Muhammad Saif ur Rehman

Date of birth: 28/01/2001 | **Nationality:** Pakistani | **Gender:** Male | **Phone number:** (+92) 3106107233 (Mobile)

Email address: saifurrehman945@outlook.com | **LinkedIn:** https://www.linkedin.com/in/saif-ur-rehman-41250b187/

WhatsApp Messenger: +923106107233 | **Address:** Multan, Pakistan (Home)

ABOUT ME

A Simulation Engineer with a deep interest in multiphase flow simulations and their applications across complex engineering systems. My expertise lies in modeling fluid behaviors using advanced CAE tools and simulation software, complemented by hands-on experience in automating workflows with Python, and core development in C++.

WORK EXPERIENCE

01/12/2023 – CURRENT Multan, Pakistan
SIMULATION ENGINEER SOCO-ENGINEERS GMBH

Material Modelling
- Integrated classical material models into MATLAB and Python as user subroutines for industrial FEA solvers.
- Developed workflows to validate material models against experimental and simulation data.
- Managed a comprehensive material database containing over 200 material types from 300+ suppliers, ensuring data integrity and compliance with material standards.

Simulation workflows
- Designed and implemented 10+ simulation workflows for virtual material testing, data parsing, automated meshing, and post-processing, significantly streamlining simulation processes.
- Contributed to 5+ post-processing repositories, leveraging scripting in Animator and META Post to enhance automation and efficiency.

Optimization framework
- Developed and maintained a shape optimization framework in Python and C++, leveraging adjoint sensitivities from FEA/CFD solvers to refine CAD designs.
- Ensured high code quality by integrating GitHub CI/CD pipelines, optimizing computational efficiency with C++ while maintaining modularity in Python.

Business or Sector Professional, scientific and technical activities | **Department** Simulation and Development |

Email saif.urrehman@soco-engineers.com | **Website** soco-engineers.com/

01/09/2022 – 01/12/2023 Islamabad, Pakistan
RESEARCH ASSISTANT NATIONAL UNIVERSITY OF SCIENCES AND TECHNOLOGY

Heat transfer in nanofluids
- Developed a numerical modeling approach to enhance heat transfer in nanofluid-based solar collectors using artificial roughness techniques.
- Designed an optimized square/triangular ribbed surface, achieving up to 70% improvement in heat transfer efficiency.
- Demonstrated that increasing the Air-Al_2O_3 volume fraction from 1% to 4% enhances the Heat transfer rate by 2 times

Ventilated Super-cavitation
- Implemented a numerical modeling technique for ventilated super-cavitation, achieving up to 65% net drag reduction in underwater bodies.
- Optimized cavitator design, revealing that a disk cavitator reduces drag by 5% more than a cone cavitator at the same cavitation number.

- Demonstrated that increasing the flow entrainment coefficient ($C_{Q,v}$) from 0.15 to 0.6 leads to a 26% reduction in drag, highlighting the strong influence of ventilation.
- Reduced computational time by integrating ANSYS Fluent's MPI interface, efficiently running simulations on an HPC cluster for large-scale analysis.

Business or Sector Professional, scientific and technical activities | **Department** SMME - Nanofluids and Aeroacoustics' Lab |

Email surme19asmme@student.nust.u.pk | **Website** www.nust.edu.pk

Links https://tinyurl.com/4j4j2ccv | https://tinyurl.com/3yp9sdzt

15/05/2023 – CURRENT Islamabad, Pakistan
FREELANCE CAE ENGINEER FIVERR | LINKEDIN

Offered Services
- Numerical Models and discretization schemes
- Multiphase flow Modelling
- Discrete Phase Modelling
- Turbulence Modelling
- FEA Models for Mechanical Structures

Delivered more than **10 major projects** with 95% client satisfaction ratio

Business or Sector Professional, scientific and technical activities | **Website** fiverr.com

25/02/2022 – 10/08/2022 Kot Addu, Pakistan
MAINTENANCE ENGINEER - INTERN PAK ARAB REFINERY - MCR

- Summarized and Reviewed 100+ Work Permits, Inspection Reports, P&IDs, in more than 10 departments
- Implemented API, ASTM & ANSI, ISO Standards, in in more than 20 rotary and stationary Equipment
- Co supervised a team of more than 10 people to address and resolve bottleneck issue during Overhaul of Naphtha Hydro pump.
- Proposed a workload planning mechanism based on AI and digital Database, reducing field time by 30%.

