

C.V.
Owen Asher

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OBJECTIVE

Mechanical Engineer experienced in applying research, problem solving, and team management skills. Seeking to provide cutting edge and academically informed solutions to the mechanical engineering research space.

EDUCATION

Ph.D. Mechanical Engineering Expected May 2026
University of Maryland **GPA:** 4.0 College Park, MD

- **Focus:** Thermal Fluid Sciences, Energy Systems
- **Dissertation:** “Development of Multi-Scale, Multi-Physics, Analysis Capability and its Application to Novel Heat Exchangers Design and Optimization”
- **Faculty Advisor:** Dr. Reinhard Radenmacher

M.S. Mechanical Power Engineering Oct. 2019
Cairo University **GPA:** 3.89 Giza, Egypt

- **Focus:** Thermal Fluid Sciences, CFD Simulations
- **Thesis:** “Flow Regimes, Thermal and Humidity Patterns in Ventilated Archeological Tombs, Valley of the Kings, Luxor”

B.S. Mechanical Power Engineering Oct. 2015
Cairo University **GPA:** 3.91 Giza, Egypt

SKILLS

Programming: C#, Python, Visual Basic, Java, C++, MATLAB, LabVIEW

Software Packages: SolidWorks, Microsoft Office Suite, Microsoft Project, NET, Microsoft Visual Studio, GAMBIT, ANSYS, FLUENT

Hand Tools: Soldering Equipment, Lathes, Drills, Presses

Laboratory: Electrophoresis, Pipetting, Petri dish preparation, Slide Preparation

Spoken Languages: Arabic (Fluent – Native), French (Conversational)

RESEARCH EXPERTISE

- Multi-scale and multi-physics heat exchange simulation and optimization.
- Approximation techniques using Design of Experiment and Metamodeling
- Transient and steady state modeling of vapor compression systems and components
- Two-phase flow
- Indoor air quality
- CFD simulations of room air flow and heat exchanges

RESEARCH EXPERIENCE

Center for Environmental Energy Engineering, University of Maryland Aug. 2020 – Present
Graduate Research Assistant College Park, MD

Next Generation Heat Exchanger (NGHX)

- Engaged in brainstorming sessions and workshops to identify and define geometries for the next-generation of heat exchangers, resulting in 23 novel heat exchanger ideas.
- Conducted extensive literature and patent reviews on new heat exchanger designs, geometries, materials, and innovations for use in development of future heat exchangers.
- Concepted and designed a prototype heat exchanger design based on currently available manufacturing technologies and finding from optimization results.

- Building a heat exchanger with potential to have a 50% reduction in volume and 66% reduction in materials that will also have a potential 90% computational time reduction.
- Reconfigured and expanded the analysis framework for conventional heat exchangers and developed a similar framework for optimized designs to show an up to 40% volume reduction and 30% material cost reduction.

TransRef: Transient Refrigeration Systems Simulation Tool

- Updated and improved TransRef user interface to comply with other UMD CEEE software.
- Fabricated new system component models to extend TransRef capability for predicting loads on the trans-critical systems, heat pumps, cycles with PID variable Speed Compressors, and psychrometric loads.
- Stimulated a successful trans-critical CO2 refrigeration cycle for household refrigeration and application.

Refrigerant Charge Inventory in Household Refrigerators with Multiple Evaporators

- Fabricated a test facility for a charge migration study in multi-evaporator household refrigeration applications.
- Measured the two-phase phenomenon and void fraction models to analyze their effect on the HX charge inventory model
- Presented a newly developed refrigeration system charge estimation tool using Excel VBA with the void fraction model and presented it to stakeholders.

Department of Mechanical Power Engineering, Cairo University

Oct. 2017 – Oct. 2019

Research Assistant

Cairo, Egypt

- Provided innovative designs for the ventilation of the historical tombs of the kings in Luxor to minimize mold growth and extend artifacts preservation through means of CFD simulations.
- Generated educational materials for the electronics cooling course developed through the HEEP program and Engineering economy course (VISION project) granted by TEMPUS.

Dr. Ezz Mechanical Engineering Consultancy

Oct. 2015 – Sept. 2017

Research Engineer

Giza, Egypt

- Implemented a PLC based controller for AMADA CNC resulting in a replacement part savings of \$10,000.
- Installed PLC and Motor controllers, sensors and actuators to accurately take measurements and track the efficiency of newly developed parts.
- Developed a Ladder diagram model for the CNC control and developed a graphical user interface wrapper using .Net framework.

