DR.-ING. USMAN ALLAUDDIN

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CARRIER ACHIEVEMENTS

Washington Accord and PEC Re-accreditation Visits	Made a crucial contribution to two major achievements: ➢ Securing a six-year extension in Pakistan's Full Signatory status of Washington Accord ➢ PEC Re-accreditation of Departments of Mechanical, Industrial & Manufacturing, Electronic and Telecommunication Engineering of NED University.
Awards	➢ Ali Suleiman Habib Engineering Excellence Award 2024 ➢ NED Alumni Association of Southern California USA Best Published Researcher Award 2022, 2021 and 2020. ➢ NEDUET Best Researcher Award 2024, 2023, 2022 and 2021. ➢ NED Alumni Association of Southern California USA Best Teacher Award 2020.
Publications	➢ 29 Journal articles and 15 International Conference papers
PhD supervision	Completed: One, In-progress: Three
Master Thesis Supervision	➢ Supervised 13 Master Thesis
Research and Innovation Funding	➢ HEC Start Up Research Grant 2018 ➢ NGIRI-IGNITE Research Funding 2020 for TWO different projects ➢ Funding from NED University for Independent Research Project 2019 ➢ Funding from DICE Foundation USA for SEVEN different projects ➢ Funding from Thal Engineering Pvt. Ltd. and Gresham's Eastern Pvt. Ltd. for FOUR different projects ➢ Funding from Silicon Valley USA ➢ PhD Research Funding from NED University for FOUR different projects ➢ HEC NRPU Grant 2021
Session Chair	➢ 2nd International Conference on Modern Technologies in Mechanical & Materials Engineering (MTME-2024) held at GIK Institute of Engineering Sciences and Technology, Topi, Pakistan. ➢ 10th, 11th, and 12th International Mechanical Engineering Conferences held at NED University of Engineering & Technology. ➢ National Conference on Computational Mechanics held at PIEAS, Islamabad.
Distinguished Speaker	National Conference on Computational Mechanics (NCCM 2019) held at PIEAS, Islamabad.
Professional Courses	➢ SIX sessions of "Hands-on Training of Computational Fluid Dynamics" ➢ FOUR sessions of "Boiler Operation and Maintenance" through NED Academy in collaboration with PEC Pakistan. ➢ ONE session of "Online course on Computational Fluid Dynamics" ➢ ONE session of "Industrial Steam Boiler System, Operation, Maintenance and Safety"
Distinction	BE Mechanical Engineering from NED University with Distinction
Conferences & Events	➢ Focal Person in 1st National Conference on Industrial Linkage by NED UET, 2024 ➢ Part of organizing committee of 9th, 10th, 11th, and 12th International Mechanical Engineering Conferences held at NED UET Karachi. ➢ Organized mega event titled "DICE Energy & Water 2018" as Chief Organizer ➢ Arranged On-job Trainings in different industries for about 800 participants in a GIZ-NEDUET Project "Skills Upgradation of Teaching Staff through Workplace Based Training Delivery" 2021.
Research Center	➢ Serving as Director of NED DICE Energy Innovation Centre
Indigenous Products	➢ Developed indigenous Battery-pack for EV cars, uni-directional fan, and solar panel laminator

BRIEF PROFESSIONAL CAREER PROFILE

Dr. Usman Allauddin did B.E and M.E in Mechanical Engineering with distinction from NED University of Engineering & Technology. He did PhD from University of Budeswehr, Munich Germany in 2017. I joined NED University as Lecturer in 2009. Currently, he is serving the Department of Mechanical Engineering of the same University as an Associate Professor. He is also the Director of NED DICE Energy Innovation Center. He has taught courses of Thermodynamics, Internal Combustion Engines, Introduction to Computational Fluid Dynamics, Advanced Heat Transfer, Advanced Fluid Mechanics, Computational Fluid Dynamics and Applied Combustion Engineering during my teaching career at NED University. His research expertise are Computational Fluid Dynamics, Turbulence Modelling & Simulation, Thermo-fluid Modelling, Impinging Jets System modelling, Computational Aerodynamics, Performance Enhancement of Energy Devices, Renewable Energy, Combustion Modelling, Combustor Design and Optimization, Battery Packs of Electric vehicles, etc. He has been an active researcher since 2012 and since then he has published 29 research articles in renowned journals and 15 research articles in International/national conferences. He has research collaborations with Cranfield University of UK, Dyson Institute UK, Prince Mohammad Bin Fahd University of Saudia Arabia, Technical University of Brunei, University of Bundeswehr of Germany, DHA SUFFA University, UET Lahore, etc. He is doing different research projects together. He also has a strong collaboration with industries and doing different industry projects. Recently, he won Ali Suleiman Habib Engineering Excellence Award for my excellence in the field of engineering and resultantly made outstanding contributions to society and the nation at large. His project "Design, Simulation and Fabrication of Battery Pack with Thermal, Vibration and Battery Management System for an Electric Car" won that award for him. Dr. Usman Allauddin has also been offering professional courses on Computational Fluid Dynamics and Industrial Boilers since 2018.