Business or Sector Professional, scientific and technical activities | **Department** Maintenance |

Website https://www.parco.com.pk/

EDUCATION AND TRAINING

01/09/2019 – 01/09/2023 Islamabad, Pakistan
BACHELORS IN MECHANICAL ENGINEERING National University of Sciences and Technology

Core Mechanical Subjects - Mechanics | Materials | Manufacturing | Machine Design | Mechanics of Machines | Thermodynamics | Fluids

Specialization - Finite Element Analysis | Computational Fluid Mechanics | Numerical Methods
Heat Transfer | Programming | Gas Turbines

Additional Courses - Vehicle Design and Performance | Mechatronics |

Address National University of Sciences & Technology (NUST) Campus, Sector H-12, Islamabad, Pakistan, Islamabad, Pakistan |

Website www.nust.edu.pk | **Level in EQF** EQF level 6

Link https://tinyurl.com/y23dvhtt

05/01/2023 – 06/01/2023 Islamabad, Pakistan
CERTIFICATE OF TRAINING - OPENFOAM School of Mechanical and Manufacturing Engineering (SMME)

Fundamentals to Advanced CFD – Covered case setup, meshing, solvers, and post-processing.
Hands-On Simulations – Practiced structured/unstructured meshing, turbulence, and multiphase flows.
Advanced Customization – Explored turbulence modeling, solver modifications, and automation with scripting.

Website https://smme.nust.edu.pk/ | **Level in EQF** EQF level 7

Link https://tinyurl.com/39x28dbj

DIGITAL SKILLS

Development Skills

Python, Data structures | Data frames, Pandas, Openpyxl | C++ Computing | Database, PostgreSQL, SQLAlchemy | Git, Docker, CI/CD Pipelines, GH WFs | Numpy, Scipy, Scr-kit learn

Simulation Software

OpenFOAM | ANSYS FLuent | COMSOL Multiphysics | Optistruct | Abaqus CAE | LS-DYNA

PROJECTS

15/07/2023 – 15/02/2024
Analyzing the Dental Zirconia Fixed Prosthesis using FEA methods

- Analyzed the impact of cement layer thickness (CLT) and Young's modulus of the cement on the stress distribution in a three-unit zirconia fixed dental prosthesis (FDP) and in the bonding interfaces by means of the finite element method.
- Optimized thickness of cement adhesive, to increase clinical service of zirconia by 35%
- Cross-discipline study providing deep insight into the dental clinical sciences

Link https://tinyurl.com/2s4zptka

01/02/2023 – 01/04/2023
Vortex shedding in Underwater Circular Cylinders

- Analyzed phenomenon of vortex shedding at high velocity (Reynolds Number = 10000)
- Validated the reliability of the RANS shear–stress-transport (SST) k-w turbulent model in predicting the VIV phenomenon of a circular cylinder, to an error bound less than 15%.

Links https://tinyurl.com/bdcbara6 | https://tinyurl.com/n8xx558x

LANGUAGE SKILLS

Mother tongue(s): **URDU**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	C1	C1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

VOLUNTEERING

01/11/2022 – 31/12/2022 Islamabad
Lead Blood Donation Drive

- In collaboration with AFIT (Rawalpindi) and Sundas Foundation.
- Organized and coordinated a team of 8 volunteers to ensure the campaign's success.
- Collected over 25 pints of blood to support Thalassemia patients in times of COVID-19
- Awarded Extra Credits in Educational Transcript for the leadership, and hard-work

01/04/2021 – 01/08/2021 Islamabad
Volunteer Initiative: Educating Underprivileged Children

- Collaborated with university peers to support an NGO in Islamabad's slum areas, providing foundational education to underprivileged children.
- Enabled children to transition into Pakistan's formal education system by equipping them with essential academic skills.
- Cultivated a sense of responsibility and commitment to social development by addressing educational disparities in marginalized communities.

MANAGEMENT AND LEADERSHIP SKILLS

Team Lead - AgroDrone

- Engineered the development UAVs for Targeted spraying of pesticides using on Corn Field
- CAD model development and prototyping. Lead a multidisciplinary team of 8 members,
- Finalist of FICS stage 3, a highly competitive startup pitching platform at NUST

Link https://tinyurl.com/58apa66n

COMMUNICATION AND INTERPERSONAL SKILLS

Time Management Techniques and Tools

- Certified in Time Management Techniques and Tools, specializing in task prioritization, productivity enhancement, and effective resource allocation.
- Equipped to manage complex projects efficiently, ensuring timely delivery and optimal results.

Link https://tinyurl.com/2p9vc94u

HOBBIES AND INTERESTS

Badminton Enthusiast

- Part of 4 member University Badminton team
- Semifinalist of Inter-School and Inter-Hostel Badminton Championship
- Formal Player for over 8 years