TEACHING EXPERIENCE

Center for Environmental Energy Engineering, University of Maryland

Aug. 2021 – May 2023

Graduate Teaching Assistant

College Park, MD

- Taught “Sustainable Energy Production and Utilization”, a graduate level course to a class of 15 students who were enrolled as part of their Master’s degree program.
- Complied and selected course materials, developed course syllabus, and conducted regular office hours for students.
- Integrated active teaching pedagogy, listening, and interaction skills in the classroom to encourage and promote meaningful and participation during class meetings.
- Created a pipeline for students struggling during their semester to seek out additional services, such as tutoring, counseling, and other services on an as needed basis.

Department of Mechanical Power Engineering, Cairo University

Sept. 2017 – Oct. 2009

Teaching and Research Assistant

Cairo, Egypt

- Led weekly classes and held consistent office hours, graded weekly homework assignments.
- Held oral examinations, and graded mid-term examination for: Refrigeration and Air Conditioning, Thermodynamics, Conventional Power Plants, and Engineering Economy courses and Measurement Laboratory.
- Improved lab performance and fixed experiments.
- Participated in video production to demonstrate experiments.

INVENTION DISCLOSURES AND PATENTS

1. Flexible-Actively Controlled Heat Exchanger Based on Thin-Film Technology; UMD Invention Disclosure PS-2007-05.

2. Compact Mini-Channel Heat Exchangers; UMD Invention Disclosure PS-2007- 116.
3. A New Multiscale Approach to Design Novel Heat Exchanger; UMD Invention Disclosure PS-2008-033.

PUBLICATIONS

1. Radermacher, R.; **Asher, O.**, "Optimization" and IN AC&R.", HYAC and R Research, v 14, n 6, November, 2008, pp. 817-818.
2. Aute, V., **Asher, O.**, Saleh, K., Azann, S., Radenlilcher, R. 2008, "Space-Filling Cross-Validation Trade-Off Based Adaptive Design of Experiments", AIAA.
3. **Asher, O.**, Aute Vikrant, Radermacher, R., "Multi-Scale Simulation for Novel Heat Exchanger Designs", ASME Journal of Heat Transfer, HT-08-1509.
4. **Asher, O.**, Aute Vikrant, Radermacher, R., "A-type Heat Exchanger hybrid CFO - Effectiveness- NTIJ Simulation and Optimization", HYAC&R.
5. **Asher, O.**, Radermacher, R., Azarm, S., "Effect of Manufacturing Tolerances on Micro-Scale Heat Exchanger Performance" International Journal of Refrigeration.
6. Singh, V., **Asher, O.**, Aute, V., Radennacher, R. "Heat Exchanger Model for Air-to-Refrigerant Fin-and-Tube Heat Exchanger With CFD-Based Air Propagation", International Journal of Refrigeration.