Google Scholar Profile: https://scholar.google.com/citations?user=jOthSmQAAAAJ&hl=en
Scopus Profile: https://www.scopus.com/authid/detail.uri?authorId=55674085400
LinkedIn Profile: www.linkedin.com/in/dr-ing-usman-allauddin-a65143307
NED University Profile: https://med.neduet.edu.pk/node/22
Memberships: Pakistan Engineering Council (MECH/21445) The Institution of Engineers Pakistan (Reg. No. 024385)

EDUCATIONAL HISTORY

Doktor-Ingenieur (Dr.-Ing.) (Doctor Engineer) **2017**
Institute of Thermodynamics, University of Bundeswehr, Munich, Germany

M.Engg in Mechanical Engineering (Energy Systems, 2nd Position, 3.7 CGPA) **2011**
NED University of Engineering & Technology, Karachi

B.E in Mechanical Engineering (With Distinction, 3.7 CGPA) **2009**
NED University of Engineering & Technology, Karachi

PhD Thesis

Title: "Modeling of Turbulent Premixed Combustion using LES and RANS Methods"
Supervisor: Prof. Dr. rer. nat. Michael Pfitzner
University: University of Bundeswehr, Munich, Germany

Abstract:

- Modelling and simulation of complex processes of turbulent premixed combustion for varied pressures, inlet conditions of flow and turbulent length scales.
- A novel LES sub-grid Flame Surface density model is used to investigate various features of significant importance e.g. counter-gradient sub-grid scalar flux, pressure and Lewis number effects.
- The performance of the simplified version of the model is investigated.
- RANS version of the model is developed and investigated its performance in comparison to the original model and well documented experimental data.

Number of publications:

Four journal and four conference (international) publications.

Journal Publications:

1. U. Allauddin, S.R.R. Lomada M. Pfitzner, "Investigation of pressure and the Lewis number effects in the context of flame surface density closure for LES of premixed turbulent combustion", Theoretical and Computational Fluid Dynamics, vol. 35(1), pp. 17-37, 2021.
2. U. Allauddin, M. Pfitzner, "Development of a RANS premixed turbulent combustion model based on the algebraic flame surface density concept" Journal of Engineering for Gas Turbines and Power, vol. 141(2), 2018.
3. U. Allauddin, M. Klein, M. Pfitzner, N. Chakraborty, "A-priori and a-posteriori analysis of algebraic flame surface density modelling in the context of large eddy simulation of turbulent premixed combustion", Numerical Heat Transfer, part A,vol. 71(2), pp. 153-171, 2017.
4. R. Keppeler, E. Tangermann, U. Allauddin, M. Pfitzner, "LES of low to high turbulence combustion in an elevated pressure environment", Flow Turbulence Combustion, vol. 92, pp. 767-802, 2014.

Conference Publications:

1. U. Allauddin, R. Keppeler, M. Pfitzner, "Turbulent premixed LES combustion models based on fractal flame surface density concept", ASME paper GT2014-25919, Proc. ASME Turbo Expo, Düsseldorf, Germany, June 2014.
2. M. Klein, U. Allauddin, R. Keppeler, M. Pfitzner, "Towards uncertainty quantification and quality assessment for large eddy simulation of turbulent premixed combustion", In Uncertainty Quantification in Computational Fluid Dynamics, Paris, France, May 2015.
3. P. Janas, U. Allauddin, M. Pfitzner, B. Boehm, A. Kempf, "Numerical investigation of the influence of different valve seat geometries on the in-cylinder flow and combustion in spark ignition engines", abstract accepted for LES4ICE, Rueil-Malmaison, France, November 2016.
4. U. Allauddin, M. Klein, M. Pfitzner, N. Chakraborty, "A-priori and a-posteriori analysis of algebraic flame surface density modelling in the context of large eddy simulation of turbulent premixed combustion", Proc. SPEIC 14 – Towards sustainable combustion, Lisboa, Portugal, November, 2014.

INDEPENDENT STUDY PROJECT / MASTER THESIS

Title: "The Simulation of Turbulent Axisymmetric Impinging Jets using RANS Methods"
Supervisor: Prof. Dr. Naseem Uddin
University: NED University of Engineering & Technology

Abstract:

- Numerically investigated the flow field and heat transfer augmentation via axisymmetric detached rib-roughners in single and multiple jets impingement with and without cross-flow interactions
- Examined the influence of jet Reynolds number, jet-outlet-to-target wall distance, blowing ratio, rib clearance ratio, rib width and rib height
- Did the validation of numerical predictions with the relevant experimental data and performed Grid Sensitivity analysis through GCI method to reduce the discretization errors
- The presence of detached ribs showed a significant augmentation in heat transfer in single jet impingement without cross-flow and enhanced peak Nusselt number in single and multiple jets impingement with detached ribs and cross-flow at moderate cross-flow velocities.

