SUPPLEMENTARY FIRED COMBINED CYCLE POWER PLANT USING GT PRO	completed(2016)
11	Abhishek	Analysis of Wind Turbine Power Generation For Different Turbine Rotors	completed(2016)
12	Ashish Yadav	Designing of A Solar Concentrator Based Mechanical Process Heat Applications In Hospitality Industry	completed(2017)
13	Vivek Hans	Estimation of Power Generation Capacity of Non Woody Biomass and Coal Biomass Mixed Fuel Samples and Their Energy Values	completed(2017)
14	Vikas Kumar Tomar	Feasibility Study of Concentrated Solar Thermal Steam Cooking System: An Application In DTU Hostel	completed(2017)
15	Piyush Raj	Investigating The Scaling Effects On Blade Structural Characteristics Of Wind Turbine Using Cfd Simulation	Completed (2018)
16.	Jitendra Yadav	Thermo-Physical Modelling Of Powder Mixed Near Dry Edm Process	Completed (2018)
17.	Amit Sheoran	Analytical Simulation And Fabrication Of Compressed Air Driven Engine Using four-stroke SI Engine	Completed (2018)
18	Saurabh Anand (2K17/THE/14)	Comparative analysis of Thermodynamics performance of Cascade Refrigeration system for refrigerant Couple R23/R290 and R23/R600A	Completed (2019)
19	Gaurav Krishnayatra	Thermal Hydraulic Modelling of Intermediate Heat Exchanger used in Liquid Metal Cooled Nuclear Reactor	Completed (2020)
20	Vijay Shekhar Sharma	Fabrication of cellulose fibre for thermal insulation using paper waste	Completed (2020)
21	Pankaj Kumar	Experimental Study on wire mesh based flat plate collector	-

INVITED LECTURES AND CHAIRMANSHIPS AT NATIONAL OR INTERNATIONAL CONFERENCE/ SEMINARS

S. No.	Title of Lecture/ Academic Session	Title of Conference/ Seminar with date (s)etc	Organized by	Whether International/ National/State
1	HYBRID SOLAR AND BIOMASS SYSTEM FOR POWER, COOLING & DESALINATION	Technology Innovations in Mechanical Engineering 2021(TIME-2021)(Key note speaker)	Sagar Institute of Science and Technology Gandhi Nagar Bhopal Bhopal (755), India, April 12-13, 2021	International
2.	Renewable energy: a review	Two weeks short term course on "Thermodynamics and its applications to solar energy systems design" 9-18 March, 2019	MITS, Gwalior	National
3.	(Recent applications of solar energy) Key note speaker	Recent advancement in mechanical engineering	Delhi college of technology and management, Palwal(Haryana)	National
4.	Fluid dynamics and CFD	Advances in chemical Engineering	MITS, Gwalior	National
5.	Modelling of thermal systems	Modeling and Simulation of Dynamical Systems and Optimization (June 9 –June 13, 2014)	Delhi Technological University (TEQIP-II)	National
6.	Applications of solar energy for power generation	Renewable Energy and Alternative Fuels(REAF-2014)"	Delhi Technological University (TEQIP-II)	National

CONFERENCE AND FDP ORGANIZED:

1. Joint organizing secretary of STME-2013(INTERNATIONAL CONFERENCE)
2. Co-Coordinator of "Modeling and Simulation of Dynamical Systems and Optimization (MSDSO-2014)" June 9 –June 13, 2014
3. Co-Coordinator of "Renewable Energy and Alternative Fuels (REAF-2014) June 16 – June 20, 2014

4. Co-Coordinator of "Precision Manufacturing: Technology for Better Tomorrow (PMTBT-14) "July 14 – July 18, 2014.

SUBJECTS TAUGHT:

1. Advanced Fluid Mechanics (PG)
2. Fluid Mechanics (UG)
3. Heat & Mass Transfer (UG)
4. Refrigeration and Air-Conditioning (UG)
5. Thermodynamics (UG)
6. Energy conservation and efficiency (PG)
7. Solar energy (PG)
8. Power plant Engineering (UG &PG)
9. Engineering Mechanics (UG)
10. Engineering Graphics (UG)

OTHER INFORMATION

- **Life time member of Solar Energy Society of India**
- **Fellow of The Institution of Engineers(INDIA)**

(Prof. Rajesh Kumar)
Professor
Mech Engg Dept
DTU, Delhi