

Dr. Mrinal K R

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Department of Mechanical Engineering,
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Research Interest

Turbomachines-Pumps: Centrifugal and Progressive Cavity Pump, Artificial lift, Turbines-Wind Turbine and Hydro-Turbine, Fluid flow: Non-Newtonian and Multiphase flow, Heat exchanger, Experimental, CFD, Surrogate modeling and Optimization.

Education

- PhD** Department of Ocean Engineering, Indian Institute of Technology Madras, Chennai, India, 2018, CGPA: 8.2/10.0
Thesis: Experimental and Numerical Analysis of Centrifugal Pump and Progressive Cavity Pump Delivering Bentonite Based Slurry.
- M.E** Internal Combustion Engineering (Thermal), Anna University Chennai, India, June 2012, CGPA: 7.4/10.0
Thesis: In-Cylinder Air Motion Studies in IC Engine Using CFD.
- B.tech** Mechanical Engineering, University of Calicut, Kerala, India June 2008, 61.5%
- Plus two** Kerala state Board, March 2002, 77%
- S.S.L.C** Kerala state Board, March 2002, 83%

Teaching and Research Experience

Institution	Year (from-to)	Designation
The National Institute of engineering (NIE), Mysore, India	07/08/2017-Till date	Assistant professor
Indian Institute of Technology, Madras. Chennai, India	19/12/2012- 06/08/2017	PhD Research Scholar
Indian Institute of Technology, Madras. Chennai, India	01/09/2012-18/12/2012	Research assistant
Indian Institute of Technology, Madras. Chennai, India	04/04/2009-17/07/2010	Research assistant

Subjects and Labs Handled

- Turbo machines
- Fluid Mechanics
- Basic thermodynamics
- Applied thermodynamics
- Research methodology
- Computer aided engineering drawing
- Machine drawing
- Fluid mechanics and machinery lab
- IC engine lab
- Heat and mass transfer lab
- Computer aided analysis lab

Projects Guided

1. Optimization of Spoiler of a Car by Bio-mimicry (2020-21)
2. Determination of Effect of Aspect Ratio on Aircraft Flight (2020-21)
3. Numerical Analysis and Optimization of a Hydro-kinetic Turbine (2019-20)
4. Numerical Analysis of Horizontal Axis Hydrokinetic Turbine (2018-19)
5. CFD Analysis of Horizontal Axis Wind Turbine (2018-19)
6. Numerical Analysis of Horizontal Axis Wind Turbine (2017-18)

Research Funding

1. Received a funding of 18.3 lakhs INR for the project titled “Enhancing the performance of solar collector using nanofluids” from SCIENCE & ENGINEERING RESEARCH BOARD (SERB) in the year 2021

Research Publications

International Journals

1. **K.R. Mrinal** and A. Samad (2018), “Performance prediction of kinetic and screw pumps delivering slurry. Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy, 232(7), 898-911.
2. **K.R. Mrinal** and A. Samad (2017), Leakage flow correlation of a progressive cavity pump delivering shear thinning non-Newtonian fluids. International Journal of Oil, Gas and Coal Technology, 16(2), 166-186.
3. **K.R. Mrinal.**, M. H., Siddique and A. Samad. (2018). Performance Prediction of a Centrifugal Pump Delivering non-Newtonian Slurry, Particulate Science and Technology, 36(1), 38-45.
4. **K.R. Mrinal.**, M. H., Siddique and A. Samad. "A Transient 3D CFD Model of a Progressive Cavity Pump." In ASME Turbo Expo 2016: Turbomachinery Technical Conference and Exposition, pp. V009T24A009-V009T24A009, Volume 9 American Society of Mechanical Engineers, 2016.
5. M. H., Siddique., **K.R. Mrinal.**, and A. Samad. Optimization of a centrifugal pump impeller by controlling blade profile parameters." In ASME Turbo Expo 2016: Turbomachinery Technical Conference and Exposition, volume 2c, pp. V02CT45A009-V02CT45A009. American Society of Mechanical Engineers, 2016.