Number of publications: Two journal publications.

1. U. Allauddin, N. Uddin, S. O. Neumann, "Heat transfer enhancement by detached-ribs on a flat surface subjected to jet impingement", Numerical Heat Transfer ,part A, vol. 63, pp. 921-940, 2013.
2. U. Allauddin, N. Uddin, "Heat transfer enhancement by detached-ribs on a surface subjected to jet impingement", J. Thermophysics Heat Transfer, vol. 27, pp. 355-359, 2013.

EMPLOYMENT HISTORY

Department/Organization	Post	Date from	Date to	Short Job Description
Mechanical/NED University of Engineering & Technology	Lecturer (Contract) BPS-18	24-Jan-09	07-Feb-10	Teaching, R&D, Supervision of Undergraduate, Industrial Projects, Administrative Work, etc.
Mechanical/NED University of Engineering & Technology	Lecturer (Adhoc) BPS-18	08-Feb-10	23-Jun-10	Teaching, R&D, Supervision of Undergraduate, Industrial Projects, Administrative Work, etc.
Mechanical/NED University of Engineering & Technology	Lecturer (Permanent) BPS-18	24-Jun-10	14-Mar-18	Teaching, R&D, Supervision of Undergraduate, Industrial Projects, Administrative Work, etc.
Mechanical/NED University of Engineering & Technology	Assistant Professor (Permanent) BPS-19	15-Mar-18	10-Jan-22	Teaching, Supervision of Undergraduate, Postgraduate, Industrial and Research Projects, R&D, Administrative Work, Director Ned Dice Energy Innovation Center.
Mechanical/NED University of Engineering & Technology	Associate Professor (Permanent) BPS-20	11-Jan-22	To-date	Teaching, Supervision of Undergraduate, Postgraduate, Industrial and Research Projects, R&D, Administrative Work, Director Ned Dice Energy Innovation Center, Organizing different National and International events, etc.

RESEARCH AND INNOVATION GRANTS

Recipient of PhD funding of Rs. 0.5 million as a supervisor of project tilted "Thermal Performance Augmentation of Ranque-Hilsch Vortex Tubes through Geometric Modifications" **(Status: In-progress)**
Recipient of PhD funding of Rs. 1 million as a supervisor of project tilted "Performance evaluation of thermo-hydraulic characteristics of mini-Channel heat sink using advanced cooling techniques" **(Status: In-progress)**
Recipient of PhD funding of 0.5 million as a supervisor of project tilted "Thermal and Optical Performance Enhancement of Solar Dish-Cavity Receiver System" **(Status: In-progress)**
Recipient of PhD funding of 1 million as a co-supervisor of project tilted "Flow patterns and Heat Transfer in Circulating Fluidized Beds" **(Status: Completed)**
Recipient of HEC NRPU Grant of Rs. 5664000/- for project titled "Performance Optimization of Energy storage using Phase change materials" (Ref No. 20-17068/NRPU/R&D/HEC/2021 2021, As CoPI) **(Status In-progress)**
Recipient of funding of Rs. 0.16 million from DICE Foundation, USA for project entitled "Digital Cluster for Electric Car" **(Status: completed)**
Recipient of funding of Rs. 0.212 million from DICE Foundation, USA for project entitled "Design and Development of Instrument Cluster (Speedometer) for Electric Vehicle" **(Status: Completed)**
Recipient of funding of Rs. 0.15 million from DICE Foundation, USA for project entitled "Design and Development of Three in one E-Axle for an Electric Vehicle (Gearbox)" **(Status: Completed)**
Recipient of funding of Rs. 0.15 million from DICE Foundation, USA for project entitled "Design and Development of Inverter and Motor-Controller of Three-in-one E-Axle for Electric Vehicle", **(Status: Completed)**
Recipient of funding of Rs. 0.15 million from DICE Foundation, USA for project entitled "Designing and Development of E-Axle (Electric Motor) For Electrical Vehicle" **(Status: Completed)**
Recipient of funding of Rs. 1.85 million from DICE Foundation, USA for project entitled "Design, Simulation and Fabrication of Thermal, Vibration and Battery Management System for the Dice Electric Car" **(Status: Completed)**
Recipient of funding of Rs. 0.2 million from NED DICE Energy Innovation Center for projects entitled "Design of system for conservation of Energy & Water at Thal Engineering" and "Energy storage systems for electrified vehicles", **(Status: Completed)**
Recipient of funding of Rs. 0.2 million from NED DICE Energy Innovation Center for projects entitled "The CFD/FES Analysis of the Revoax Reverse Flue Boilers" and "Part detailing of EV three wheeler on solid modelling along with FES", **(Status: Completed)**
Recipient of HEC Start Up Research Grant of Rs. 487,800/- (Ref. No. SRGP-2067, 2018) **(Status: completed)**
Recipient of PKR 1 million funding for the Independent Research Project titled "Performance Enhancement of an Impinging Jet System Using a Variety of Techniques". **(Status: completed)**
Recipient of NGIRI-IGNITE 2020 research funding on two R&D projects titled "Numerical Study to Investigate Heat and Fluid Flow Characteristics of a Roughened Solar Air Heater" and "Part Detailing of EV Three Wheeler on Solid Modelling along with FES". **(Status: completed)**
Recipient of PKR 0.8 million funding from Thal Engineering Pvt. Ltd. and Gresham's Eastern Pvt. Ltd. for NED DICE Energy Innovation Center **(Status: Utilized)**
Recipient of USD 5000 funding from Silicon Valley Builders USA for Upgradation of numerical facility at NED DICE Energy Innovation Center **(Status: Utilized)**
Recipient of USD 25000 funding from Ciena Health Care USA for Upgradation of NED DICE Energy Innovation Center **(Status: Utilized)**
Applied for Rs. 5 million research grant under Sindh Research Support Program 2024-25 with research project titled "Impact of Turbulators and Nanoparticles on Performance Enhancement of Heat Exchangers in Solar Applications – Combined Experimental and Numerical Study" as PI. **(Status: Under Review)**

