

Dr. Syed Ahmad Raza

Department of Mechanical Engineering, NED University of Engineering & Technology, Karachi, Pakistan
+92 333 3449270, ahmad@ahmads.org, drahad@neduet.edu.pk
www.ahmads.org

HIGHLIGHTS

- Professional academic with nearly 12 years of experience in teaching and research, and two years of industrial experience
- Expertise in computational fluid dynamics (CFD) with experience in developing computationally efficient CFD codes in multiple programming languages; developer of **TIGER-C solver**
- Served in various administrative roles over the years
- Highly rated teacher with exceptional feedback in Bachelor's, Master's and Ph.D. programs
- Development of courses and laboratory workbooks
- Extensive experience working with diverse teams in multicultural environments

ACADEMIC BACKGROUND

Ph.D. in Mechanical Engineering June 2021
National Taiwan University of Science and Technology (Taiwan Tech), Taipei, Taiwan
Ph.D. research in computational fluid dynamics (CFD) under the supervision of **Prof. Ming-Jyh Chern**

M.Eng. in Mechanical Engineering June 2013
NED University of Engineering & Technology (NED UET), Karachi, Pakistan
Specialization: Energy systems with a thesis related to solar energy engineering

B.Eng. in Mechanical Engineering December 2008
NED University of Engineering & Technology (NED UET), Karachi, Pakistan

EMPLOYMENT HISTORY

Assistant Professor, Department of Mechanical Engineering March 2016 – Present
NED University of Engineering & Technology, Karachi, Pakistan

Ph.D. Research Scholar, Department of Mechanical Engineering September 2016 – June 2021
National Taiwan University of Science and Technology, Taipei, Taiwan

Lecturer, Department of Mechanical Engineering May 2011 – February 2016
NED University of Engineering & Technology, Karachi, Pakistan

Engineer September 2010 – April 2011
Fluid System International (Pvt) Ltd; Industrial Development & Engineering Associates, Karachi, Pakistan

Planning Engineer (Acting) / Graduate Trainee Engineer September 2009 – August 2010
Eni Pakistan Limited, Sindh, Pakistan

Trainee Mechanical Engineer December 2008 – August 2009
ENAR Petrotech Services (Pvt) Ltd, Karachi, Pakistan

ADMINISTRATIVE RESPONSIBILITIES

- Planning and administration for [Advanced Studies & Research Board \(ASRB\)](#), NED UET, 2022–
- In-charge [Heat Transfer Laboratory](#), NED UET, 2022–
- Managed the clusters of [Computational Fluid Dynamics Laboratory](#), Taiwan Tech, 2017–2020
- Founder and president of Pakistan Student Association (PSA), Taiwan Tech, 2017–2018
- Coordinator of International Muslim Students Association (IMSA), Taiwan Tech, 2016–2017
- In-charge [Steam Generation and Steam Turbines Laboratory](#), NED UET, 2011–2016
- Supervised commissioning of an electric boiler and experimental steam benches at the [Steam Generation and Steam Turbines Laboratory](#), NED UET, 2011–2014
- Planning Engineer (Acting) at Bhit and Badhra Gas Plant of Eni Pakistan Limited, 2010

TEACHING RESPONSIBILITIES

Undergraduate Courses

Heat and Mass Transfer, Fluid Mechanics II, Power Plant Engineering, Gas Turbines, Steam Generation and Steam Turbines, Thermodynamics, Fundamentals of Thermal-Fluid Engineering, Textile Mill Utilities II (Refrigeration and Air Conditioning), Mechanics of Machine, Engineering Mechanics

Postgraduate Courses

Applied Computational Fluid Dynamics, Computational Fluid Dynamics, Power Plant Design, Power Plant Engineering, Solar Thermal Energy Systems

Professional Trainings

- Training on “Power Plant Operations” related to mechanical equipment, conducted for K-Electric employees, Karachi, Pakistan, January 15 – February 20, 2022
- Introductory training sessions on OpenFOAM during Convective Heat Transfer course for postgraduate students at National Taiwan University of Engineering and Technology, Taipei, Taiwan, 2018–2019
- Training on “Plant Design and Maintenance,” as part of the refresher course for Iraqi Nationals, a collaboration of NED University of Engineering & Technology and Pakistan Petroleum Limited, Karachi, Pakistan, July 20 – August 4, 2015
- Training on “Mechanical Utilities: Introduction, Maintenance and Troubleshooting,” conducted at PROFEX Center, Karachi, Pakistan, May 31 – June 1, 2014

