

# Curriculum Vitae

## Omar Abdelaziz, Ph.D.

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### RESEARCH EXPERTISE

- Technology characterization and prioritization.
- Low global warming potential refrigerants, life cycle climate performance modeling.
- Computational fluid dynamics (CFD) simulations: heat exchangers, room air flow, and species transport.
- Two-phase flow: Experimental/Analytical Techniques.
- Energy efficiency and sustainable energy production and utilization.
- Energy systems with application to combined heat and power (thermally activated technologies).
- Renewable energy performance characterization and planning.
- Integrating Cooling Technologies.
- District Cooling
- Advanced and not-in-kind cooling technologies
- Transient and steady state modeling of vapor compression systems and components including transcritical CO<sub>2</sub> systems.
- Multi-scale and multi-physics heat exchangers' simulation and optimization (CFD/ $\epsilon$ -NTU/refrigerant headers/structural analysis).
- Multi-objective multi-disciplinary optimization.
- Approximation techniques: Design of Experiment, Metamodeling.
- Indoor air quality.

### PROFFESIONAL EXPERIENCE

**Assistant Prof. Thermofluids**, September 2020 – Present

American University in Cairo, Cairo, Egypt

- Teaching undergraduate classes in heat transfer, thermodynamics, fluid mechanics, power plant technology, and renewable energy
- Leading scientific research in the areas of energy efficiency
  - PI for the AUC Climate Initiative Program on “Solar Crop Dryer: Turning Wastage to Wage in Egypt's Sun-dried Tomato Industry” (333k EGP + 25.6k USD)
  - Co-PI for the AUC Climate Initiative Program on “The AUC Data Hub for Climate Change Mitigation: Establishment of a training and reporting platform for the Carbon footprint of Egyptian Universities”
  - PI for the KAUST-Cooling Initiative (\$590 k USD)
  - Co-PI for the SSE's Dean Research Award on “Evaluating the effectiveness of four-sided wind towers as a passive environmental solution in institutional buildings”

- Advising Graduate Students working in thermal and fluids areas.

**Managing Director**, September 2020 – April 2021

GRFN Egypt consulting, Giza, Egypt

- Provide state-of-the-art research and development consulting to unique projects
- Led the development of variable speed district cooling technologies feasibility study

**Research and Development Director**, January 2018 – August 2020

GRFN consulting, Dubai, UAE

- Provided state-of-the-art research and development consulting to unique projects
- Led the Dubai building energy and water profiling for RSB
- Led building energy modeling efforts for Taqati

**Assistant Prof. Thermofluids**, January 2019 – August 2020

Zewail City of Science and Technology, Giza, Egypt

- Teaching undergraduate classes in heat transfer, thermodynamics, fluid mechanics, power plant technology, and renewable energy
- Leading thermal science research in renewable energy Program
  - Co-PI for the MATS project funded by the ASRT and responsible for the power block and the solar field (12 M EGP)
  - Co-PI on a study for Vodafone-Egypt PV integration and Corporate Sustainability Plan
- Leading scientific research in the areas of energy efficiency
  - PI for the KAUST-Cooling Initiative (\$590 k USD)
  - PI for the ASRT funded reusable mask project (315 k EGP)
- Developing laboratory infrastructure for the Renewable Energy Program
- Developing a graduate program in Mechanical Engineering

**Managing Director**, October 2017 – September 2019

Clean Energy Air and Water Technologies (CLEAT), F.Z.E.

- R&D consulting
- Refrigerant changeover support (technical and environmental impact assessment using LCCP)
  - Supporting several UNIDO projects
  - Participating in the UNEP Ozone Secretariat Technical and Economic Assessment Panel Task for on Energy Efficiency
- Business Development: work on developing a new network of clients and potential sponsors
- Building equipment assessment and evaluation
- Building energy modeling
- Life cycle analysis
- Measurement and verification using the IPMVP
- Assessment of air cleaning technologies and different energy recovery systems
- Assessment of water treatment and desalination systems and potential novel technologies based on state-of-the-art research
- CFD analysis
- Optimization studies

- Developing/conducting workshops and producing workshop reports and/or roadmap reports.

**Group Leader**, October 2014 – September 2017

Oak Ridge National Laboratory, Oak Ridge, TN

- Manage and lead a research portfolio of more than 18 million USD annually:
  - Established Corporate Research and Development Agreements (CRADA) with major US and multinational manufacturers for different projects, executed Non-Disclosure Agreements (NDA) and Material Transfer Agreements (MTA) with various collaborators.
  - Manage subcontracts with government contractors, small businesses and academia.
- Generate new research ideas, write proposals, and diversify and expand program funding.
- Lead alternative Lower Global Warming Potential (Low-GWP) refrigerant research at ORNL including:
  - Evaluating alternative Low-GWP refrigerants for Heating Ventilation Air Conditioning and Refrigeration (HVAC&R) systems and components.
  - Evaluating alternative Low-GWP refrigerants for AC in hot climates.
  - Evaluating the safe charge limits of alternative Low-GWP refrigerants.
- Provide technical expertise and support to other researchers within the Building Technology Research and Integration Center (BTRIC).
- Mentor post-doctoral researchers, graduate interns, and undergraduate students.
- Supervise Graduate Student; first Ph.D. Student (in collaboration with GaTech) graduated in fall 2016 with distinction.
- Host visiting scholars: (e.g. Prof. Ming Qu from Purdue University).
- Pursue international research collaboration (e.g. with Kuwait Institute for Scientific Research and United Nations Environmental Program).
- Attend relevant national international conferences to present current research (invited as keynote speaker in various events).
- Manage relationship with Industry, Academia, other National Laboratories, and The U.S. Department of Energy.
- Manage the Heating, Ventilation, Air-conditioning, and Refrigeration (HVAC), Water Heating, and Appliances Subprogram at ORNL.

**Senior Fellow**, August 2012 – August 2014

U.S. Department of Energy, Washington D.C.

- Assessed various technologies with strong potential for energy savings in the US buildings' sector:
  - Investigated advanced non-solid-state lighting technologies.
  - Investigated the use of carbon fiber in innovative building fabric.
- Developed new programs for BTO:
  - Investigated Building Integrated Solar Technologies (BIST).
  - Coordinated the development of BIST roadmap with Navigant Consulting, Inc.
  - Developed new Small Business Innovation Research topics and supported BTO personnel in award selection.
- Responsible for the development and updates of the Building Technologies Office (BTO) Technology Prioritization Tool:

- Review technology database.
- Moderate peer-review webinars with experts in different building related fields.
- Coordinate with Navigant Consulting Inc. on technology scenarios and measure updates.
- Develop minimum building energy use metrics based on thermodynamic limits.

**R&D Staff, October 2009 – September 2014**

Oak Ridge National Laboratory, Oak Ridge, TN

- Manage and lead a research portfolio of more than 3.5 million USD annually:
  - Established Corporate Research and Development Agreements (CRADA) with major US manufacturers for different projects, executed Non-Disclosure Agreements (NDA) and Material Transfer Agreements (MTA) with various collaborators.
  - Advanced water heater development (transcritical CO<sub>2</sub>, thermally activated heat pump water heaters) – CRADA with General Electric.
  - Advanced appliance development incorporating energy storage and retrieval – CRADA with Whirlpool.
  - High performance cold climate heat pump development – CRADA with Emerson Climate Technologies and Johnson Controls Inc.
  - Low global warming potential refrigerant solutions for commercial refrigeration – CRADA with Honeywell.
  - Magnetocaloric refrigeration system development for commercial air conditioning applications.
  - Manage subcontracts with government contractors, small businesses and academia.
- Support other researchers within the building technology research and integration center.
- Mentor post-doctoral researchers, graduate interns, and undergraduate students.
- Pursue international research collaboration.
- Attended relevant national and international conferences to present current research.
- Wrote local, national, and international proposals.
- Participated in several research projects within the whole building and community integration and the building equipment research groups.
  - US-China Clean Energy Research Center – Building Energy Efficiency: participated in proposal writing, developed working group for solar building integration.
  - Scoping studies: commercial refrigeration, appliances, not-in-kind technologies.
  - Road map efforts: worked with ORNL teams on developing water heaters, heating ventilation and air conditioning, working fluids, appliances road maps for the US Department of Energy.
  - Technical support for the Commercial Building Energy Alliance (CBEA).