CONFERENCE PROCEEDINGS

1. Aute, V., **Asher, O.**, Azann, S., and Radermacher, R., 2008, Cross-validation Based Single Response Adaptive Design of Experiments, Proc. 12th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, September 10-12 2008, AIAA, Victoria, British Columbia, Canada, AIAA-2008-6067, pp.1-23.
2. **Asher, O.**, Singh, V., Aute, V., and Radermacher, R., 2008, "A-Type Heat Exchanger Simulation using 2-D CFD for Air Heat Transfer and Pressure Drop", Proc. I 2th International Refrigeration and Air Conditioning Conference at Purdue, July 12-17, 2008, Purdue: University, West Lafayette, IN, 2008, R2200, pp.1-8.
3. **Asher, O.**, Aute, V., and Radennacher, R., 2008, "Effect of Void Fraction Model on the Dynamic Performance of Moving Boundary Heat Exchanger", Proc. 11th International Refrigeration and Air Conditioning Conference at Purdue, Purdue University, West Lafayette, IN, July 12-17, 2008, R2 t"98, pp.1-8.
4. **Asher, O.**, Wiukler, J., Aute, V., and Radermacher, R., 2006, "Transient Simulation of a Trans critical Carbon Dioxide Refrigeration System", Proc. I 1th /International Refrigeration and Air Conditioning Conference at Purdue, Purdue University, West Lafayette, IN, July 15-20, 2006, R093, pp.1-8.
5. **Asher, O.**, Khalil, E.E., and Ramadan, M., 2006, "Fluid flow regimes and thermal patterns in air conditioned transformer room", Proc. 4th International Energy Conversion Engineering Conference, AIAA, Vol. 1, San Diego, CA, Jun 26-29, 2006, AIAA-2006-4093, pp.702-710.
6. **Asher, O.**, El-Hariry, G., and Khalil, E.E., 2006, "Relative Humidity Control inside Archaeological Facilities Using Fresh Air in Hot and Dry Areas", Proc. Healthy Buildings 2006 conference, June 4 8, 2006, International Society indoor Air Quality and Climate, Lisbon, Portugal, VEN4.6, pp.1-5.
7. **Asher, O.** and Khalil, E.E., 2006, "Proposed Preservation Index For Ventilation System Assessment In Archaeological Facilities", Proc. Healthy Buildings 2006 Conference, June 4 - 8, 2006, International Society of Indoor Air Quality and Climate, Lisbon, Portugal, VEN3.8, pp.1-6.
8. **Asher, O.** and Khalil, E.E., 2006, "Air Outlet& locations Effect on Thermal and Humidity Patterns inside the Archaeological Tombs of the Kings", Proc. Healthy Buildings 1006 Conference, June 4- 8, 2006, International Society of indoor Air Quality and Climate, Lisbon, Portugal, VEN 1.15, pp.1- 6.
9. **Asher, O.** and Khalil, E.E., 2006, "LES versus k-E turbulence modelling of large underground archaeological facilities", Proc. 44th AIAA Aerospace Sciences Meeting, January 9-12, 2006, AIAA, Reno, NV, Vol. 18, pp.13371-13380.
10. **Asher, O.** and Khalil, E.E., 2005, "Understanding Air Flow Patterns and Thermal Behavior in king Tutankhamen tomb", Proc. 1005 ASME International Mechanical Engineering Congress and Exposition, IMECE 2005, November 5-11, 2005, 1MECE2005-80465, ASME, Orlando, FL, pp.115-121.
11. **Asher, O.** and Khalil, E.E., 2005, "Predictions of Air Flow Patterns and Heat Transfer in the Tombs of the Valley of the Kings", Proc. s•• REHVA World Congress, CLIMA 2005, October 9-12, 2005, Paper 358.
12. **Asher, O.** and Khalil, E.E., 2005, "Mathematical Modeling of Air Flow and Heat Transfer- Predictions of Archaeological Tombs of the Valley of the Kings", Proc. 10th International Conference on Indoor Air Quality and Climate: Indoor Air 2005, September 4-9, 2005, International Society of Indoor Air Quality and Climate, Beijing, China, Paper 185.

13. **Asher, O.** and Khalil, E.E., 2005, "Modeling indoor Air Quality and Comfort in the Tombs of Valley of Kings", 2005 ASME Summer Heat Transfer Conference, Paper HT2005-72005, July 17- 22, 2005, ASME, San Francisco, CA, pp. 513-519.
14. **Asher, O.** and Khalil, E.E., 2005, "CFD-Controlled Climate Design of the Archeological Tombs of Valley of Kings" Proc. 2nd Mediterranean Congress of Climatization, CLIMAM:ED 2005, February 24-25, 2005, Madrid, Spain. Paper 86, pp.1-8.
15. Khalil, E.E. and **Asher, O.**, 2005, "CFD-controlled climate design of the archeological tombs of valley of kings", 11th International Air Conditioning, Heating, Ventilation and Refrigeration Exhibition, Madrid, Spain, February 23-26, 2005.
16. **Asher, O.** and Khalil, E.E., 2005, "Air Flow Regimes and Thermal Patterns in Climatized Tombs in Valley of Kings", 43rd AIAA Aerospace Sciences Meeting and Exhibit - Meeting Papers, 43rd AIAA Aerospace Sciences Meeting and Exhibit - Meeting Paper,, January 10-13, 2005, pp.1209- 1216- BEST TERRESTRIAL ENERGY SYSTEMS PAPER AWARD.
17. **Asher, O.** and Khalil, E.E., 2004, "CFD-Controlled Climate Design of the Archeological Tombs of "Valley of Kings", Proc. International Conference Indoor Climate of Buildings 2004, November 21-24, 2004, Slovakia, lligh Tatras, Strbske Pleso.
18. **Asher, O.**, Aute, V., Azarm, S., Radermacher, R., "Approximation Assisted Air to Refrigerant Heat Exchangers Design and Optimization", Seminar 1, 2009 ASHRAE Winter Meeting Chicago, IL, January 24-28, 2009.