SPECIAL ACHIEVEMENTS

Honors and Awards

- Best Researcher Award from NED UET, 2022
- A+ grade in doctoral thesis defense examination at Taiwan Tech, June 2021
- Continuing Ph.D. Scholarship, awarded by Taiwan Tech, 2019–2021
- Excellent poster presentation award (third place) at the 26th National Computational Fluid Dynamics Conference (NCFD), Keelung, Taiwan, 2019
- NTUST Scholarship for Ph.D. studies, awarded by Taiwan Tech, 2016–2019
- Worldwide ranking (fourth place) in Advanced Level Business Studies examinations of University of Cambridge Local Examinations Syndicate, United Kingdom, June 2004

- Scholarship for Advanced Level studies, awarded by Al Wadi International School, Jeddah, Saudi Arabia, 2002–2003

Professional Activities

- Approved Ph.D. Supervisor of Higher Education Commission (HEC), Pakistan
- Member of Pakistan Engineering Council (PEC), registration number 22453 (Mechanical)
- Review editor and reviewer for *Frontiers in Mechanical Engineering*, Fluid Mechanics section, 2022
- Reviewer for *Journal of Mechanical Science and Technology*, 2019
- Technical advisory committee member of 11th and 12th *International Mechanical Engineering Conferences*, Karachi, Pakistan, 2022–2023
- Organizing committee member of 5th and 6th *International Mechanical Engineering Congresses*, and *International Conference on Energy and Sustainability*, Karachi, Pakistan, 2013–2016
- Member of ASME NED Student Chapter and ASHRAE NED Student Chapter, NED University of Engineering & Technology, Karachi, Pakistan, 2008

FUNDED RESEARCH PROJECTS

- Principal Investigator, Investigation of vortex-induced vibration of structures using in-house CFD solver (Independent Research Project), granted by NED University of Engineering & Technology, Karachi, Pakistan, 2022.
- Ph.D. scholar, Numerical investigation of enhancement of vortex-induced motion of structures for energy harvesting (MOST 110-2221-E-011-067), granted by Ministry of Science and Technology, Taiwan, 2021.
- Ph.D. scholar, Direct forcing immersed boundary modeling on dynamic stall and flow control of airfoil in turbulent flow (MOST 107-2221-E-011-075-MY3), granted by Ministry of Science and Technology, Taiwan, 2018.
- Ph.D. scholar, Study of applications of direct forcing immersed boundary modeling on optimal design of flow energy converter (MOST 106-2221-E-011-079), granted by Ministry of Science and Technology, Taiwan, 2017.

JOURNAL ARTICLES

1. Yosua Heru Irawan, Syed Ahmad Raza, and Ming-Jyh Chern. Vortex-induced vibration of two circular cylinders in a side-by-side arrangement at moderate Reynolds number: a numerical study. *Physics of Fluids*, December 2022. ISSN 1070-6631. **(Submitted)**
2. Yosua Heru Irawan, Syed Ahmad Raza, and Ming-Jyh Chern. Passively enhanced VIV responses of side-by-side cylinders at moderate Reynolds number. *Ocean Engineering*, December 2022. ISSN 0029-8018. **(Submitted)**
3. Yosua Heru Irawan, Syed Ahmad Raza, and Ming-Jyh Chern. Numerical predictions of vibration responses and flow energy conversion efficiency of side-by-side cylinders at moderate Reynolds number. *Applied Ocean Research*, 129:103392, December 2022. ISSN 0141-1187. doi:[10.1016/j.apor.2022.103392](https://doi.org/10.1016/j.apor.2022.103392).
4. Syed Ahmad Raza, Yosua Heru Irawan, and Ming-Jyh Chern. Effect of grid size and initial conditions on vortex-induced vibration of a circular cylinder. *Ocean Engineering*, 263:112332, November 2022. ISSN 0029-8018. doi:[10.1016/j.oceaneng.2022.112332](https://doi.org/10.1016/j.oceaneng.2022.112332).

5. Mahad Shaikh, Muhammad Uzair, and Syed Ahmad Raza. Optimization of thermal storage using different materials for cooking with solar power. *Transactions of the Canadian Society for Mechanical Engineering*, 46(2):490–502, June 2022. ISSN 0315-8977. doi:[10.1139/tcsme-2021-0160](https://doi.org/10.1139/tcsme-2021-0160).
6. Syed Ahmad Raza, Yosua Heru Irawan, and Ming-Jyh Chern. Effect of boundary conditions and domain size on the turbulent flow characteristics over a circular cylinder. *Journal of the Chinese Institute of Engineers*, 44(7):659–672, July 2021. ISSN 0253-3839. doi:[10.1080/02533839.2021.1940295](https://doi.org/10.1080/02533839.2021.1940295).
7. Syed Ahmad Raza, Ming-Jyh Chern, Herman Susanto, and Yun-Hui Zhou. Numerical investigation of the effects of a small fixed sphere in tandem arrangement on VIV of a sphere. *Journal of Wind Engineering and Industrial Aerodynamics*, 206:104368, November 2020. ISSN 0167-6105. doi:[10.1016/j.jweia.2020.104368](https://doi.org/10.1016/j.jweia.2020.104368).
8. Muhammad Uzair, Naveed ur Rehman, and Syed Ahmad Raza. Probabilistic approach for estimating heat fluid exit temperature correlation in a linear parabolic trough solar collector. *Journal of Mechanical Science and Technology*, 32(1):447–453, January 2018. ISSN 1976-3824. doi:[10.1007/s12206-017-1245-3](https://doi.org/10.1007/s12206-017-1245-3).