**Research Associate, August – October 2009**

Center for Environmental Energy Engineering (CEEE), University of Maryland, College Park, MD

- Mentored and trained graduate students in the areas of CFD simulations, approximation assisted optimization, object-oriented programming, vapor compression cycle simulations, and heat exchanger simulations.

- Provided customer support for CEEE consortium members.
- Assisted in the CEEE consortium meeting organization.
- Developed approximation assisted multi-scale simulation capabilities for a new research project.

## **ACADEMIC AND RESEARCH MENTORSHIPS**

Mentored visiting professors, post-doctoral research associates, post-M.Sc. research assistants, graduate students, and undergraduate students. In addition, I also mentored some of the Junior R&D staff at the Building Equipment Research Group.

### **Post-Doctors Mentored:**

*Ramy Abdelhady, Ph.D.:* (March – September 2021) working on advanced cooling technologies.

*Muhammad Hassan, Ph.D.:* (2019-2020) working on advanced cooling technologies.

*Chengyun Hua, Ph.D.:* (2016-2017) working on nanoscale heat transfer mechanisms using laser spectroscopy (Time Domain Thermo Reflectance) and nano-scale heat transfer simulation and optimization.

*Ahmed Elatar, Ph.D.:* (2016- ) working on CFD simulations of various applications and experimental evaluation of alternative refrigerants for high ambient temperature conditions. Ahmed is expected to finish his work at ORNL next March. During his work, Ahmed published 1 report and participated on writing 4 journal papers and 2 conference papers.

*Mingkan Zhang, Ph.D.:* (2015- ) working on advanced simulation of magnetocaloric air conditioning systems and CFD simulations of flammable refrigerant diffusion in rooms. His work is published in highly reputable journals and conferences.

*Viral Patel, Ph.D.:* (2015 - 2017) worked on several high-profile projects including the ultrasonic dryer, the thermoelectric dryer, and the advanced rotating evaporator for residential refrigerators. Dr. Patel's work was impressive, and he was eventually hired as an Associate R&D staff at ORNL starting June 2017.

*Edvin Cetegen, Ph.D.:* (2010-2011) worked on advanced commercial refrigeration system simulation using U.S. DOE reference buildings. He worked on evaluating alternative refrigerants in the pumped-liquid refrigerant test loop.

*Kai Wang, Ph.D.:* (2009-2011) worked on absorption heat pump water heater simulation and analysis. He also studied potential chemical additives to suppress the crystallization problems associated with Water/LiBr aqueous systems.

*Padmja Kisari, Ph.D.:* (2009-2010) worked on chemical additive to suppress the crystallization problems associated with Water/LiBr aqueous systems.

### **Post-M.Sc. Mentored:**

*Heba Magdy (2020):* worked on technoeconomic evaluation of indirect evaporative cooling technologies.

*Zhiyao Yang, (2015-2017):* worked on developing advanced sorption systems simulation tool (SorpSim, currently available on GitHub). After finishing his 2-years work at ORNL he decided to go back to Purdue University and work with Prof. Ming Qu (a close collaborator) with the potential for continued collaboration opportunities in the future.

*Ahmad Abu-Heiba, (2014 – 2016)* worked on several high-profile projects including the Ground Level Integrated Diverse Energy Storage (GLIDES) system, thermoelectric heat pump dryer, and the gas engine driven integrated heat pump system. Ahmad's work was impressive, and he was hired as a full-time staff in 2017.

### **Graduate Students:**

Mohamed Ragab, working on alternative refrigerants – graduated spring 2021

Omar Zaki, working on advanced and high-performance sensible-only cooling vapor compression system.

Amr Ashraf, working on building energy simulation and potential evaluation of indirect evaporative systems.

Mostafa Sadek, working on advanced CFD simulation problems for mechanical ventilator designs.

Maram Salah, working on CFD simulation of high-volume flow rate air distribution systems for advanced air conditioners

Abdelrahman Abdeldayem, working on CFD simulation of advanced and high-performance sensible cooling technologies.

Anne Mallow (I was her Ph.D. Co-Advisor), graduated in December 2016. Dr. Mallow worked with me and Prof. Samuel Graham from 2012-2016 on 2 main projects: her Ph.D. dissertation topic on advanced thermal storage and the other on the improved defrosting mechanism associated with rotating heat exchangers.

Khaled Saleh, I mentored Dr. Khaled Saleh when he was first admitted to the University of Maryland in 2008 and throughout my activity as a research associate at CEEE.

### **Undergraduate students:**

Ahmed Ragab, Kareem Rafaat, Israa Gamal, Habiba Allam, Kareem Sherif, Mohamed Essa; Zewail City of Science and Technology, 2019 – developing low cost data acquisition system for temperature monitoring of low-cost housing in Upper Egypt.

Matthew Mitrani, University of Florida (2016)

Nelson James, Stanford University (2015)

Kellen Catani, University of Tennessee (2014)

Evelyn Tio, MIT, (2012)

Kyle Karber, Arizona State University (spring 2011, spring 2012)

Leonardo David Banchik, University of Nevada-Las Vegas, (spring 2011)

Benjamin Shassere, Tennessee Tech University, (2011)

Anne Mallow, West Virginia University (2010)

### **Visiting Professors:**

Prof. Ming Qu, Purdue University (2016)

Prof. Jose B. Davila, Christian Brothers University (2015)

Prof. Abdullah Othman Nuhait, King Saud University (2012)

Prof. Ming Qu, Purdue University (2011)

### **R&D Staff Mentored:**

Ayyoub Momen, Ph.D., Joined ORNL in 2012 and became subprogram manager in 2017

Kyle Gluesenkamp, Ph.D., Joined ORNL as a Post-Doctoral Research Associate in 2011, was hired as a full-time staff in 2012 and is currently a successful PI with a strong research portfolio (>\$3M per year)

Ahmad Abu-Heiba, Joined ORNL as a Post-M.Sc. research assistant in 2014 and was hired as full-time staff in 2016. I mentored over the past year to assume stronger roles as Principal Investigator and improve his research skills.

## EDUCATION

**Ph.D. Mechanical Engineering**, August 2009, University of Maryland, College Park, MD

**GPA:** 4.0

**Focus:** Thermal Fluid Sciences, Energy Systems

**Dissertation:**

“Development of Multi-Scale, Multi-Physics, Analysis Capability and its Application to Novel Heat Exchanger Design and Optimization”

**Faculty Advisor:** Dr. Reinhard Radermacher (raderm@umd.edu)

**M.Sc. Mechanical Power Engineering**, October 2005, Cairo University, Giza, Egypt

**Grade:** 91% – Ranked first in a class of 30 students

**Focus:** Thermal Fluid Sciences, CFD simulations

**Thesis:**

“Flow Regimes, Thermal and Humidity Patterns in Ventilated Archaeological Tombs, Valley of the Kings, Luxor”

**Faculty Advisor:** Dr. Essam E. Khalil (khalile1@asme.org)

**B.Sc. Mechanical Power Engineering**, July 2003, Cairo University, Giza, Egypt

**Grade:** 94% – Ranked second in a class of 280 students

**Graduation Project:** Heat Exchanger Design and Control

**Faculty Advisor:** Dr. Essam E. Khalil (khalile1@asme.org)

## ADDITIONAL EXPERIENCE

**Graduate Research Assistant**, 2006 – August 2009

Center for Environmental Energy Engineering, University of Maryland, College Park, MD

- Developed a modeling framework for Next Generation Heat Exchanger (NGHX) as part of Ph.D. Dissertation and fabricated and evaluated a prototype design.
- Continued to improve and provide technical support to TransRef (transient refrigeration systems simulation tool).
- Researched refrigerant charge inventory in household refrigerators with multiple evaporators.
- Develop workshop material and conduct short courses for heat exchanger design.
- Write winning proposals and attract research funding.
- Mentoring graduate and undergraduate students.
- Taught a graduate course as a teaching practicum in partial fulfillment of the Future Faculty Program (ENME 808D: “Sustainable Energy Production and Utilization”; Spring 2008).

