

Mohamed Hatem Mousa

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Education

University of Illinois at Urbana–Champaign

Doctor of Philosophy in Mechanical Engineering

GPA: 3.93/4.00

Thesis: “Phase Change Utilization for Highly Efficient and Sustainable Cooling”

Expected: Aug 2022

American University in Cairo

Bachelor of Science in Mechanical Engineering,

May 2018

Minor in Business Administration

GPA: 3.98/4.00

Publications and Conferences

- Mousa, M. H.; Yang, C-M.; Nawaz, K; Miljkovic, N. Review of Heat Transfer Enhancement Techniques in Two-Phase Flows for Highly Efficient and Sustainable Cooling. *Renewable & Sustainable Energy Reviews* **In Press**
- Mousa, M. H.; Günay, A. A.; Orejon, D.; Khodakarami, S.; Nawaz, K.; Miljkovic, N. Gas-Phase Temperature Mapping of Evaporating Microdroplets. *ACS Applied Materials & Interfaces* **2021**, *13* (13), 15925–15938.
- Mousa, M. H.; Miljkovic, N.; Nawaz, K. Review of Heat Transfer Enhancement Techniques for Single Phase Flows. *Renewable & Sustainable Energy Reviews* **2021**, *137*, 110566.
- Mousa, M. H., A. Alperen Günay, Daniel Orejon, Nenad Miljkovic, “Gas Phase Temperature Mapping of Evaporating Water Microdroplets”, ASME International Mechanical Engineering Congress & Exposition, **2019**

Research & Professional Experience

University of Illinois at Urbana–Champaign (in collaboration with Oak Ridge National Lab)

Aug 2018-Present

Mechanical Science & Engineering Department, Research Assistant

Urbana, IL

- Collaborated with a multi-disciplinary team to mitigate interfacial stresses on a planar transformer
- Prepared project timeline for collaboration with Building Equipment department at Oak Ridge National Lab
- Managed budgeting proposal to ensure setup adheres to financial needs while maintaining qualification standards
- Established objectives, tasks, and resources needed to realize collaboration goals with Oak Ridge National Lab
- Managed vendor communications to acquire the equipment needed to implement design into production
- Modeled thermodynamically boiler setup with EES to optimize design and maximize its capability within constraints
- Developed electrical and mechanical equipment needed to build flow boiler setup
- Designed and built a flow boiler setup to investigate and analyze enhancements in boiling from modified surfaces
- Innovated and developed hydrophilic and additively manufactured tubes that would enhance cooling
- Planned experiments to test the design performance and capability of the boiler across different boiling regimes
- Presented technical details and progress to collaborators at Oak Ridge National Lab
- Supported upgrades to the newly developed flow boiler to cater to management requirements and needs
- Conducted risk identification and lab tests to ensure flow boiler is safe and reliable without an operator present
- Troubleshoot and resolved dynamic and static instabilities amongst other issues in flow boiling setup
- Designed and conducted tests to analyze thermal management through evaporation of a water microdroplet
- Developed and built a novel setup to measure temperatures around droplets with a spatial resolution of $\pm 1 \mu\text{m}$
- Analyzed the effect of 4 functional substrates of different roughness on the evaporation dynamics of microdroplets
- Analyzed evaporation theories and frameworks experimentally and through heat transfer calculations

Oak Ridge National Laboratory

June 2019-Aug 2019

Energy & Transportation Science Division, ASTRO Researcher

Oak Ridge, TN

- Mentored 2 undergraduate students and analyzed their pool boiling setup to identify any gaps or issues in design
- Developed flow boiler prototypes to investigate the thermal management effect of different flow boiling regimes
- Delivered reports to upper management to summarize progress and other technical details

MARS Wrigley Inc.

July 2017-Aug 2017

R&D Department, Research Intern

Cairo, EGY

- Planned and managed 4 experiments on 1250 specimens to formulate quality assurance and specs document
- Designed experiments to analyze oven capabilities and variabilities on a sample of 240 specimens
- Worked with R&D and industrial departments to eliminate 39,600 LE/year in costs through resource organization

- Led foremen into resolving problems regarding the chocolate temper of Galaxy Flutes
- Managed and produced the official Galaxy Flutes process specification document for data books

ABB Ltd.

R&D and Industrial Engineering Department at low voltage factory, Intern

Jan 2017
Cairo, EGY

- Analyzed assembled components using Solidworks to ensure they can be manufactured with factory machinery
- Managed resources and tasks required to resolve changeover time issues and risk of falling behind schedule
- Communicated and demonstrated need for 5S to workers operating on punching machines

Leadership

Egyptian Student Association (ESA)

Vice President

Aug 2020-Aug 2021
Urbana, IL

- Formulated the association’s overall long-term strategies and goals
- Represented the executive board and the association at public events
- Guided and evaluated the executive board

Engineers Volunteering in STEM Education (ENVISION)

Logistics Coordinator

Aug 2020-Aug 2021
Urbana IL

- Planned different outreach events and communicated them with the entire engineering student body
- Reviewed the scheduling of different events conducted by ENVISION

Global Leaders (GLOBE)

Group Leader

Aug 2019-Aug 2021
Urbana, IL

- Arranged meetings with students of different cultural backgrounds to promote intercultural awareness
- Orchestrated and directed awareness events with the Asian American Cultural Center

Graduate Mechanical Society (GraMS)

Chief Communications Officer

Aug 2019-Aug 2020
Urbana, IL

- Articulated and moderated communications between the department and the student body
- Promoted and publicized academic workshops to the different engineering departments

American University in Cairo Racing Team

HR Director

Aug 2017-Aug 2018
Cairo, EGY

- Reconciled between departments whenever conflicts and miscommunications occur
- Manged and delegated HR members to other departments to conduct evaluations

Peer Advising Leader (PAL)

Major Explorations Video Series co-founder & HR member (Matrix structure)

Aug 2017-Aug 2018
Cairo, EGY

- Founded and supervised a video series to promote career exploration
- Negotiated with the rhetoric department an incentive system that encourages freshmen to attend career day

Technical and Linguistic Skills

Languages:

Fluent in spoken and written English and Arabic

Computer Skills:

- Engineering Equation Solver (EES)
- SolidWorks
- Minitab
- Ansys Fluent
- LabVIEW
- MATLAB

Lab Equipment:

- Cleanroom
- SEM
- Micro-goniometer

Honors

Mechanical Distinguished Fellowship, University of Illinois at Urbana–Champaign

Aug 2018-Aug 2019

Shell’s Excellence Award School of Sciences & Engineering, American University in Cairo

Aug 2018

Highest Academic Achievers, American University in Cairo

Aug 2016-Aug 2018