DEVELOPMENT OF AN ADVANCED HPC FACILITY

Developed an advanced High Performance Computational (HPC) facility in the Mechanical department from the funding received from HEC. Using this facility, I published following research papers in high-quality JCR journals:

1. U. Allauddin, H.M.U. Khan, R. Mohiuddin, N. Uddin, W.A. Khan, "Nanoscale heat transfer investigation of an array of jets impingement with different working fluids under crossflow with and without pin-fins", Journal of Heat Transfer, vol. 50(1), 81-104, 2020.
2. U. Allauddin, T. Jamil, M. Shakaib, H.M.U. Khan, R. Mohiuddin, M.S. Saeed, H. Ahsan, N. Uddin., Heat transfer enhancement caused by impinging jets of Al_2O_3-water nanofluid on a micro-pin fin roughened surface under crossflow conditions−A numerical study, J. Enhanced Heat Transfer, vol. 27(4), pp. 367-387, 2020.
3. U. Allauddin et al., Parametric Study of Swirl Effects on Combustion in an Industrial Natural Gas Combustor using CFD, Journal of Engineering Thermophysics, vol. 30(1), pp. 75-102, 2020.

PHD SUPERVISION

1. Flow patterns and Heat Transfer in Circulating Fluidized Beds" **(Status: Completed)**
2. Performance evaluation of thermo-hydraulic characteristics of mini-Channel heat sink using advanced cooling techniques" **(Status: In-progress)**
3. Thermal and Optical Performance Enhancement of Solar Dish-Cavity Receiver System" **(Status: In-progress)**
4. Thermal Performance Augmentation of Ranque-Hilsch Vortex Tubes through Geometric Modifications **(Status: In-progress)**

MASTER THESIS SUPERVISION

1. Numerical Investigation of Flow and Heat Transfer Characteristics in Nanofluid Impinging Jet System. **(Status: Completed)**
2. Performance enhancement of an impinging jet system using a variety of techniques. **(Status: Completed)**
3. Theoretical and experimental design of reversible axial exhaust fan. **(Status: Completed)**
4. Heat transfer and fluid flow characteristics investigation using detached ribs in a wall jet flow. **(Status: Completed)**
5. A Numerical Study for the Thermal Performance Enhancement of Heat Exchangers. **(Status: Completed)**
6. Investigation of Flow and Heat Transfer over a Dimpled Plate Jet Impingement System. **(Status: Completed)**
7. Simulation of Ranque – Hilsch Vortex Tube using RANS Methods. **(Status: Completed)**
8. Effect of Nozzle Shape on Fluid Flow and Heat Transfer characteristics of an Impinging Jet System – A Numerical Study **(Status: Completed)**
9. Comparative study on heat transfer enhancement by turbulent impinging jet under passive excitations **(Status: Completed)**
10. Heat Transfer Enhancement Study on a Surface having Axisymmetric Detached Ribs exposed to Impinging Jet flow. **(Status: Completed)**
11. Modeling Simulation and Analysis of Chassis Frame for Electric Vehicle. **(Status: Completed)**
12. Static Aero-Elastic Analysis of Expanded Reinforced Polystyrene Composite UAV Wing. **(Status: Completed)**
13. Numerical Analysis of Cooling Performance of High-Power Electronic Devices using Liquid Metals **(Status: Completed)**