### **Teaching and Research Assistant, 2003 - 2005**

Department of Mechanical Power Engineering, Cairo University, Giza, Egypt

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

### **Research Engineer, 2003 - 2004**

Dr. Ezz Mechanical Engineering Consultancy, Giza, Egypt

- Designed and implemented a PLC based controller for AMADA CNC resulting in a replacement part cost savings of \$10,000.
- Installed PLC and Motor controllers, sensors and actuators.
- Developed a Ladder diagram model for the CNC control and developed a graphical user interface wrapper using .Net framework.

### **Summer Intern, August 2002**

Commercial Buildings Mechanical System Design Dept., **Dar-Alhandasha**, Cairo, Egypt

### **Summer Intern, July 2002**

Mechanical Design Dept., Consulting Engineering Bureau, Cairo, Egypt

### **Team Leader -Automated Guided Vehicle, May 2002**

RoboCon Contest, Cairo, Egypt

### **Property Operation Intern/HVAC/BMS/Domestic Water System Maintenance, Summer 2001**

Conrad International Cairo, Cairo, Egypt

### **Building Management System Design Summer Intern, August 2000**

Petrokima Co., Giza, Egypt

### **Automotive Maintenance Summer Intern, June 2000**

Peugeot Service Center, Ghamrah, Cairo Egypt

### **Electric Battery Management, Test Data Analysis Summer Intern, July 1999**

New Generation Motors Corporation, Ashburn, Virginia

## **LEADERSHIP EXPERIENCE AND PROFESSIONAL ACTIVITIES**

- Co-Chair, Refrigeration, Air-Conditioning and Heat Pumps Technical Options Committee (RTOC), Ozone Secretariat, United Nation Environment – November 2019 - Present
- Member, Technology and Economic Assessment Panel (TEAP), Ozone Secretariat, United Nation Environment – November 2019 – Present
  - Chapter Lead Author for TEAP Energy Efficiency Task Force (2020)
  - Member for TEAP Replenishment Task Force (2019)
  - Chapter Lead Author for TEAP Energy Efficiency Task Force (2019)
  - Outside Expert for TEAP Energy Efficiency Task Force (2018)



- Vice Chair ASHRAE Research Administration Committee (RAC) – June 2021 - Present
- Instructor, ASHRAE Global Training Center – January 2018 - Present
- International Consultant for the United Nations Industrial Development Organization; providing technical support for refrigerant conversion projects – September 2017 – Present
- Member of the Technical Review Panel for the Global Cooling Challenge (<https://globalcoolingprize.org/>), (<https://globalcoolingprize.org/prize-governance/technical-review-committee/>)
- Advisory Editorial Board of Applied Thermal Engineering
- Reviewer: International Journal of Refrigeration, Applied Thermal Engineering, International Journal of Energy Technology and Policy, HVAC&R, ASME Journal of Thermal Science and Engineering Applications, Energy, and Renewable Energy.
- American Society of Heating, Refrigerating and Air-Conditioning Engineers, March 2006 – Present.
  - Established a multi-disciplinary task group for low GWP research (2012), founding Chair
  - Started a new task group within ASHRAE for Optimization in the HVAC&R industry (2008) – now TC1.13: Optimization.
  - MTG.LowGWP Voting Member.
  - Corresponding member for ASHRAE Technical committees TC1.1, TC1.3, TC1.13, TC8.4, TC8.5, TC 8.11 and Technology Council.
- Association of Energy Engineers; February 2007 – 2009.
  - 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 “Crazy Green Idea” contest.
  - Monitor for GlobalCon 2007 and WEC 2008.
- **Sigma Xi, The Scientific Research Society**, October 2010 – Present; Judge for Student competition 2015.
- American Society of Mechanical Engineers, August 2008 – Present.
- Egyptian Syndicate of Engineers, August 2003 – Present.
- Session Vice-Chair, 2008 Purdue International Refrigeration and Air Conditioning Conference.
- University of Maryland Leadership Network, Fall 2007 – 2009.
- University of Maryland Sustainability Group, Spring 2008 – 2009.

## HONORS AND AWARDS

- Listed in the Montreal Protocol Who’s Who: <https://www.unep.org/ozonaction/index.php/resources/montreal-protocol-whos-who/montreal-protocol-whos-who> in recognition of my services.
- Best Paper in “Cooling, Cryogenics, and Electronics Cooling 1”, The 15<sup>th</sup> International Conference on Heat Transfer, Fluid Mechanics, and Thermodynamics (HEFAT) and Editorial Board of Applied Thermal Engineering (ATE). July 2021.
- 2020 State Encouragement Award in Engineering Sciences, Egypt

- 2020 George Briley ASHRAE Journal Article Award for the paper, “Setting Charge Limits for Flammable Refrigerants” published in the July 2018 edition of the ASHRAE Journal.
- ASHRAE 2018 Best Technical Paper Award
- Montreal Protocol 30<sup>th</sup> anniversary Technical Leadership Award, Montreal Canada
- The 12<sup>th</sup> IEA Heat Pump Conference Ritter Von Rittinger Award (ORNL Building Equipment Team)
- 2016 Distinguished Service Award, ASRHAE
- A. James Clark School of Engineering Future Faculty Fellowship; 2007 - 2009
- A. James Clark School of Engineering Fellowship; 2006 - 2009
- Best Paper Award in Terrestrial Energy, AIAA; January 2005
- Cairo University Excellence Assistantship Award; 1998 - 2003
- Schlumberger Sponsorship; 2001 - 2002, 2002 - 2003

## PROFESSIONAL DEVELOPMENT COURSES

- Alan Alda Communication Workshop (January 2017)
- Developing Leadership Potential (2015)
- Situational Leadership II (2014)
- Management Bootcamp (2014)
- Project Management (2014)

## JOURNAL ARTICLES, BOOKS AND EDITORIAL<sup>1</sup>

1. Mohammed, Ramy H., Mohamed El-Morsi, and Omar Abdelaziz. "Indirect evaporative cooling for buildings: A comprehensive patents review." *Journal of Building Engineering*, Volume 50, 1 June 2022, 104158. <https://doi.org/10.1016/j.jobee.2022.104158>
2. Omar Zaki, Ramy Mohammed, Omar Abdelaziz, Separate Sensible and Latent Cooling Technologies: A comprehensive review, *Energy Conversion and Management*, Volume 256, 15 March 2022, 115380, <https://doi.org/10.1016/j.enconman.2022.115380>
3. Abdelaziz, Omar, and Nigel Cotton. "Technoeconomic Evaluations for Energy Efficient Domestic low GWP Refrigeration Technologies." *International Journal of Refrigeration* (2021). <https://doi.org/10.1016/j.ijrefrig.2021.07.044>
4. Hassan, Muhammed A., and Omar Abdelaziz. “Best Practices and Recent Advances in Hydronic Radiant Cooling Systems–Part II: Simulation, Control, and Integration.” *Energy and Buildings* (2020), Volume 224, 1 October 2020, 110263. <https://doi.org/10.1016/j.enbuild.2020.110263>
5. Yang, Zhiyao, Ming Qu, Omar Abdelaziz, and Kyle R. Gluesenkamp. “Development and case study of the liquid desiccant system module in sorption system simulation program (SorpSim)”, *Applied Thermal Engineering* volume 162, 2019, pages 114261.
6. Abu-Heiba, A., Patel, V., Baxter, V., Abdelaziz, O., Elatar, A., “Setting Charge Limits for Flammable Refrigerants”, *ASHRAE Journal*, Volume 60, Issue 7
7. Elatar, A., Abu-Heiba, A., Patel, V., Dean, E., Baxter, V., Abdelaziz, O., Zhang, M., “Evaluation of flammable volume in the case of a catastrophic leak of R-32 from a

<sup>1</sup> <https://orcid.org/0000-0002-4418-0125>  
<https://www.scopus.com/authid/detail.uri?authorId=25925760200>  
<https://www.scival.com/overview/summary?uri=Customer/104016/Researcher/7387670>  
<https://scholar.google.com/citations?user=uotwzP4AAAAJ&hl=en>  
<https://publons.com/researcher/714517/omar-abdelaziz/>

