Mina Mikhaeel

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RESEARCH EXPERIENCE

Mechanical Science and Engineering Dept. - University of Illinois Urbana-Champaign (UIUC) Urbana, IL, USA
Graduate Research Assistant Feb. 2018 - Present

Predicting regime transitions in two phase flows - sponsored by the **Air Conditioning and Refrigeration Center (ACRC)**, including:

- Reviewed literature about different approaches for predicting regime transitions
- Developed simulation models in Python and Julia languages
- Searched and analyzed experimental data from the literature and used it for validation
- Used statistical methods for model validation, verification and uncertainty quantification
- Presented results in journal articles (2 accepted to the IJHMT and working on my 3rd one), reports, posters, and presentations

Mechanical Science and Engineering Dept. - University of Illinois Urbana-Champaign (UIUC) Urbana, IL, USA
Graduate Research Assistant Aug. 2008 - May 2013

Dynamic modeling of commercial aircraft thermal systems - collaboration with **Rolls Royce**, including:

- Led the 3-researcher university thermal team
- Participated in preparing 2 schedules for phases I and II of the project
- Implemented mathematical models in MATLAB Simulink for air-air heat exchanger; passenger cabin; fan; and mixing junction
- Collaborated with the other project teams (electrical and aircraft systems) to ensure connectivity of the different aircraft sub-models

Creating, characterizing, and testing enhanced surfaces for boiling heat transfer - sponsored by the **Air Conditioning and Refrigeration Center (ACRC)**, including:

- Designed and constructed an experimental apparatus for pool boiling
- Machined microgrooves (~100 μm) on Aluminum using a CNC micro-end-milling machine
- Characterized the created enhanced surfaces using clean room equipment (optical microscope, optical profiler, and goniometer)
- Sourced parts for my experimental apparatus: metals and alloys; high temperature plastics; sealants; thermal interface materials; thermocouples; dry block calibrators; precision thermometers; power supplies; machining tools; and electric heaters
- Conducted pool boiling experiments on aluminum and copper surfaces under different testing conditions
- Created programs for data acquisition using National Instruments Labview software
- Developed MATLAB codes for reducing experimental data

Lab. of Applied Thermodynamics and Refrigeration - Royal Institute of Technology (KTH) Stockholm, Sweden
Research Engineer Jan. 2008 - Jun. 2008

Building an experimental apparatus for testing compressors with natural refrigerants (in a team of 6), including:

- Selected, ordered, and connected measuring instruments
- Programmed microcontrollers
- Created a program for data acquisition & analysis using Agilent VEE Pro software

Copeland Europe Compressor Manufacturer Welkenraedt, Belgium
Trainee in the Application Engineering Dept. Summer 2006

- Learned about the digital scroll compressor technology
- Created a simulation model for heat pumps with Enhanced Vapor Injection (EVI)
- Started the analysis of the field test data for an air/water heat pump with EVI
- Conducted a limited literature review about capacity control techniques in heat pumps

PUBLICATIONS

M.M.K. Mikhaeel and A.M. Jacobi. **Using Thermodynamic Availability to Predict the Transitional Film Reynolds Number between the Jet and Sheet Modes in Falling Liquid between Horizontal Tubes.** *International Journal of Heat and Mass Transfer*, 161, 2020, 120246

M.M.K. Mikhaeel and A.M. Jacobi. **Using Thermodynamic Availability to Predict the Transitional Film Reynolds Number between the Droplet and Jet Modes in Falling Liquid between Horizontal Tubes.** *International Journal of Heat and Mass Transfer* (accepted for publication Sep. 2020)

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WORK EXPERIENCE

Jones Lang LaSalle (JLL) - Qantas account - Australia — Sydney, Australia
Assistant Facilities Manager — Mar. 2015 – Jan. 2018

Managing Qantas' landside engineering buildings (~ 30 buildings) in Sydney airport, including:

- Managed: site operations and maintenance, health & safety, and risk
- Managed preventative and reactive maintenance of air conditioning, refrigeration, and fire systems

Buildings Alive Pty Ltd — Sydney, Australia
Building Systems Engineer — Dec. 2013 - Dec. 2014

Improving resource utilization and performance in the operation of commercial buildings, including:

- Reviewed daily energy and water consumption profiles for commercial buildings (office buildings and hospitals) to recommend saving initiatives
- Investigated building management systems (BMSs) and mechanical plant rooms for inefficiencies
- Performed data analysis of electricity and water consumptions
- Prepared internal development plans for company services

EDUCATION

University of Illinois Urbana-Champaign (UIUC) — Illinois, USA
Ph.D. in Mechanical Engineering — Anticipated Fall 2020

Research: Predicting Regime Transitions in Two-phase Flows

Royal Institute of Technology (KTH) — Stockholm, Sweden
M.Sc. in Mechanical Engineering — Nov. 2007

Specialization: Sustainable Energy Engineering
Thesis: Performance Evaluation of Constant Speed and Variable Speed Compressors in Brine/Water Heat Pumps
Tasks included: (1) Created a quasi-steady state model for a hydronic heating system, including sub-models for: house, radiator system, vapor compression system, and brine system; (2) Investigated and modeled the performance of 6 commercial compressors (3 variable speed and 3 on/off); and (3) Calculated the seasonal performance factor for the 6 simulated heat pumps

Ain Shams University — Cairo, Egypt
B.Sc. in Mechanical Engineering — Jun. 2002

Specialization: Mechanical Power Engineering
Thesis: Design of a Central Air Conditioning System for the Main Building in a Touristic Village
Tasks included: (1) Estimated cooling demands; (2) Designed air ductwork and chilled water piping systems; and (3) Selected air conditioning system components

SKILLS

- **Language:** English & Arabic (fluent), and French (intermediate)
- **Computer:** Julia, Python, MATLAB/Simulink, Latex, Microsoft Office (Word, Excel, and PowerPoint), Engineering Equation Solver (EES), AutoCAD, STELLA software for dynamic system modeling, and National Instruments Labview

AWARDS

- International Fulbright Science and Technology (IFST) Award
- Undergraduate Excellence Scholarship - School of Engineering, Ain Shams University

References will be furnished upon request