AWARDS AND ACHIEVEMENTS

1. Played significant role in the successful re-accreditation of Washington Accord and PEC Accreditation of Mechanical, Industrial & Manufacturing, Electronic and Telecommunication Engineering Departments of NED University.
2. Organized 1st National Conference on Industrial Linkage by NED UET, 2024 as Focal Person.
3. Recipient of Ali Suleiman Habib Engineering Excellence Award 2024
4. Recipient of Best Teacher Award 2020 by NED Alumni Association of Southern California, USA.
5. Recipient of Best Published Researcher Award 2022 by NED Alumni Association of Southern California, USA.
6. Recipient of Best Published Researcher Award 2020 by NED Alumni Association of Southern California, USA.
7. Recipient of Best Published Researcher Award 2021 by NED Alumni Association of Southern California, USA.
8. Recipient of NEDUET Best Researcher Award 2024, 2023, 2022, 2021 and 2020.
9. Worked as a reviewer for International Journal of Heat and Mass Transfer, Journal of Numerical Heat Transfer, Part A: Applications, Journal of Waves in Random and Complex Media, Journal of Heat Transfer and Journal of Energy & Fuels
10. Participated as "Session Chair" in 2nd International Conference on Modern Technologies in Mechanical & Materials Engineering (MTME-2024) held at GIK Institute of Engineering Sciences and Technology, Topi, Pakistan.
11. Participated as "Distinguished Speaker" in National Conference on Computational Mechanics (NCCM 2019) held at PIEAS, Islamabad.
12. Participated as "Session Chair" in National Conference on Computational Mechanics (NCCM 2019) held at PIEAS, Islamabad.
13. Participated as "Session Chair" in 13th, 12th, 11th International Mechanical Engineering Conferences held at NED UET Karachi.
14. Part of Technical Advisory Committee of 13th, 12th, 11th, 10th and 9th International Mechanical Engineering Conferences held at NED UET Karachi.
15. Organized SIX sessions of a professional course titled "Hands on Training of Computational Fluid Dynamics" through NED Academy at Mechanical Engineering Department.
16. Organized ONE session of an online professional course on Computational Fluid Dynamics through NED Academy.
17. Organized FOUR sessions of a professional course titled "Boiler Operation and Maintenance" through NED Academy at Mechanical Engineering Department in collaboration with PEC Pakistan.
18. Organized ONE session of a professional course titled "Industrial Steam Boiler System, Operation, Maintenance and Safety" through NED Academy at Mechanical Engineering Department.
19. Attended Higher Education teaching course of Harvard University.
20. Paper setter for Competitive Examination for Engineering Cadre for the Post of Assistant Engineer (Mechanical) BPS-17 under Public health Engineering & Rural Development Department, Government of Sindh.
21. Organized mega event titled "DICE Energy & Water 2018" as Chief Organizer
22. Organizing Committee member of 17th Word Wind Energy Conference 28-30 Nov. 2018.
23. Attended 4-Days PEC PEV Training on "Outcome based Accreditation for Program Evaluators organized by PEC in 2024.

RESEARCH PUBLICATIONS

Year 2024

- M. Adeel, U. Allauddin, A. Iranzo, Investigation of laminar flow and heat transfer performance of Gallium alloy based nanofluids in minichannel heat sink, Thermal Science and Engineering Progress, vol. 56, pp. 103000, 2024.
- S. Sharif, M. Shakaib, U. Allauddin, A CFD and experimental study of hydrodynamic and heat transfer behavior in ribbed fluidized beds, International Journal of Chemical Reactor Engineering, vol. 22(9), pp. 1039-1054, 2024.
- T. Jamil, A. Iqbal, U. Allauddin, E. Ahmad, S. A. Hashmi, Fluid Coupled Structural Analysis and Optimization of Expanded Polystyrene Reinforced Composite Fiber Wing of an Unmanned Aerial Vehicle, Journal Mechanics of Composite Materials, 60(2), pp. 211-226, 2024.
- S. Sharif, M. Shakaib, U. Allauddin, A Computational Study for Air–Solid Particles Flow Patterns in Rib-Roughened Fluidized Bed Vessels, International Journal of Fluid Mechanics Research, 51(3), 2024.
- U. Allauddin, Naeemullah, P.G. Verdin, Effect of nozzle shape on fluid flow and heat transfer characteristics of an impinging jet system – A numerical study, In 2nd International Conference on Modern Technologies in Mechanical & Materials Engineering (MTME-2024), 20 April 2024, GIK Institute of Engineering Sciences and Technology, Topi, Pakistan, Volume 398, Paper number 01004.