- rooftop unit”, International Journal of Refrigeration, Volume 91, 2018, Pages 39-45, ISSN 0140-7007, <https://doi.org/10.1016/j.ijrefrig.2018.04.024>.
8. Mallow, A., Abdelaziz, O., Graham, S., “Thermal charging performance of enhanced phase change material composites for thermal battery design”, International Journal of Thermal Sciences, Volume 127, 2018, Pages 19-28, ISSN 1290-0729, <https://doi.org/10.1016/j.ijthermalsci.2017.12.027>.
  9. Qu, M., Abdelaziz, O., Zhiming, G., Yin, H., “Isothermal membrane-based air dehumidification: A comprehensive review”, Renewable and Sustainable Energy Reviews, Volume 82, Part 3, 2018, Pages 4060-4069, ISSN 1364-0321, <https://doi.org/10.1016/j.rser.2017.10.067>.
  10. Nawaz, K., Shen, B., Elatar, A., Baxter, V., Abdelaziz, O., “Performance optimization of CO<sub>2</sub> heat pump water heater”, International Journal of Refrigeration, Volume 85, 2018, Pages 213-228, ISSN 0140-7007, <https://doi.org/10.1016/j.ijrefrig.2017.09.027>.
  11. Qu, M, Abdelaziz, O, Phelan, P, and Habibzadeh, B. "Combined Cooling, Heating, and Power Systems for Buildings." Handbook of Integrated and Sustainable Buildings Equipment and Systems, Volume I: Energy Systems. Ed. Gonzalez, JE, and Krarti, M. ASME Press, 2017. [https://doi.org/10.1115/1.861271\\_ch6](https://doi.org/10.1115/1.861271_ch6)
  12. Nawaz, K., Shen, B., Elatar, A., Baxter, V., Abdelaziz, O., “R290 (propane) and R600a (isobutane) as natural refrigerants for residential heat pump water heaters”, Applied Thermal Engineering, Volume 127, 25 December 2017, Pages 870-883. <https://doi.org/10.1016/j.applthermaleng.2017.08.080>
  13. Shen, B., Abdelaziz, O., Shrestha, S., Elatar. A., “Model-based optimizations of packaged rooftop air conditioners using low global warming potential refrigerants”, International Journal of Refrigeration, Volume 87, March 2018, Pages 106-117, <https://doi.org/10.1016/j.ijrefrig.2017.10.028>
  14. Zhang, M., Abdelaziz, O., Momen A.M., and Abu-Heiba, A., “A numerical analysis of a magnetocaloric refrigerator with a 16-layer regenerator”, Scientific Reports, Volume 7, Article number: 13962, 2017, <https://doi.org/10.1038/s41598-017-14406-9>
  15. Nawaz, K., Shen, B., Elatar, A., Baxter, V., Abdelaziz, O., “R1234yf and R1234ze (E) as low-GWP refrigerants for residential heat pump water heaters”, International Journal of Refrigeration, Volume 82, October 2017, Pages 348-365. <https://doi.org/10.1016/j.ijrefrig.2017.06.031>
  16. Gluesenkamp, K.R.; Chugh, D.; Abdelaziz, O.; Moghaddam, S.; “Efficiency analysis of semi-open sorption heat pump systems”, Renewable Energy, Volume 110, September 2017, Pages 95-104. <https://doi.org/10.1016/j.renene.2016.07.075>
  17. Chugh, D., Gluesenkamp, K.R., Abdelaziz, O., Moghaddam, S., “Ionic liquid-based hybrid absorption cycle for water heating, dehumidification, and cooling”, Applied Energy, Volume 202, 15 September 2017, Pages 746-754, ISSN 0306-2619, <https://doi.org/10.1016/j.apenergy.2017.05.161>.
  18. Qu, M., Abdelaziz, O., Sun, X.G., Yin, H., “Aqueous solution of [EMIM][OAc]: Property formulations for use in air conditioning equipment design”, Applied Thermal Engineering, Volume 124, September 2017, Pages 271-278, ISSN 1359-4311, <https://doi.org/10.1016/j.applthermaleng.2017.05.167>.
  19. Beshr, M., Aute, V., Abdelaziz, O., Fricke, B., Radermacher, R., "Potential emission savings from refrigeration and air conditioning systems by using low GWP refrigerants", The International Journal of Life Cycle Assessment, Volume 22, Issue 5, May 2017, Pages 675-682, doi:10.1007/s11367-016-1186-6.
  20. Ally, M.R., Sharma, V., Abdelaziz, O., “Exergy Analysis of Electrically- and Thermally-driven Engines to Drive Heat Pumps: An Exhaustive Comparative Study”, International

Journal of Refrigeration, Volume 76, April 2017, Pages 313-327, ISSN 0140-7007,  
<https://doi.org/10.1016/j.ijrefrig.2017.02.011>.

21. Abdelaziz, O., Shrestha, S., "Evaluation of Alternative Refrigerants for Mini-Split Air Conditioners", ASHRAE Transaction, 2017, Vol. 123 Issue Part1, pages 147-161, (LV-17-014).
22. Goetzler, W, Guernsey, M., Young, J., Fuhrman, J., and Abdelaziz, O., "The Future of Air Conditioning for Buildings - Executive Summary (English translation)", Chinese Journal of HV&AC, 2016
23. Mallow, A., Abdelaziz, O., Graham, S., "Thermal charging study of compressed expanded natural graphite/phase change material composites", Carbon, Volume 109, November 2016, Pages 495-504, <http://dx.doi.org/10.1016/j.carbon.2016.08.030>
24. Odukamaiya, A., Abu-Heiba, A., Gluesenkamp, K. R., Abdelaziz, O., Jackson, R. K., Daniel, C., Graham, S., Momen, A. M., "Thermal analysis of near-isothermal compressed gas energy storage system", Applied Energy, Volume 179, October 2016, Pages 948-960, <http://orproxy.lib.utk.edu:2052/10.1016/j.apenergy.2016.07.059>
25. Shen, B., Shrestha, S., Abdelaziz, O., "Model validations for low-global warming potential refrigerants in mini-split air-conditioning units", Science and Technology for the Built Environment, Volume 22, 2016 - Issue 8: Low GWP Working Fluids Pages 1254-1262, <http://dx.doi.org/10.1080/23744731.2016.1208538>
26. Abdelaziz, O. and Shrestha, S., "Evaluating Alternative Refrigerants for High Ambient Temperature Environments", IEA Heat Pump Center Newsletter, Volume 34, No. 1, Pages 18-21, 2016
27. Beshr, M., Aute, V., Sharma, V., Abdelaziz, O., Fricke, B., and Radermacher, R., "A comparative study on the environmental impact of supermarket refrigeration systems using low GWP refrigerants", International Journal of Refrigeration, Volume 56, August 2015, Pages 154-164, ISSN: 0140-7007.
28. Qu, M., Abdelaziz, O., Yin, H., "New configurations of a heat recovery absorption heat pump integrated with a natural gas boiler for boiler efficiency improvement", Energy Conversion and Management, Volume 87, Pages 175-184, June 2014.
29. Saleh, K., Abdelaziz, O., Aute, V., Radermacher, R., Shapour, A., "Approximation assisted optimization of headers for new generation of air-cooled heat exchangers", Applied Thermal Engineering Volume 61, Number 2, Pages 817-824, 2013.
30. Aute, V., Saleh, K., Abdelaziz, O., Azarm, S., and Radermacher, R., "Cross-validation based single response adaptive design of experiments for Kriging metamodeling of deterministic computer simulations". Structural and Multidisciplinary Optimization, Volume 48, Number 3, Pages 581-605, 2013.
31. Mallow, A., O. Abdelaziz, K. Kalaitzidou, and S. Graham, "Investigation of the Stability of Paraffin/Exfoliated Graphite Nanoplatelet Composites for Latent Heat Thermal Storage Systems", Journal of Materials Chemistry, Volume 22, Number 46, Pages 24469-24476, 2012.
32. Shen, B., Abdelaziz, O., Rice, C. K., "Auto-Calibration and Control Strategy Determination for a Variable-Speed Heat Pump Water Heater Using Optimization" HVAC&R Research, Volume 18, Number 5, October 2012, Pages 904-914, 2012.
33. Bansal, P., Abdelaziz, O., Vineyard, E. A., "Status of Not-in-Kind Refrigeration Technologies for Household Space Conditioning, Water Heating and Food Refrigeration", International Journal of Sustainable Built Environment, Volume 1, Number 1, June 2012, Pages 85-101, 2012.
34. Bansal, P. K., Vineyard, E. A., Abdelaziz, O., "Advances in household appliances- A review", Applied Thermal Engineering, Volume 31, Issues 17-18, December 2011, Pages 3748-3760, 2011.