International Conferences

1. Pranavas Subrahmanya Bhat, Santhosh R Haliyur, **K.R. Mrinal** and Karthikeyan Thandayutham (2021), “CFD Analysis of Rear Spoiler of a Car by Biomimicry of Humpback Whale” International Conference on Energy and Materials Technologies (Online) (ICEMT-2021) AUG 20-21, 2021, Sri Sivasubramaniya Nadar College of Engineering, Chennai.
2. Matha Prasad P.S, Ritwik Kaul and **K.R. Mrinal** (2020), “A Matlab/Simulink model for the Speed Control of a Two Wheeler when Turning a Curve” International Conference on Frontiers in Engineering Science and Technology (ICFEST-2020), Yenepoya Institute of Technology, Thodar, Moodabidri, India.
3. Sandeepa Bola Kamath, Sandesh Prasanna Kamat and **K.R. Mrinal** (2020) “Design, Analysis and Fabrication of a Roll Cage for an All-Terrain Vehicle (ATV)” International Conference on Frontiers in Engineering Science and Technology (ICFEST-2020), Yenepoya Institute of Technology, Thodar, Moodabidri, India.
4. **K.R. Mrinal**, W.K. Tungoe and C.L. Kithan (2018), “Numerical Analysis of Horizontal Axis Wind Turbine Using Q-Blade, Proceedings of the 7th International and 45th National Conference on Fluid Mechanics and Fluid Power (FMFP) December 10-12, 2018, IIT Bombay, Mumbai, India
5. **K.R. Mrinal**, S. Suraj and S.G. Nihal (2018), “A Study of Materials and Manufacturing Techniques for the Wind Turbine Blades”, International Conference on Advances in Manufacturing Technology (ICAMT), 22-23 June, Chennai Institute of Technology, Chennai, India.
6. **K.R. Mrinal**, M. H., Siddique and A. Samad (2016), “A Transient 3D CFD Model of a Progressive Cavity Pump”, Turbomachinery Technical Conference & Exposition presented by the ASME International Gas Turbine Institute, 13-17 June, Seoul, South Korea.
7. **K.R. Mrinal** and A. Samad (2014), “CFD Simulation of Flow Through Progressive Cavity Pump”, Fifth International Conference on Fluid Mechanics and Fluid Power, 12-14 December, IIT Kanpur, Kanpur, India.
8. **K.R. Mrinal** and A. Samad (2012), “Numerical Modelling of Flow through Progressive Cavity Pump – A review”, December 6-8, 2012, second International Conference on Drilling Technology 2012 (ICDT-2012) and the first National Symposium on Petroleum Science and Engineering 2012, IIT Madras, Chennai, India.
9. **K.R. Mrinal** and V. Kalaiselvam (2012), “In-Cylinder Air Motion Studies in IC Engine using CFD”, International conference in Magna on Emerging Engineering Trends (ICMEET2K12), Magna College of Engineering, Chennai, India.
10. M.H. Siddique, **K.R. Mrinal** and A. Samad (2016), “Optimization of a Centrifugal Pump Impeller by Controlling Blade Profile Parameters”, Turbomachinery Technical Conference & Exposition presented by the ASME International Gas Turbine Institute, Seoul, South Korea.
11. A. Samad, A. Sonawat, S.A.I. Bellary, R. Adhav, **K.R. Mrinal**, A. Goharzadeh, A. Hussain, (2014) “Multiphase Flow Challenges in Artificial Lifts,” Manama, Bahrain.

Technical Skills

Modeling software	: Auto CAD, Autodesk Inventor, Solid works, ANSYS- Workbench.
Meshing software	: ICEM-CFD, Ansys Meshing, Gambit 2.4.6.
CFD Solver	: ANSYS-Fluent, ANSYS-CFX, OpenFoam, COMSOL STARCCM+.
FEM Solver	: ANSYS-Mechanical, Abaqus.
BEM Model	: Qblade.
CFD Post processing	: Ansys CFD-Post, Tecplot 360 ex 2014.
Statistics package	: Minitab 16, JMP 10.
Programming language	: Matlab, Python.

Conferences/Workshops Related Activities

1. Coordinator, Two days National Conference on Recent Advancement in Mechanical and Material Sciences -2022 (NCRAMMS-2022) on July 7 & 8th , 2022.
2. Coordinator, Webinar on Emerging Areas of Fluid and Heat Transfer Simulation for Industry 4.0 on 19 July, 2021.
3. Coordinator, Online one week Faculty Development Programme on “Basic Concepts in Turbomachinery and its Applications on August 24 to 28, 2020.
4. Coordinator, Online one week Faculty Development Programme on “Basics of Computational Fluid Dynamics: Application and Analysis, from August 31st to 4th September, 2020.
5. Jury member in thermal stream for CogNIEscience-2019 A National Level Technical Paper presentation competition to be held on April 11, 2019 at National Institute of Engineering, Mysore.