Year 2023

- U. Allauddin, MU Rafique, O Malik, O Rashid, A Waseem, P King, M Karim, H Almond, Investigation of the Thermo-hydraulic Performance of a Roughened Parabolic Trough Collector, Applied Thermal Engineering, vol. 219, pp. 119523, 2022.
- U. Allauddin, M. Ikhlaq, T. Jamil, F. Alvi, H.A. Hussain, H. Mustafa, M.H. Azeem, "Heat-transfer enhancement of a solar parabolic trough collector using turbulators and nanoparticles: A numerical study", Journal of Enhanced Heat Transfer, vol. 30(3), pp. 51-73 2023.
- U. Allauddin, M.U. Sohail, M Sohaib, MA. Siddiqui, M.H.U. Khan1, K. Khan, P.G. Verdin, "Heat transfer enhancement investigation in jet impingement system of a single and array of square jets using numerical tools", International Journal of Computational Thermal Sciences, vol. 15(4), pp. 15-29, 2023.
- J.A. Butt, Y. Nergis, U. Allauddin, M. Sharif, S.Y. Khan, A. Khan, "Impact of coal quality on power plant and environment: Assessment of physiochemical and ash composition of Thar coal from Pakistan", Arabian Journal of Geosciences, vol. 16(8), 455, 2023.
- F. Abbas, U. Ali , A. Rasheed, M.A. Qaisrani M.B. Shafiq , U. Allauddin, M.U. Farooq, S. Abbas, A. Zulkarnain, "Numerical Investigation of a Novel Design of Cross Axis Wind Turbine with Improved Efficiency", Proceedings of 12th International Mechanical Engineering Conference, 10-11 May 2023.
- S. Saeed , S. Ali , K. Hayat , M. Zahid , M.A. Qaisrani, M.B. Shafiq, M.U. Farooq, U. Allauddin, "Design Optimization and Performance Assessment of a Novel Savonius Wind Turbine", Proceedings of 12th International Mechanical Engineering Conference, 10-11 May 2023.
- O. Qadeer, M.U. Khan, M.B. Shafiq, U. Allauddin, M.A. Qaisrani, L.A. Khan, "Numerical Investigation of Small-Scale Wind Turbine for Commercial Buildings", Proceedings of 12th International Mechanical Engineering Conference, 10-11 May 2023.

Year 2022

- SY Khan, U Allauddin, SMF Hasani, R Khan, M Arsalan, A CFD analysis on the effect of tube curvature, hot flow control valve profile, and inlet swirl on the thermal performance of curved vortex tubes, Journal of Thermal Analysis and Calorimetry, vol. 147, pp. 12761-12778, 2022.
- MB Shafiq, U Allauddin, MA Qaisrani, T Rehman, N Ahmed, MU Mushtaq, HM Ali, Thermal performance enhancement of shell and helical coil heat exchanger using MWCNTs/water nanofluid, Journal of Thermal Analysis and Calorimetry, vol. 147, pp. 12111-12126, 2022.
- U. Allauddin, WA Khan, SE Ali, SMM Haider, AS Ahmed, A. Rehman, PG Verdin, Numerical investigation of fluid flow and heat characteristics of a roughened solar air heater with novel V-

shaped ribs, Transactions of the Canadian Society for Mechanical Engineering, vol. 46(3), pp. 561-572, 2022.

- A Rasheed, U Allauddin, HM Ali, M Uzair, PG Verdin, YH Siddiqui, Heat transfer and fluid flow charachteristics investigation using detached ribs in an axisymmetric impinging jet flow, Journal of Thermal Analysis and Calorimetry, vol. 147(24), pp. 14517-1453, 2022.
- S.Y. Khan, U. Allauddin, S.M.F. Hasani, R. Khan, M. Arsalan, The Effect of Tube Curvature on Temperature Separation Efficiency of Ranque-Hilsch Vortex Tube, Proceedings of International Petroleum Technology Conference, 2nd Feb. 2022.
- U. Allauddin, M.H. Baig, O. Anis, S.H. Siddiqui1, M.M. Aman, M.W. Baqar, T.A. Hussain, M.A. Mohsin, Indigenous Development of a portable Laminator for small Scale Production of Solar Panels, Proceedings of 7th Multi Disciplinary Student Research International Conference (MDSRIC), 29 – 30 Nov, 2022.
- S.Y. Khan, U. Allauddin, The Effect of Inlet Swirl on Thermal Performance of Curved Vortex Tube, Proceedings of International Mechanical Engineering Conference 14th & 15th January, 2022.
- M. Osama, U. Allauddin, Design and Modelling of Lower Prosthetic Limb for Additive Manufacturing, Proceedings of International Mechanical Engineering Conference 14th & 15th January, 2022.
- H. Raza, M. Mehdi, U. Allauddin, N. Malik, 3D Structural Analysis of an Electric Vehicle Chassis Using Computer Simulations, Proceedings of International Mechanical Engineering Conference 14th & 15th January, 2022.
- U. Allauddin, M.H. Baig, S.H. Siddiqui, M.M. Aman, M.W. Baqar, T.A. Hussain, M.A. Mohsin, "Design and Fabrication of small-scale solar Panel Lamination Machine", Proceedings of International Mechanical Engineering Conference 14th & 15th January, 2022.