35. Singh, V, Abdelaziz, O., Aute, V., Radermacher, R., "Simulation of air-to-refrigerant fin-and-tube heat exchanger with CFD-based air propagation", International Journal of Refrigeration, Volume 34, Issue 8, Pages 1883-1897, December 2011.
36. Wang, K., Abdelaziz, O., Kisari, P., Vineyard, E. A., "State-of-the-art review on crystallization control technologies for water/LiBr absorption heat pumps", International Journal of Refrigeration, Volume 34, Issue 6, September 2011, Pages 1325-1337, 2011.
37. Wang, K., Abdelaziz, O., Vineyard, E. A., "The impact of water flow configuration on crystallisation in LiBr/H<sub>2</sub>O absorption water heater", International Journal of Energy Technology and Policy, Volume 7; Issue 4, Pages 393 - 404, 2011.
38. Abdelaziz, O., Aute, V., Azarm, S., Radermacher, R., "Approximation Assisted Optimization for Novel Compact Heat Exchanger Designs", HVAC&R Research, Volume 16, Number 5, September 2010, Pages 707-728, 2010.
39. Abdelaziz, O., Radermacher, R., "Modeling Heat Exchangers Under Consideration of Manufacturing Tolerances and Uncertain Flow Distribution" International Journal of Refrigeration, Volume 33, Issue 4, June 2010, Pages 815-828.
40. Radermacher, R., Abdelaziz, O., "Optimization" and HVAC&R.", HVAC and R Research, v 14, Number 6, November 2008, Pages 817-818.
41. Abdelaziz, O., "FLOW REGIMES, THERMAL AND HUMIDITY PATTERNS IN ARCHAEOLOGICAL TOMBS - Preserving an International Heritage" LAP Lambert Academic Publishing, ISBN 978-3-8433-7022-6, Paperback, 172 pages.

## REFEREED CONFERENCE PROCEEDINGS

1. Zaki, O. and Abdelaziz, O., Seasonal Performance Evaluation of Radiant Sensible Cooling in High Ambient Temperature Environments, 16<sup>th</sup> International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, Applied Thermal Engineering, HEFAT 2022, 08 – 10 August 2022, Virtual Conference.
2. Hassan M. and Abdelaziz, O., "A Novel Adaptive Predictive Control Strategy of Hybrid Radiant-Air Cooling Systems in Hot and Dry Climates". 15<sup>th</sup> International Conference on Heat Transfer, Fluid Mechanics, and Thermodynamics, Applied Thermal Engineering, HEFAT 2021, July 25 – 28, 2021. Virtual Conference. pp. 77 – 84. **Best Session Paper Award.**
3. Nawaz, K., Shen, B., Elatar, A., Baxter, V., and Abdelaziz, O., "Alternate refrigerants for Heat Pump Water Heater Applications" (2021). 13<sup>th</sup> IEA Heat Pump Conference, April 26-29, Jeju, Korea pp. 1148-1155
4. Nawaz, K., Shen, B., Elatar, A., Baxter, V., and Abdelaziz, O., "Alternate refrigerants for Heat Pump Water Heater Applications- Opportunities and Challenges" (2021). International Refrigeration and Air Conditioning Conference. Paper 2216. <https://docs.lib.purdue.edu/iracc/2216>
5. Nawaz, K., Abdelaziz, O., and Jacobi, A., "Characterization of Solid Desiccant for Dehumidification Applications" (2021). International Refrigeration and Air Conditioning Conference. Paper 2217. <https://docs.lib.purdue.edu/iracc/2217>
6. Nawaz, K., Shen, B., Elatar, A., Baxter, V.D., Abdelaziz, O. "Performance evaluation of CO<sub>2</sub> HPWH system". 14<sup>th</sup> IIR-Gustav Lorentzen Conference on Natural Refrigerants (GL2020). Proceedings. Kyoto, Japan, December 7-9<sup>th</sup> 2020. Paper n. 1171. Publication date: 2020/12/07. <http://dx.doi.org/10.18462/iir.gl.2020.1171>.
7. Edwards, K, Abuheiba, A., Stoyanov, M. K., Zhang, M., Elatar, A., Patel, V. K., Baxter, V.D., Finney, C., and Abdelaziz, O. "Reduced-order model to estimate safe flammable refrigerant charge limits for a one-room air conditioner". 25<sup>th</sup> IIR International Congress of Refrigeration - Montreal, Quebec, Canada, August 24 – 30<sup>th</sup>, 2019.



8. Elatar, A. F., Abu-Heiba, A., Patel, V.K., Baxter, V.D., Zhang, M., Abdelaziz, O., and Edwards, K. D. "Risk assessment of catastrophic leak of R452B from packaged unit into a residential space". 1<sup>st</sup> IIR international conference on the application of HFO refrigerants, Birmingham, September 2-5, 2018.  
<http://dx.doi.org/10.18462/iir.hfo.2018.1105>.
9. Nawaz, K., Ally, M.R., and Abdelaziz, O. "Ammonia and propane as natural refrigerants for heat pump applications". 13<sup>th</sup> IIR Gustav Lorentzen Conference on Natural Refrigerants (GL2018). Proceedings. Valencia, Spain, June 18-20th, 2018. Paper n. 1226. Publication date: 2018/06/18. <http://dx.doi.org/10.18462/iir.gl.2018.1226>.
10. Ally, M., Sharma, V., Abdelaziz, O., "Ammonia as natural refrigerant in electrically and thermally driven engines for heat pumps". 13<sup>th</sup> IIR Gustav Lorentzen Conference on Natural Refrigerants (GL2018). Proceedings. Valencia, Spain, June 18-20<sup>th</sup>, 2018. Paper n. 1225. Publication date: 2018/06/18. <http://dx.doi.org/10.18462/iir.gl.2018.1225>.
11. Nawaz, K., Shen, B., Elatar, A., Baxter, V.D., and Abdelaziz, O. "Hydrocarbons as natural refrigerants for heat pump water heating applications". 13<sup>th</sup> IIR Gustav Lorentzen Conference on Natural Refrigerants (GL2018). Proceedings. Valencia, Spain, June 18-20<sup>th</sup>, 2018. Paper n. 1227. Publication date: 2018/06/18.  
<http://dx.doi.org/10.18462/iir.gl.2018.1227>.
12. Elatar, A., Edwards, K.D., Abu-Heiba, A., Patel, V., Baxter, V., Zhang, M., and Abdelaziz, O. "Investigation of Low GWP Flammable Refrigerant Leak From Rooftop Units". ASHRAE Winter Conference Proceeding, ASHRAE, 2018. Paper number CH-18-C062.
13. Shen, B., Abdelaziz, O., Rice, C.K., Baxter, V., "Field Investigation of an Air-Source Cold Climate Heat Pump", 12<sup>th</sup> IEA Heat Pump Conference 2017, Rotterdam, Netherland, May 15-18, 2017, Paper Number P.1.5.6.
14. Gluesenkamp, K.R., Yang, Z., Abdelaziz, O., "Translating cycle performance to system-level efficiency for sorption heat pumps", 12<sup>th</sup> IEA Heat Pump Conference 2017, Rotterdam, Netherland, May 15-18, 2017, Paper Number P.4.3.4.
15. Elatar, A., Nawaz, K., Shen, B., Baxter, V., and Abdelaziz, O. "Characterization of Wrapped Coil Tank Water Heater During Charging/Discharging." Proceedings of the ASME 2017 International Mechanical Engineering Congress and Exposition. Volume 7: Fluids Engineering. Tampa, Florida, USA. November 3–9, 2017. V007T09A019. ASME.  
<https://doi.org/10.1115/IMECE2017-71818>.
16. Zhang, M., & Abdelaziz, O. "Numerical Analysis of Flow and Electric Field Effects on an EHD Enhanced Mini Heat Exchanger." Proceedings of the ASME 2017 Heat Transfer Summer Conference. Volume 1: Aerospace Heat Transfer; Computational Heat Transfer; Education; Environmental Heat Transfer; Fire and Combustion Systems; Gas Turbine Heat Transfer; Heat Transfer in Electronic Equipment; Heat Transfer in Energy Systems. Bellevue, Washington, USA. July 9–12, 2017. V001T02A001. ASME.  
<https://doi.org/10.1115/HT2017-4800>.
17. Bahar, B., Parmelee, W., Fackler, s., Sherrer, R., Zerby, J., Abdelaziz, O., Ming, Q., Junge, B., Beers, D., Prasad, A., "An overview of advancements in electrochemical compressor driven heat pump systems", 12<sup>th</sup> IEA Heat Pump Conference 2017, Rotterdam, Netherland, May 15-18, 2017, Paper Number O.4.9.4.
18. Abdelaziz, O., Ming, Q., Sun, X.G., Bahar, B., Parmelee, W., Fackler, S., Sherrer, R., Zerby, J., Chouhan, A., Prasad, A., "Development of Separate Sensible and Latent Cooling System using Electrochemical Compressor", 12<sup>th</sup> IEA Heat Pump Conference 2017, Rotterdam, Netherland, May 15-18, 2017, Paper Number O.4.9.3.
19. Chugh, D., Gluesenkamp, K.R., Abdelaziz, O., Moghaddam, S., "Hybrid Membrane-based Ionic Liquid Absorption Cycle for Water Heating, Dehumidification, and Cooling",

