

# DR. MAHRUKH

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## PERSONAL INFORMATION

Date of birth: 15<sup>th</sup> July 1985

Religion: ISLAM

Nationality: Pakistani

## QUALIFICATIONS

|                         |                              |                                     |
|-------------------------|------------------------------|-------------------------------------|
| S.S.C (Matric)          | Fair View Public School      | 86%                                 |
| H.S.C (Pre-Engineering) | BAMM PECHS College for women | 79.09%                              |
| B.E (Mechanical)        | NEDUET                       | 81.46 %( 12th position)             |
| M.Engg. (Energy System) | NEDUET                       | 3.85CGPA (1 <sup>st</sup> position) |
| PhD (CFD Modeling)      | Cranfield University         | Completed                           |

## TRAININGS

One month Internship in PIA (2005)

Mechanical Maintenance & Operation of Process/Power Plant (1 week course) (2005)

One week Training on Computational Fluid Dynamics (CFD) Industrial usage (2010)

Six week Training course on Computational Thermo-Fluid Mechanics (2011)

Doctoral Training Courses (during PhD) from Cranfield University, UK (2013-2016)

## JOB EXPERIENCE

April 2012 till to date: NED University of Engineering & Technology Karachi

**Assistant Professor** (Department of Mechanical Engineering)

January 2009 to March 2012: NED University of Engineering & Technology Karachi

**Lecturer** (Department of Mechanical Engineering)

- Delivering Lectures on subjects Engineering Mechanics (ME-101) and Basic Mechanical Engineering (ME-107).
- Taking Practical labs of Fluid Mechanics, Gas Dynamics, Gas Turbine and Thermodynamics.
- Guiding students of Mechanical engineering for final year projects (Project advisor).
- Use to sit in the lab of Gas Dynamics/Aerodynamics where I have to teach students the experimental model testing on the Wind Tunnel
- Responsible for the work related to the Gas Dynamics lab.

January 2008 to August 2008: M/s International Consultants, **Design Engineer** (HVAC).

- Responsible for Design/Load Calculation and supervision of CAD Operators for preparation of HVAC system drawings of Miscellaneous Buildings/Projects.
- Also surveying the drawings and carrying out the items-wise quantities of HVAC system.
- Designing of Chilled Water and Condenser Water Risers, Fresh Air and Exhaust Air Risers etc.
- Selection of HVAC Equipment Chiller, Cooling Tower, Air Handling Units, Fan Coil units, Pumps, Fans etc.

May 2007 to December 2007: M/s S. Mehboob & Company, Consulting Engineers

**Design Engineer** (HVAC). Designing work 08 months period.

## **PROJECTS**

B.E-Mechanical Final year Project (2006)

**“Design of an Injection Mold of an Automotive Component”**

Project advisor B.E Mechanical Students

**2012-To design and fabricate Solar Still**

**2012-Design and fabrication of 5 kW Micro Turbine based MEMS**

**2012-To study the feasibility of converting Cummins Diesel Engines on Bio-fuel and heat recovery from new system**

**2011- Utilization of Solar Thermal Energy for Air Conditioning**

**2010- Power Generation through BIOGAS**

## **RESEARCH**

Numerical simulation of problems related to Turbulence using CFD. Investigated the flow over bluff bodies using Unsteady-Reynolds Averaged Navier-Stokes (URANS) equation based models and Large Eddy Simulation (LES) models, and Detached Eddy Simulation (DES) model. DES based analyses is presented in Turbulence Heat and Mass Transfer 2012 conference.

Also worked on a project based study related to renewable energy, the source was river/or oceans current and the device is a Gorlov-Hydro-Turbine. The flow across the turbine using RANS is simulated and the optimum blade twist-angle is designed to get maximum power from the upcoming water stream. This work is presented in International Conference on Energy and Sustainability 2013.

The focus of the PhD work is on synthesis and modelling of the nanoparticle’s formation and growth during high velocity oxygen-fuel (HVOF) spraying process using solution precursor. A computational model is developed for capturing the flow dynamics of solution precursor high velocity oxygen-fuel spray (SP-HVOFS) process. The nanoparticles synthesis including precursor droplets fragmentation and evaporation inside the HVOF torch is modelled by using CFD techniques. Part of this work is published in Journal of Thermal Spray Technology 2014, Surface and Coating Technology 2015, and Industrial & Engineering Chemistry Research 2016. Further work is submitted to publish in other journals.

## **FIELD OF INTEREST**

Thermal sciences, nanoparticle’s spray coatings, Computational Fluid Dynamics (CFD), Renewable Energies, Heating Ventilation & Air Conditioning (HVAC)

## **SOFTWARES**

| <b>CFD SOFTWARE</b>       | <b>CAD SOFTWARE</b> | <b>OTHER SOFTWARE</b>            |
|---------------------------|---------------------|----------------------------------|
| ICEM CFD (Pre-processor)  | Pro-E               | Microsoft Project                |
| GAMBIT (Pre-processor)    | AutoCAD             | Microsoft Office                 |
| FLUENT (Solver)           |                     | HVAC (System Designing Software) |
| CFX (Solver)              |                     |                                  |
| TECPLOT (Post-processing) |                     |                                  |

## **FUTURE PLANS**

I envision my future research to span across both CFD and experimental fluid flow analysis in thermal spraying process, mechanical devices, across wind\hydro turbines, and high rise buildings and will use this tool to optimize the HVAC designing of buildings. My main motivation is to have a deep knowledge on the numerical methods of problem solving. I am interested to work on varied projects in this area of research.

## **REFERENCES**

### ***Professor Sai Gu***

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