Year 2021

- U. Allauddin, S. Salahuddin, M. Uzair, Performance enhancement of an impinging jet system using different working fluids-A numerical study, Heat Transfer Research, vol. 52(1), pp. 17-30, 2021.
- U. Allauddin, H.R. Ansari, S.S. Ahmed, A. Anjum, H.A. Siddique, M.Y. Ahmed, A.A. Khan[1], S.S. Khan, M. Salman, N. Uddin, Parametric Study of Swirl Effects on Combustion in an Industrial Natural Gas Combustor using CFD, Journal of Engineering Thermophysics, vol. 30(1), pp. 75-102, 2021.
- M. Mahrukh, U. Allauddin, M. E. Haque, N. Uddin, A numerical investigation of flow over single and three tandem square cylinders at Reynolds number of 22000, vol. 40(4), pp. 724-746, Mehran University Research Journal of Engineering and Technology, 2021.
- M. Shaikh, M. Uzair, U. Allauddin, Effect of geometric configurations on charging time of latent-heat storage for solar applications, Renewable Energy, vol. 179, 262-271, 2021.
- M. Uzair, M.A. Siddiqui, U. Allauddin, Numerical study of flow patterns and performance of a coupled cavity–dish system under different focal lengths, Transactions of the Canadian Society for Mechanical Engineering, vol. 46, pp. 225-235, 2021.
- M.U. Sohail, H.R. Hamdani, A. Islam, K. Parvez, A.M. Khan, U. Allauddin, M. Khurram, H. Elahi, Prediction of non-uniform distorted flows, effects on transonic compressor using CFD, regression analysis and artificial neural networks, Applied Sciences, vol. 11, pp. 3706, 2021.

Year 2020

- U. Allauddin, S.R.R. Lomada M. Pfitzner, "Investigation of pressure and the Lewis number effects in the context of flame surface density closure for LES of premixed turbulent combustion", Theoretical and Computational Fluid Dynamics, 35(1), pp. 17-37, 2021.
- U. Allauddin, T. Jamil, M. Shakaib, H.M.U. Khan, R. Mohiuddin, M.S. Saeed, H. Ahsan, N. Uddin., Heat transfer enhancement caused by impinging jets of Al_2O_3-water nanofluid on a micro-pin fin roughened surface under crossflow conditions−A numerical study, J. Enhanced Heat Transfer, vol. 27(4), pp. 367-387, 2020.
- U. Allauddin, H.M.U. Khan, R. Mohiuddin, N. Uddin, W.A. Khan, "Nanoscale heat transfer investigation of an array of jets impingement with different working fluids under crossflow with and without pin-fins", Journal of Heat Transfer, vol. 50(1), 81-104, 2020.

- N.U. Rehman, M. Uzair, U. Allauddin,, An optical-energy model for optimizing the geometrical layout of solar photovoltaic arrays in a constrained field, Renewable Energy, vol. 149, pp. 55-65, 2020.
- D. Lu, M.I. Afridi, U. Allauddin, U. Farooq, M. Qasim, Influence of Transpiration on Heat Transfer and Entropy Generation in a Dissipative Nanofluid Flow with Magnetic Dissipation: An Exact Approach, Journal of Energies, vol. 13(20), pp. 5506, 2020.

Year 2019

- U. Allauddin, M. Pfitzner, "Development of a RANS premixed turbulent combustion model based on the algebraic flame surface density concept" Journal of Engineering for Gas Turbines and Power, vol. 141(2), pp. 021025, 2018.

Year 2018

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- P. Janas, U. Allauddin, M. Pfitzner, B. Boehm, A. Kempf, "Numerical investigation of the influence of different valve seat geometries on the in-cylinder flow and combustion in spark ignition engines", abstract accepted for LES4ICE, Rueil-Malmaison, France, November 2016.