- 12<sup>th</sup> IEA Heat Pump Conference 2017, Rotterdam, Netherland, May 15-18, 2017, Paper Number O.4.4.3.
20. Yang, Z., Qu, M., Gluesenkamp, K.R., Abdelaziz, O., "Liquid Desiccant System Component Models in the Sorption System Simulation Program (SorpSim)", 12<sup>th</sup> IEA Heat Pump Conference 2017, Rotterdam, Netherland, May 15-18, 2017, Paper Number O.4.6.2.
  21. Shen B., Abdelaziz, O., Shrestha S., "Performance Optimization of Alternative Lower Global Warming Potential Refrigerants in Mini-Split Room Air Conditioners", 12<sup>th</sup> IEA Heat Pump Conference 2017, Rotterdam, Netherland, May 15-18, 2017, Paper Number O.4.1.3.
  22. Abdelaziz, O., Shrestha, S., Shen, B., "Alternative Lower Global Warming Potential Refrigerants for Air Conditioning in Hot Climates" Second International Conference on Energy and Indoor Environment for Hot Climates: Outdoor Cooling Technologies, Challenges, and Opportunities for the Hot Climates, Paper number HC-17-13, February 26th - 27th, 2017, Doha, Qatar.
  23. Gao, Z., Abdelaziz, O., Qu, M., "Modeling and Simulation of Membrane-Based Dehumidification and Energy Recovery Process", 2017 ASHRAE Winter Conference, LV-17-C070, January 28 – February 1, 2017, Las Vegas, NV, USA
  24. Mallow, A., Gluesenkamp, K., Abdelaziz, O., and Graham, S., "Optimized Design of a Compressed Graphite/PCM Thermal Battery" at IV<sup>th</sup> International Symposium on Innovative Materials for Processes in Energy Systems, IMPRES, October 23-26, Taormina, Sicily, Italy
  25. Zhang, M., Momen, M., Abdelaziz, O., "The Operating Principle of a Fully Solid State Active Magnetic Regenerator", The 7th International Conference on Magnetic Refrigeration at Room Temperature (THERMAG VII), 11-14 Sept 2016, Turin, Italy
  26. Patel, V.K., Mallow, A., Momen, A. M., Johnson, T., Staats, W., Abdelaziz, O., "Experimental Evaluation of a Residential Refrigerator with a Novel Rotating Heat Exchanger as an Evaporator", 2016 ACEEE Summer Study on Energy Efficiency in Buildings, Pages 1-1 to 1-12
  27. Mallow, A., Graham, S., Gluesenkamp, A., Abdelaziz, O., "Design of Compressed Graphite/PCM Thermal Batteries", 4th International Conference on Computational Methods for Thermal Problems, Georgia Tech, Atlanta, USA, July 6-8, 2016
  28. Shen, B., Abdelaziz, O. Liudahl, L., "Assessment of DR-55 as A Drop-In Replacement For R410A", 16<sup>th</sup> International Refrigeration and Air Conditioning Conference at Purdue, July 11-14, 2016, paper 2333, Page 1-9
  29. Zhang, M., Momen, A.M., Abdelaziz, O., "Preliminary Analysis of a Fully Solid State Magnetocaloric Refrigeration", 16<sup>th</sup> International Refrigeration and Air Conditioning Conference at Purdue, July 11-14, 2016, paper 2447, Page 1-10
  30. LaClair, T., Gao, Z., Abdelaziz, O., Wang, M., Wolfe, E., Craig, T., "Thermal Storage System for Electric Vehicle Cabin Heating - Component and System Analysis", SAE Technical Paper 2016-01-0244, 2016, doi:10.4271/2016-01-0244.
  31. Wang, M., Wolfe, E., Craig, T., LaClair, T., Abdelaziz, O., Gao, Z., "Design and Testing of a Thermal Storage System for Electric Vehicle Cabin Heating", SAE Technical Paper 2016-01-0248, 2016, doi:10.4271/2016-01-0248.
  32. Abdelaziz, O., Shrestha, S., "Evaluation of Air-to-Refrigerant Heat Exchangers using Alternative Lower Global Warming Refrigerants", First Pacific Rim Thermal Engineering Conference, Hawaii's Big Island, HI, USA, March 13-17, 2016.
  33. Mallow, A., Abdelaziz, O., Graham, S. "Thermal Charging Study of Compressed Expanded Natural Graphite/Phase Change Material Composites", First Pacific Rim Thermal Engineering Conference, Hawaii's Big Island, HI, USA, March 13-17, 2016.

34. Abdelaziz, O., Shrestha, S, Munk, J., Linkous, R., “Evaluation of Alternative Refrigerants for High Ambient Applications in a Mini-Split AC Unit”, 2016 ASHRAE Winter Conference, Orlando, FL, USA, January 23-27, 2016.
35. Shen, B., Abdelaziz, O., Rice, C K., Baxter, V. D., “Cold Climate Heat Pumps Using Tandem Compressors”, 2016 ASHRAE Winter Conference, Orlando, FL, USA, January 23-27, 2016.
36. Odukamaiya, A., Momen, A., Abu-Heiba, A., Gluesenkamp, K., Abdelaziz. O., Graham, S. “Transient Thermofluids Analysis of a Ground-Level Integrated Diverse Energy Storage (GLIDES) System”, ASME 2015 International Mechanical Engineering Congress and Exposition, Volume 6B: Energy, Houston, Texas, USA, November 13–19, 2015, ISBN: 978-0-7918-5744-1
37. Shen, B., Rice, C.K., Abdelaziz, O., and Shrestha, S. “Development of a cold climate heat pump using two-stage compression”. ICR2015, the 24<sup>th</sup> IIR International Congress of Refrigeration, Improving Quality of Life, Preserving the Earth. August 16 – 22, 2015. Yokohama, Japan. Paper n. 393. <http://dx.doi.org/10.18462/iir.icr.2015.0393>.
38. Abdelaziz, O. “Primary Energy Efficiency Analysis of Different Separate Sensible and Latent Cooling Techniques”. ICR2015, the 24<sup>th</sup> IIR International Congress of Refrigeration, Improving Quality of Life, Preserving the Earth. August 16 – 22, 2015. Yokohama, Japan. Paper n. 60. <http://dx.doi.org/10.18462/iir.icr.2015.0060>.
39. Qu, M. and Abdelaziz, O. “Improving water and energy efficiency of power plant through absorption heat pump”. ICR2015, the 24<sup>th</sup> IIR International Congress of Refrigeration, Improving Quality of Life, Preserving the Earth. August 16 – 22, 2015. Yokohama, Japan. Paper n. 865. <http://dx.doi.org/10.18462/iir.icr.2015.0865>.
40. Ayyoub M. Momen; Edem Kokou; Pradeep Bansal; Kyle R. Gluesenkamp; Omar Abdelaziz, “Preliminary Investigation of Novel Direct Contact Ultrasonic Fabric Drying”, ASME 2015 International Mechanical Engineering Congress and Exposition, Volume 6A: Energy, Houston, Texas, USA, November 13–19, 2015, ISBN: 978-0-7918-5743-4
41. Ayyoub M. Momen, Omar Abdelaziz, and Keith Rice, “Novel Frost Handling Techniques Using Air Bearing Heat Exchangers for Household Refrigerators”, ASHRAE summer Conference 2015, Atlanta, GA, June 2015.
42. Brandon J. Johnson, Michael R. Starke, Omar Abdelaziz, Roderick Jackson, Leon M. Tolbert, “A Dynamic Simulation Tool for Estimating Demand Response Potential from Residential Loads”, Innovative Smart Grid Technologies Conference (ISGT), 2015 IEEE Power & Energy Society, vol., no., pp.1,5, 18-20 Feb. 2015, doi: 10.1109/ISGT.2015.7131867
43. Vikrant Aute, Omar Abdelaziz, Daniel Bacellar, “Novel Heat Exchanger Design Using Computational Fluid Dynamics and Approximation-Assisted Optimizations”, paper no. CH-15-C040, ASHRAE winter Conference 2015, Chicago, IL, January 2015.
44. Ayyoub M. Momen, Omar Abdelaziz, Kyle Gluesenkamp, Edward Vineyard, Michael Benedict “Thermofluid analysis of magnetocaloric refrigeration”, the ASME International Mechanical Engineering Congress and Exposition, Montreal, QC, Canada, November 14-20, 2014.
45. Beshr, M., Aute, V., Sharma, V., Abdelaziz, O., Fricke, B.A., Radermacher, R., “A Comparative Study on the Environmental Impact of CO<sub>2</sub> Supermarket Refrigeration Systems”, 11th IIR Gustav Lorentzen Conference on Natural Refrigerants, Hangzhou, China, August 31st – September 2nd, 2014.
46. Bacellar, D., Ling, J., Aute, V., Radermacher, R., Abdelaziz, O., “Multi-Scale Modeling and Approximation Assisted Optimization Assisted Optimization of Bare Tube Heat Exchangers”, 15th International Heat Transfer Conference, Kyoto, Japan, August 10-15, 2014.



