

Muhammad Haider

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Summary

- PhD candidate seeking a work opportunity for solving fundamental and applied problems in thermal engineering
- 3 years of hands-on experience in thermal system instrumentation, data acquisition/processing, design of experiments
- 5 years of R&D experience involving conceptualization, design, manufacturing and testing in a multidisciplinary team
- Good understanding of connecting applied system level research with fundamental research in the field of thermodynamics, heat and mass transfer, and fluid mechanics

Work Experience

03/2018 – Present Graduate Research Assistant, Air Conditioning and Refrigeration Center, UIUC

Hands-on: Experience working on a transcritical CO₂ air conditioning system, and an R134a pump system involving component and system testing, instrumentation, data acquisition/processing, piping, and wiring

Ejector modeling: Proposed ejector performance map using a user-centered design approach with 20% prediction accuracy. Currently, using machine learning tools for improving prediction accuracy for extreme working conditions

Ejector system modeling: Modelled ejector system components (heat exchangers and compressor) and developed robust system solver in MATLAB to analyze ejector system performance for component selection purposes

Hypothesis & design of experiments: Hypothesized ejector physics after literature review and available experimental data. Currently, designing experiments to evaluate hypothesis by planning to conduct flow visualization studies for motive jet shape based on Flash Boiling Atomization theory, and then utilizing the new information in developing advanced CFD models for estimating entropy generation during mixing inside an ejector

01/2015 – 07/2017 Lecturer, National University of Sciences and Technology (NUST), Pakistan

Courses taught: Refrigeration and Air Conditioning, Thermodynamics, Mechanical Vibrations; Mentored engineers working on radar project (below) and undergraduate students for Shell Eco Marathon, and Final Year Projects

09/2009 – 12/2014 R&D Engineer, Microwave Engineering Research Lab, NUST, Pakistan

Developed man portable *Ground Surveillance Radar*, a multidisciplinary team project, funded by Government of Pakistan

Mechanical designing and manufacturing: Designed detailed 3D models of radar assembly, and developed production drawings in Pro/Engineer (now Creo Elements); manufacturing, assembly, and troubleshooting of radar components

Experimentation: Conducted parameter identification of radar assembly, and thermal characterization of electronics

Thermal management: Designed (using commercial CFD packages) and manufactured custom heatsinks for radar electronics; design planning for ruggedization of radar assembly to meet MIL-STD-810G

Miscellaneous: Engaged in procurement, user/product documentations, development of inventory management system

Education

08/2017–Present Ph.D. Mechanical Engineering, University of Illinois at Urbana-Champaign GPA: 3.96/4.00

- **Coursework:** Design of Thermal Systems, Multiphase Systems & Processes, Intermediate Heat Transfer, Introduction to Computer Control of Mechanical Systems, Numerical Thermo-Fluid Mechanics, Advanced Gas Dynamics
- Recipient of *Fulbright Foreign Student Scholarship* from US State Department for PhD studies at UIUC (2017-22)

09/2009-08/2013 M.S. Mechanical Engineering, NUST, Pakistan GPA: 3.50/4.00

- **Thesis:** *Multi-Domain Modeling of Pan Tilt Platform with Mechanical Imperfections*
- **Keywords:** Multi-body dynamics, bond graph modeling, system modeling, system identification

09/2004-05/2008 B.E. Mechanical Engineering, NUST, Pakistan GPA: 3.60/4.00

- Awarded 2nd best student final year project on “Design and Fabrication of Rapid Prototyping Machine using Fused Deposition Modeling”; NUST Merit Scholarship in 7/8 semesters

Skills

Software: MATLAB, ANSYS (Fluent/Mechanical), Labview, Creo Elements, SolidWorks, EES, Excel, PowerPoint

Hardware: Data acquisition system, TI MSP430 microcontroller, Instrumentation (temperature, pressure)

Interpersonal: Problem solving, Communication, Emotional Intelligence, Teamwork, Adaptability, Leadership