Reviewer – Journal/ Conferences/Thesis

1. Journal of Petrol.Science and Engineering, Elsevier (2019)
2. Proceedings of the institution of mechanical engineers part a journal of power and energy (2019).
3. Thesis reviewed and M.tech (thermal) external evaluator at Siddaganga Institute of Technology (SIT), Tumkur (2019).
4. Reviewer of manuscripts for the International Conference in Fluid, Thermal and Energy Systems, organized by National Institute of Calicut (NIT Calicut), Calicut from 9-11, June 2022.
5. Reviewer of manuscripts for Fluid Mechanics and Fluid Power (NSFMFP), 8th International and 47th National Conference at Indian Institute of Technology (IIT) Guwahati, Assam, India, during December 9 – 11, 2020.

Short-Term Courses/Workshops Attended

1. Two-Week Online Faculty Development Program on “Data Science with Machine Learning” conducted by EICT Academy-IIT Kanpur from 5 -16 July, 2021
2. Five Days workshop on “Recent Trends in Thermo-Fluids” Organized by National Institute of Technology, Sikkim from 22-26 February 2021 sponsored by TEQIP-III.
3. One month short term training programme on “Faculty Induction Program” Organised by

National Institute of Technical Teachers Training and Research (NITTTR), Bhopal from September 14 to October 9, 2020.

4. One Week Short Term Training Program on “Data Science & Learning systems for Engineering Research & Design” jointly Organised by National Institute of Technology, Kurkshetra and Government Engineering College, Bikaner from 24-30 June, 2020 under TEQUIP Mentoring/Twinning System
5. One week faculty development program on Digital Manufacturing using Autodesk Fusion 360 (Online Live FDP) conducted by ICT Academy on 22-27 June, 2020.
6. Two-Week Online Short Term training Program on “ Green Energy Technology for Sustainable Development” jointly organized by National Institute of Technology, Kurkshetra and Government Engineering College, Bikaner from 11-20 June, 2020 under TEQUIP Mentoring/Twinning System
7. One Week Online short term training Program on “Renewable Energy and Utilization” Organised by Sandip Institute of Engineering and Management Nashik from 26-30 May, 2020.
8. Two Week faculty development on “E-Learning Recourse Creation- A Beginning Towards New Era of E-Learning organised by D.Y.Patil College of Engineering, Kolhapur from June 8 to 20, 2020.
9. Faculty development program on “ Deep Learning and Its Applications conducted by Electronics and ICT Academy, IIT Roorke from May 11 to 20, 2020.
10. Webinar on CFD for Centrifugal Pump organised by Imperial College of Engineering and Research, Wagholi, Pune, India from May 19 to 20, 2020.
11. Faculty development program on “MOODLE” organised by Tagore Institute of Engineering and Technology, Attur in association with Spoken Tutorial IIT Bombay, Pandit Madam Mohan Malaviya National Mission on Teachers and Teaching, MHRD Govt of India from May 4 to 9, 2020.
12. Faculty development program on “ Recent Advances in Solar Systems (RASS)” organized by Department of Mechanical Engineering, National Institute of Technology from July 8 to 12, 2019.
13. Faculty development program on “Research Avenues in Advanced Manufacturing and Mechanical Engineering” organized by Department of Industrial and production Engineering at National Institute of Engineering from May 13 to 17, 2019.
14. Faculty training programme on “ Engineering Faculty You Can Do Research, Learn How..’ at National Institute of Engineering from February 22 and 23, 2019.
15. Short Term course on “Small Wind Turbine Building Course ” organized by Center for Scientific Research (CSR) in Auroville, Tamil Nadu from January 26 to 28, 2018.

Achievements

- Student travel grant instituted by Indian Institute of Technology Madras for attending an international conference in Seoul , South Korea (Turbo machinery Technical Conference & Exposition presented by the ASME International Gas Turbine Institute).
- Runner-up in the academic category for the 2016 ANSYS Hall of Fame global competition.
- Professional Development Hours Earned: 32.5 PDHs for attending Technical Conference sessions and presentations held at ASME Turbo Expo 2016 • June 13-17, 2016 • COEX Seoul, South Korea

List of References

1. Dr. Abdus Samad, Professor, Department of Ocean Engineering, IIT Madras, Chennai, India. E-mail: samad@iitm.ac.in, Contact Number: (+91)-44-22574826.
2. Dr. Siddarth Joshi, Associate Professor, Department of Mechanical Engineering, National Institute of Engineering, Mysore, Karnataka, India, E-mail: sjoshi@nie.ac.in, Contact Number: (+91)- 8123799218.