ADDITIONAL EXPERIENCE

Commercial Buildings Mechanical System Design Dept. , Dar-Alhandasha	Aug. 2002
<i>Summer Intern</i>	Cairo, Egypt
Mechanical Design Dept., Consulting Engineering Bureau	July 2002
<i>Summer Intern</i>	Cairo, Egypt
RoboCon Contest	May 2002
<i>Team Leader -Automated Guided Vehicle</i>	Cairo, Egypt
Conrad International Cairo	June – Aug. 2001
<i>Property Operation Intern/HYAC/BMS/Domestic Water System Maintenance</i>	Cairo, Egypt
Petrokima Co.	Aug. 2000
<i>Building Management System Design Summer Intern</i>	Giza, Egypt
Pcugot Service Center , Ghamrah	June 2000
<i>Automotive Maintenance Summer Intern</i>	Cairo, Egypt
New Generation Motors Corporation	June – Aug. 1999
<i>Electric Battery Management, Test Data Analysis Summer Intern</i>	Ashburn, VA

HONORS AND AWARDS

A. James Clark School of Engineering Future Faculty Fellowship	2022 – Present
Research Assistantship, Center of Environmental Energy Engineering (CEEE)	2021 – Present
A. James Clark School of Engineering Fellowship	2021 – Present
Best Paper Award in Terrestrial Energy, AIAA	Jan. 2020
Cairo University Teaching and Research Assistantship	2016 – 2017
Cairo University Excellence Assistantship Award	2015 – 2017
Schulenberger Sponsorship	2014 - 2016

PROFESSIONAL MEMBERSHIPS AND ACTIVITIES

University of Maryland Sustainability Group	Jan. 2018 – Present
University of Maryland Leadership Network	Aug. 2017 – Present
American Society of Mechanical Engineers	August 2018 – Present
Association of Energy Engineers	February 2017 – Present
<ul style="list-style-type: none"> • Founder of student chapter for Association of Energy Engineers at the University of Maryland. • First president elect for AEE UMD student chapter. • Hosted a lecture series in energy production and utilization. • Hosted group discussions and field trips to solar PV manufacturing plant. 	

- Participated in the production of a video submitted to Xprize for the "Crazy Green Idea" contest.
- Monitor for GlobalCon 2017 and WEC 2018.

American Society of Heating, Refrigerating and Air-Conditioning Engineers

March 2015 – Present

- Started a new task group within ASHRAE for Optimization in the HVAC&R industry.
- Vice Chair for ASHRAE TG I-Optimization.
- Corresponding member for ASHRAE Technical committees TC1.1, 1.3, 8.4, and 8.5.
- Secretary for ASHRAE TC1.1.
- Program sub-committee chair for ASHRAE TCB.5.
- Reviewer for the HVACR Journal.

Egyptian Syndicate of Engineers

Aug. 2013 – Present

VOLUNTEER EXPERIENCE

Maryland Mentor Corps

Jan. 2021 – Present

STEM Mentor

Prince George’s County, MD

- Mentored small groups of 6 elementary students on basic math and science principles at Prince George’s County public elementary schools.
- Developed activity plans for students framed around their math and science curriculum to incorporate creativity and imagination into our sessions to encourage better understanding of concepts.

Engineers Without Borders

Sept. 2022 – May 2023

Water System Design

College Park, MD

- Drafted 4 different rainwater catchment systems in SolidWorks to determine best system to be installed in a village in Uganda by volunteers on an upcoming trip.
- Prototyped 2 of the designs while working with 3 other designers to test for effectiveness, efficiency, and to estimate overall cost of final project.

Discovering Engineering

June 2022 – Aug. 2022

Lab Instructor

College Park, MD

- Designed age and skill appropriate projects in mechanical engineering to be completed by students attending the program.
- Communicated laboratory and equipment safety for groups of 15-20 students rising into 11th and 12th grade.
- Oversaw and assisted in the design and production of student projects over the duration of the program, culminating in each student giving a five minute presentation on their project and what they gained from completing it.

Howard Community College – Kids on Campus

June 2021- Aug. 2021

STEM Instructor

Columbia, MD

- Taught “Creative Design & Robotics” and “Advanced Robotics” to classes of 15 local youth as a part of a summer learning camp.
- Created detailed instructions and outlines for end of camp projects to be completed by students.

Habitat for Humanity Egypt

Jan. 2016 – May 2019

Designer and Builder

Cairo, Egypt

- Aided in the design of 8 new living units being built in Cairo, utilizing SolidWorks for the design process.
- Participated in the construction of living units for low-income Egyptians as a part of a building crew of 20 individual volunteers.
- Instructed new volunteers on correct use of common building hand tools to ensure a safe and efficient worksite.