47. Phelan, P., Abdelaziz, O., Otanicar, T., Phelan, B., Prasher, R., Taylor, R., Tyagi, H., “The Impact of Thermal Engineering Research on Global Climate Change”, 15th International Heat Transfer Conference, Kyoto, Japan, August 10-15, 2014.
48. Beshr, M., Aute, V., Abdelaziz, O., Fricke, B.A., Radermacher, R., “Impact of Charge Degradation on the Life Cycle Climate Performance of a Residential Air- Conditioning System”, 15th International Refrigeration and Air Conditioning Conference, West Lafayette Indiana, July 14-17, 2014.
49. Beshr, M., Aute, V., Abdelaziz, O., Fricke, B.A., and Radermacher, R. “Impact of Charge Degradation on the Life Cycle Climate Performance of a Residential Air- Conditioning System” (2014). 15th International Refrigeration and Air Conditioning Conference, West Lafayette Indiana, July 14-17, 2014. Paper 1427. <http://docs.lib.purdue.edu/iracc/1427>.
50. Beshr, Mohamed; Aute, Vikrant; Abdelaziz, Omar; Fricke, Brian; and Radermacher, Reinhard, “An Evaluation of the Environmental Impact of Different Commercial Supermarket Refrigeration Systems Using Low Global Warming Potential Refrigerants” (2014). 15th International Refrigeration and Air Conditioning Conference, West Lafayette Indiana, July 14-17, 2014. Paper 1428. <http://docs.lib.purdue.edu/iracc/1428>.
51. Shen, B., Abdelaziz, O., Baxter, V, Rice, C.K., “Compressor Selection and Equipment Sizing for Cold Climate Heat Pumps”, 11th International Energy Agency Heat Pump Conference, Quebec, Montreal, Canada, May 12-16, 2014.
52. Beshr, M., Aute, V., Abdelaziz, O., Fricke, B.A., Radermacher, R., “A Tool for Life Cycle Climate Performance (LCCP) Based Design of Residential Air Source Heat Pumps”, 11th International Energy Agency Heat Pump Conference, Quebec, Montreal, Canada, May 12-16, 2014.
53. Johnson, B., Jackson, R., Tolbert, L.M., Starke, M.R., Abdelaziz, O., “A MATLAB Based Occupant Driven Dynamic Model for Predicting Residential Power Demand”, IEEE PES T&D, Chicago, Illinois, April 14th, 2014.
54. Maerzke, K., Mozurkewich, G., Abdelaziz, O., Gluesenkamp, K.R., Schneider, W., Morrison, D., Maginn, E., “Ionic Liquid Development for Absorption Heat Pump Applications”, International Sorption Heat Pump Conference, Washington, District of Columbia, March 31st – April 3rd, 2014.
55. Chugh, D., Gluesenkamp, K.R., Abdelaziz, O., Moghaddam, S., “A Novel Absorption Cycle for Combined Water Heating, Dehumidification, and Evaporative Cooling”, International Sorption Heat Pump Conference, Washington, District of Columbia, March 31st – April 3rd, 2014.
56. Yang, Z., Tang, X., Qu, M., Abdelaziz, O., Gluesenkamp, K.R., “Development of Updated ABSorption SIMulation Software (ABSIM)”, International Sorption Heat Pump Conference, Washington, District of Columbia, March 31st – April 3rd, 2014.
57. Johnson, B.J., Starke, M.R., Abdelaziz, O., Jackson, R.K., Tolbert, L.M., “A Method for Modeling Household Occupant Behavior to Simulate Residential Energy Consumption”, Innovative Smart Grid Technologies 2014, Washington, District of Columbia, IEEE Power Energy Society, February 19-22, 2014.
58. Abdelaziz, O., Shrestha, S.S., “Development of Versatile Compressor Modeling using Approximation Techniques for Alternative Refrigerants Evaluation”, ASHRAE 2014 Winter Conference, New York, New York, January 18-22, 2014.
59. Shrestha, S.S., Sharma, V., Abdelaziz, O., “Comprehensive Compressor Calorimeter Testing of Lower-GWP Alternative Refrigerants for Heat Pump and Medium Temperature Refrigeration Applications”, ASHRAE 2014 Winter Conference, New York, New York, January 18-22, 2014.
60. Abdelaziz, O., Farese, P., Abramson, A., and Phelan, P, “Technology Prioritization: Transforming the U.S. Building Stock to Embrace Energy Efficiency”, TechConnect

World 2013 Joint Conferences, Expo and Innovation Showcase, Volume 3, Page 732 - 735, Washington D.C., May 12 - 16, 2013.

