

Dalia Ghaddar

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🔗 <https://scholar.google.com/citations?user=DqB2P2IAAAAJ&hl=en&oi=ao>

Education

- Jan 2021 – present **University of Illinois at Urbana-Champaign (UIUC), US. Ph.D. candidate** in Mechanical Engineering focusing on thermodynamics, heat transfer, experimental system design and HVAC applications, GPA: 4.00/4.00, Expected graduation: 2024/2025.
- Aug 2018 – Dec 2020 **American University of Beirut (AUB), Lebanon. M.Sc.** in Mechanical engineering, GPA: 4.00/4.00
- Aug 2014 – May 2018 **American University of Beirut (AUB), Lebanon. B.E.** in Mechanical engineering, GPA: 3.81/4.00

Awards and Achievements

- 2022 **Arab American association of engineers and architects (AAAEA) scholarship, Illinois, US.**
- 2014 – 2020 **Dean's honor list, Mechanical engineering, AUB. In recognition of outstanding academic achievement.**






Academic experience

Research experience

- Jan 2022 – present **Graduate Research Assistant, Mechanical science and engineering department, UIUC, US.**
Advisor: *Prof. Nenad Miljkovic*
- Increasing the efficiency of water harvesting systems by utilizing scalable and robust coatings :
 - Applied a very scalable technique to structure aluminum surfaces that can render heat exchangers superhydrophobic or superhydrophilic.
 - Investigated condensation heat transfer rates on micro/nano-structured surfaces of heat exchangers using MATLAB.
 - Investigating delayed frosting for residential and automotive heat exchangers:
 - Tested large scale (>20cm) heat exchangers with different surface wettabilities and characteristics to study their anti-icing and frosting performance in a wind tunnel test facility (mimicking evaporator performance in a heat pump system).
 - Working on an automobile air conditioning system with a two-phase refrigerant (R134a) to test the frosting performance of heat exchangers in heat pump mode.
 - Handling refrigerants safely including charging/discharging and leak detection
 - Working with sensors along with LabVIEW interface to collect and process frosting/defrosting data
- Source of funding:** The sources of funding for my research are the Air-Conditioning and Refrigeration Center (ACRC) and the center for Power Optimization of Electro-Thermal Systems (POETS), a National Science Foundation (NSF) center.
- Aug 2018 – Jul 2020 **Graduate Research Assistant, Mechanical engineering department, AUB, Lebanon**
Advisor: *Prof. Nesreene Ghaddar*
Thesis title: *Model-based dynamic controller of personalized ventilation for thermal comfort in naturally ventilated spaces*
- Thermal comfort and dynamic controller modeling:
 - Developed a thermal comfort model using segmental skin temperatures for naturally ventilated office spaces assisted with personalized ventilation units.
 - Developed a dynamic PID controller to maintain acceptable thermal comfort at all times of operation using the thermal comfort correlation.
- Sep 2017 – May 2018 **Undergraduate Research Assistant, Mechanical engineering department, AUB, Lebanon.**
Advisor: *Prof. Kamel Aboughali*
- Improvement of a multi-segmented bioheat model:
 - Refined a multi-segmented bioheat model that can accurately predict the skin temperature variation of nude and clothed human body segments in steady, transient and non-uniform environments using FORTRAN and C++.
- Advisor: *Prof. Ghanem Oweis*
- Shear layer vortex dynamics in the patent false lumen of an aortic dissection:
 - Produced an aortic dissection model to examine the free shear layer developed under steady and pulsatile flow conditions.
 - Elucidated the dynamical flow processes associated with shear layer development in a patent false lumen aortic dissection.



Academic experience (continued)

Teaching experience


- Jan 2021 – Dec 2021  **Graduate Teaching Assistant, UIUC, US**
Courses: *ME 330: Engineering Material, ME 320: Heat Transfer, ME 520: Thermal Systems*
- Jun 2022 – Aug 2022  **Graduate Mentor, UIUC, US.**
Research Experience for Undergraduate Students: *Mentored three undergraduate mechanical engineering students for the summer.*
- Dec 2018 – Nov 2021  **SAT Math Course Instructor, Skillz, Lebanon.** *Conducted more than 40 SAT Math sessions in private school institutions and SAT centers.*
- Feb 2018 – Nov 2021  **Mechanical and Mathematics Course Instructor, Elite Tutors, Lebanon.** *Gave mechanical and mathematics courses to university students as well as scientific subjects to high school students.*
 **Professional Tutor, Ostaz, Lebanon.** *Completed more than 285 tutoring sessions with an excellent rating and received a certificate from the British Council.*

Research Publications

Peer reviewed papers



- Ghaddar, D.**, Itani, M., Ghaddar, N., Ghali, K., & Zeaiter, J. (2021). Model-based adaptive controller for personalized ventilation and thermal comfort in naturally ventilated spaces. (Vol. 14).  doi:10.1007/s12273-021-0783-x
- Itani, M., **Ghaddar, D.**, Ghaddar, N., & Ghali, K. (2021). Model-based multivariable regression model for thermal comfort in naturally ventilated spaces with personalized ventilation. (Vol. 14, pp. 78–93).  doi:10.1080/19401493.2020.1850865
- Ghaddar, D.**, Ghaddar, N., & Ghali, K. (2020). Autonomously controlled pv unit in a naturally ventilated space to provide comfort by the use of thermal imaging. In *Ashrae topical conference proceedings*, American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc.

Thesis


- Ghaddar, D.** (2020). Model-Based Dynamic Controller of Personalized Ventilation for Thermal Comfort in Naturally Ventilated Spaces. Retrieved from  https://scholarworks.aub.edu.lb/bitstream/handle/10938/21962/Thesis_Dalia_Ghaddar.pdf?sequence=3

Services





Council Member

- 2021 - present  **Graduate MechSE Society (GRAMS)**
Communications Director
UIUC, Urbana, US.
Website: <https://grams.mechse.illinois.edu/council>
-  **Lebanese Student Association (LSA)**
Communications Director
UIUC, Urbana, US.



Work History

- Jun 2017  **Khatib and Alami company, Lebanon.**
Internship at Khatib and Alami, a multidisciplinary consultancy firm.


Relevant courses

-  **MEMS theory and fabrication :** Design and hands-on fabrication of micro-and nano-electromechanical systems, cleanroom fabrication theory.
-  **Thermal Systems:** Steady-state simulation and optimization of thermal systems; Dynamic performance and probabilities in system design.
-  **Convective Heat Transfer:** Calculation of heat transfer within ducts and over submerged objects for laminar and turbulent flow; Natural convection, film condensation and boiling.
-  **Intermediate Heat Transfer:** Conduction heat transfer; Radiation heat transfer; Mass transfer; Phase change; Heat exchangers; numerical methods.

Skills

- Languages  Strong reading, writing and speaking competencies in Arabic and English.
Soft Skills  EES, MATLAB, Simulink, LabVIEW, AutoCAD, SolidWorks, \LaTeX , Arduino, Visual Studio Code.

Skills (continued)

Communication Skills  Excellent presentation skills, confident and professional speaking abilities, team building and problem solving abilities .