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- R. Keppeler, E. Tangermann, U. Allauddin, M. Pfitzner, "LES of low to high turbulence combustion in an elevated pressure environment", Flow Turbulence Combustion, vol. 92, pp. 767-802, 2014.
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- U. Allauddin, N. Uddin, "Heat transfer enhancement by detached-ribs on a surface subjected to jet impingement", J. Thermophysics Heat Transfer, vol. 27, pp. 355-359, 2013.
- U. Allauddin, M.A. Siddiqui, S.A. Raza, H.B. Kakar, "Assessment of coal gasification technologies potential for Sindh coal reservoirs", Proc. Int. Conference on Energy and Sustainability, Karachi, Pakistan, January 2013.

Year 2012

- N. U. Shaikh, M.A. Siddiqui, U. Allauddin, "Integrated solar water-heater and solar water cooler performance during winter time", NED University J. Research, pp. 61-72, 2012.

ADMINISTRATIVE RESPONSIBILITIES

- Member of BoS of Department of Mechanical Engineering of NED University
- Member of BoR of Planning and Development Department of NED University.
- Also served as BoS member of Mechanical Engineering Department of Government Technical College Karachi and Mechanical Engineering Department of Nazeer Hussain University.
- Member of Anti-Drug and Tobacco Committee and Accessibility Committee and Disability Committee of NED University
- Member of committee formed for the Procurement of Laboratory Equipment for "Thermofluids Laboratory" for Department of Mechanical Engineering under mega-V.
- Member of committee for Standards of Light and Heavy Commercial EVs revision at PSQCA.
- Member of Committee for curriculum revision of MED in light of ECDC recommendations.

Currently also working as a Director of NED DICE Energy Innovation Centre with a mission:

"To foster energy-related innovations, transform them into commercial solutions, and serve as an R&D hub for industry, empowering the nation to address energy and water challenges".

- Worked on design and development of Pakistan first ever indigenous electric car and an indegenious Battery-pack system for it. The prototype and first version of the car is launched and efforts are being done for its commercial production.
- Generated PKR 1.2 million funding to complete industrial projects entitled "Energy storage system of Electric vehicles", "Parametric Study of a Newly Designed Industrial Boiler using CFD", "Study of Swirl Effects on Combustion in an Industrial Natural Gas Combustor using CFD", "Energy conservation at Thal Engineering", "Part Detailing of Electric Three Wheeler on Solid Modelling along with FES", "Design and Fabrication of Battery Packs along with Battery Management System and Thermal Management System for an Electric car" and "Design Simulation and Implementation of Thermal, Vibration and Battery Management System for an Electric Car".
- Design and developed a new professional website of the Center
- Started Research Assistantship Program in which the Chartered members of the Centre can offer one project of their industry and one project of National interest and a team of four students will dedicatedly work on the project. Each team will get a stipend of Rs. 10,000/- per month for ten months. The applied projects from industry will be offered, students will get an exposure of industry, one of the supervisors will be from industry so students will learn the practices of industry.
- The Centre purchased Solar Panels Testing equipment by the funding received from USA organization to make Centre self-financed by offering different services and generate revenue out of it. PKR 125,000/- was generated in the first assignment.
- DICE Energy & Water was arranged at NED University on 10-11 October 2018. The event included four different event categories. It provided an opportunity to the academia and the industry to share innovative ideas and solutions to address the current energy/water scenario. More than 120 innovative project ideas were received from 28 different Universities of Pakistan.
- In collaboration with Shell Tameer organized two different sessions for the commercialization of projects registered in DICE Energy & Water 2018 event.
- Organized a technical session entitled "A Talk on Global Energy Economics" on 10th January 2019, Mr. Muqtadar Quraishi from Cornell University, Ithaca, New York State, USA.
- Organized meetings of the Industrial board of the Centre with the key agenda of "Development of the DICE Energy & Water Innovation Center to effectively support industry in their Energy and Water related problems".

Worked as an ASME Faculty Coordinator of ASME NED Chapter which had responsibilities of:

- Organized a variety of activities of technical content and professional and personal values
- Prepared students to participate in International, National and Local activities arranged by ASME
- Created a professional and practical approach in the young engineers by engaging them in different activities of ASME

STUDENTS' FEEDBACK ON TEACHING

Course	Average Ranking (Max. 10)	Standard Deviation	Ranking
Fall 2024			
ME-224 Internal Combustion Engines	9.335	1.085	Excellent
ME-544 Advanced Heat Transfer	9.889	0.320	Excellent
ME-548 Advanced Fluid Mechanics	9.378	1.284	Excellent
Spring 2024			
ME-112 Thermodynamics	9.216	1.632	Excellent
ME-544 Advanced Heat Transfer	9.407	1.394	Excellent
Fall 2023			
ME-224 Internal Combustion Engines	9.589	0.924	Excellent
ME-548 Advanced Fluid Mechanics	9.413	1.681	Excellent

REFERENCES

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