CONFERENCE CONTRIBUTIONS

1. Syed Ahmad Raza, Yosua Heru Irawan, and Ming-Jyh Chern. Simulation of three-dimensional laminar and turbulent flows over a cylinder undergoing vortex induced vibration. In *11th International Mechanical Engineering Conference (IMEC), Karachi, Pakistan, 2022*.
2. Syed Ahmad Raza, Herman Susanto, Ming-Jyh Chern, and Tzyy-Leng Horng. Direct-forcing immersed boundary modeling of VIV control of a sphere. In *7th Asia-Pacific Congress on Computational Mechanics (APCOM), Taipei, Taiwan*. Asia-Pacific Association of Computational Mechanics (APACM), 2019.
3. Ming-Jyh Chern, Herman Susanto, and Syed Ahmad Raza. Direct-forcing immersed boundary modeling for effect investigation of a smaller fixed sphere in front of the vortex-induced vibration of elastically mounted sphere. In *26th National Computational Fluid Dynamics Conference (NCFD), Keelung, Taiwan, 2019*.
4. Herman Susanto, Ming-Jyh Chern, Yun-Hui Zhou, and Syed Ahmad Raza. Direct-forcing immersed boundary modeling of vortex-induced vibration of sphere at moderate Reynolds number. In *The 5th International Forum on Advanced Technologies (IFAT), Taipei, Taiwan, 2019*.
5. Yun-Hui Zhou, Ming-Jyh Chern, and Syed Ahmad Raza. Numerical solution of vortex-induced vibration of sphere using direct-forcing immersed boundary method. In *2nd International Conference on Mechanics (ICM), Yilan, Taiwan, 2018*.
6. Anjum Khalid, Anwar Anis Ahmed, and Syed Ahmad Raza. Off-grid electricity production for schools with hybrid system in the coastal region of Sindh-Pakistan. In *5th International Mechanical Engineering Congress, Karachi, Pakistan, 2015*.
7. Anjum Khalid and Syed Ahmad Raza. Economic and environmental benefits of adopting energy efficiency methods for a typical house in Pakistan. In *International Conference on Energy and Sustainability, Karachi, Pakistan, 2013*.
8. Asma Adeel, Mubashir Ali Siddiqui, and Syed Ahmad Raza. Optimization of wind turbine performance using design of experiment methodology. In *International Conference on Energy and Sustainability, Karachi, Pakistan, 2013*.

9. Usman Allauddin, Mubashir Ali Siddiqui, Syed Ahmad Raza, and Hamal Baryam Khan Kakar. Assessment of coal gasification technologies potential for Sindh coal reserves. In *International Conference on Energy and Sustainability, Karachi, Pakistan, 2013*. **(Invited lecture)**
10. Naveed ur Rehman, Syed Ahmad Raza, Muhammad Uzair, and Mubashir Ali Siddiqui. Simplified methodology for solar energy potential assessment of any proposed site in Karachi. In *20th Expo ASHRAE Conference, Karachi, Pakistan, 2013*.

SKILLS AND TRAININGS

Engineering Software and Programming Languages

- C++, Python, MATLAB, Javascript, Fortran
- Engineering Equation Solver (EES), Transient System Simulation Tool (TRNSYS), CFD-ACE, Fluent

Programming Projects

- Developed a 3-D Navier-Stokes, finite volume solver, using the direct-forcing immersed boundary method in C++ for simulation of multiple structures undergoing vortex-induced vibration in turbulent flow, with a user-friendly input configuration file; later called the **TIGER-C solver**
- Developed a command-line utility program called **ColDataUtil** in C++ for loading, writing and performing calculations on column data files for the data obtained from typical solvers used widely in computational fluid dynamics

Acquired Training

- International workshop on “Fundamentals of Intellectual Property” by Commercial Law Development Program (CLDP), Office of the General Counsel, US Department of Commerce, September 2013
- Short course on “HVAC - The Building Services Design Process and Design Considerations” by Pakistan Engineering Council (PEC), September 2012
- “Professional Competency Enhancement Programme for Teachers (PCEPT)” by National Academy of Higher Education (NAHE), Higher Education Commission (HEC), Pakistan, 8–30 December 2011
- Training workshop on “Introduction to Personal Safety” by Maxtrain International, at Bhit Field, Eni Pakistan Limited, December 2009