61. Fricke, B. A., Abdelaziz, O., and Vineyard, E. A., Reducing the Carbon Footprint of Commercial Refrigeration Systems Using Life Cycle Climate Performance Analysis: From System Design to Refrigerant Options, 2<sup>nd</sup> IIR International Conference on Sustainability and the Cold Chain, Paris, France, April 02-04, 2013.
62. Mallow, A., O. Abdelaziz, K. Kalaitzidou, and S. Graham, "Investigation of the Stability of Paraffin/Exfoliated Graphite Nanoplatelet Composites for Latent Heat Thermal Storage Systems", 2012 International Mechanical Engineering Congress and Exposition, November 9-15, 2012, Houston, TX. Presented at the Micro Nano Forum Poster Presentation Session on Tuesday, November 13<sup>th</sup>.
63. Evans III, B., West, D., Mallow, A., Abdelaziz, O., "Scaling and Optimization of Magnetic Refrigeration for Commercial Building HVAC Systems Greater than 175 kW in Capacity", THERMAG V, 5th IIR/IIF International Conference on Magnetic Refrigeration at Room Temperature, Grenoble, France, September 17-20, 2012.
64. Shassere, B., Abdelaziz, O., Evans III, B., West D., "Thermal Imaging of Active Magnetic Regenerator MCE Materials During Operation", THERMAG V, 5th IIR/IIF International Conference on Magnetic Refrigeration at Room Temperature, Grenoble, France, September 17-20, 2012.
65. Abdelaziz, O., Wang, K., Vineyard, E.A., Roetker, J., "Development of Environmentally Benign Heat Pump Water Heaters for the US Market", 2012 ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA, August 12-17, 2012.
66. Abdelaziz, O., Fricke, B., Vineyard, E. A., "Development of Low Global Warming Potential Refrigerant Solutions for Commercial Refrigeration Systems using a Life Cycle Climate Performance Design Tool", 14th International Refrigeration and Air Conditioning Conference, July 16-15, 2012, Purdue University, West Lafayette, IN.
67. Wang, K., Abdelaziz, O., Vineyard, E. A., "Thermophysical Properties of Lithium Bromide + 1, 2-Propanediol Aqueous Solutions - Solubility, Density and Viscosity", 14th International Refrigeration and Air Conditioning Conference, July 16-15, 2012, Purdue University, West Lafayette, IN.
68. Karber, K. Abdelaziz, O., Vineyard, E. A., "Experimental Performance of R-1234yf as a Drop-in Replacement for R-134a in Domestic Refrigerators", 14th International Refrigeration and Air Conditioning Conference, July 16-15, 2012, Purdue University, West Lafayette, IN.
69. Saleh, K., Abdelaziz, O., Aute, V., Radermacher, R., Azarm, S., "New Generation of Air-Cooled Heat Exchanger 1 kW Module Design Optimization", 14th International Refrigeration and Air Conditioning Conference, July 16-15, 2012, Purdue University, West Lafayette, IN.
70. Abdelaziz, O., and Shen, B., Cold Climates Heat Pump Design Optimization, 2012 ASHRAE Winter conference, Chicago, IL, January 21-25, 2012.
71. Abdelaziz, O., Shen, B., Gao, Z., Baxter, V., Iu, I., "Development of a High Performance Air Source Heat Pump for the US Market", 10<sup>th</sup> IEA Heat Pump Conference 2011, 16 - 19 May 2011, Tokyo, Japan, 20110627, 20110831.
72. Wang, K., Kisari, P., Abdelaziz, O., Vineyard, E., 2010, "Testing of Crystallization Temperature of a New Working Fluid for Absorption Heat Pump Systems", International Conference on Road to Climate Friendly Chillers, September 30th - October 1st, 2010, Cairo, Egypt, <http://www.rcfc2010.org/>, paper # 1005, pp. 1-6.
73. Kisari, P., Wang, K., Abdelaziz, O., Vineyard, E., 2010, "Crystallization Temperature of Aqueous Lithium Bromide Solutions at Low Evaporation Temperature", International

- Conference on Road to Climate Friendly Chillers, September 30th - October 1st, 2010, Cairo, Egypt, <http://www.rcfc2010.org/>, paper # 1006, pp. 1-7.
74. Saleh, K., Abdelaziz, O., Aute, V., Radermacher, R., and Azarm, S., 2010, "Microchannel Approximation Assisted Design Optimization and CFD Verification", 13<sup>th</sup> International Refrigeration and Air Conditioning Conference, July 10-15, 2010, Purdue University, West Lafayette, IN, 2010, R2312, pp.1-8.
  75. Abdelaziz, O., Aute, V., Azarm, S., Radermacher, R., "Approximation Assisted Optimization for Novel Compact Heat Exchanger Designs" – Keynote Lecture, Seventh International Conference on Enhanced, Compact and Ultra-Compact Heat Exchangers: From Microscale Phenomena to Industrial Applications, September 13-18, 2009, Heredia, Costa Rica.
  76. Aute, V., Abdelaziz, O., Azarm, 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.
  77. Singh, V., Abdelaziz, O., Aute, V., and Radermacher, R., 2008, "A-Type Heat Exchanger Simulation using 2-D CFD for Airside Heat Transfer and Pressure Drop", *Proc. 12th International Refrigeration and Air Conditioning Conference at Purdue*, July 12-17, 2008, Purdue University, West Lafayette, IN, 2008, R2200, pp.1-8.
  78. Abdelaziz, O., Aute, V., and Radermacher, R., 2008, "Effect of Void Fraction Model on the Dynamic Performance of Moving Boundary Heat Exchanger", *Proc. 12th International Refrigeration and Air Conditioning Conference at Purdue*, Purdue University, West Lafayette, IN, July 12-17, 2008, R2198, pp.1-8.
  79. Abdelaziz, O., Winkler, J., Aute, V., and Radermacher, R., 2006, "Transient Simulation of a Transcritical Carbon Dioxide Refrigeration System", *Proc. 11th International Refrigeration and Air Conditioning Conference at Purdue*, Purdue University, West Lafayette, IN, July 15-20, 2006, R093, pp.1-8.
  80. Abdelaziz, O., Khalil, E.E., and Ramadan, M., 2006, "Fluid flow regimes and thermal patterns in air conditioned transformers room", *Proc. 4th International Energy Conversion Engineering Conference*, AIAA, Vol. 1, San Diego, CA, Jun 26-29, 2006, AIAA-2006-4093, pp.702-710.
  81. Abdelaziz, 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 of Indoor Air Quality and Climate, Lisbon, Portugal, VEN4.6, pp.1-5.
  82. Abdelaziz, 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.
  83. Abdelaziz, O. and Khalil, E.E., 2006, "Air Outlets locations Effect on Thermal and Humidity Patterns inside the Archaeological Tombs of the Kings", *Proc. Healthy Buildings 2006 Conference*, June 4 – 8, 2006, International Society of Indoor Air Quality and Climate, Lisbon, Portugal, VEN1.15, pp.1-6.
  84. Abdelaziz, O. and Khalil, E.E., 2006, "LES versus k- $\epsilon$  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.
  85. Abdelaziz, O. and Khalil, E.E., 2005, "Understanding Air Flow Patterns and Thermal Behaviour in king Tutankhamen tomb", *Proc. 2005 ASME International Mechanical Engineering Congress and Exposition, IMECE 2005*, November 5-11, 2005, IMECE2005-80465, ASME, Orlando, FL, pp.115-121.

86. Abdelaziz, O. and Khalil, E.E., 2005, "Predictions of Air Flow Patterns and Heat Transfer in the Tombs of the Valley of the Kings", *Proc. 8<sup>th</sup> REHVA World Congress, CLIMA 2005*, October 9-12, 2005, Paper 358.
87. Abdelaziz, 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. 10<sup>th</sup> 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.
88. Abdelaziz, O. and Khalil, E.E., 2005, "Modeling of 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.
89. Abdelaziz, O. and Khalil, E.E., 2005, "CFD-Controlled Climate Design of the Archeological Tombs of Valley of Kings" *Proc. 2<sup>nd</sup> Mediterranean Congress of Climatization, CLIMAMED 2005*, February 24-25, 2005, Madrid, Spain, Paper 86, pp.1-8.
90. Khalil, E.E. and Abdelaziz, O., 2005, "CFD-controlled climate design of the archeological tombs of valley of kings", 11<sup>th</sup> International Air Conditioning, Heating, Ventilation and Refrigeration Exhibition, Madrid, Spain, February 23-26, 2005.
91. Abdelaziz, O. and Khalil, E.E., 2005, "Air Flow Regimes and Thermal Patterns in Climatized Tombs in Valley of Kings", 43<sup>rd</sup> AIAA Aerospace Sciences Meeting and Exhibit - Meeting Papers, 43<sup>rd</sup> AIAA Aerospace Sciences Meeting and Exhibit - Meeting Papers, January 10-13, 2005, pp.1209-1216 – **BEST TERRESTRIAL ENERGY SYSTEMS PAPER AWARD.**
92. Abdelaziz, 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, High Tatras, Štrbské Pleso.

## **ADDITIONAL CONFERENCE PROCEEDINGS AND ARTICLES**

1. Abdelaziz, O., Aute, V., Azarm, S., Radermacher, R., "Approximation Assisted Optimization for Novel Compact Heat Exchanger Designs" – Keynote Lecture, Seventh International Conference on Enhanced, Compact and Ultra-Compact Heat Exchangers: From Microscale Phenomena to Industrial Applications, September 13-18, 2009, Heredia, Costa Rica.
2. Khalil, E.E. and Abdelaziz, O., 2006, "A Dry Passage to the After Life", *Fluent News*, Spring 2006, pp. 28.
3. Abdelaziz, O. and Khalil, E.E., 2005, "Indoor Air Flow Regimes in the Tombs of Valley of Kings", *Proc. of International Conference on Energy and Environment*, Sharm El Sheikh, March 2005, EE9.
4. Abdelaziz, O. and Khalil, E.E., 2004, "CFD-Controlled Climate Design of The Archeological Tombs of Valley of Kings", *Proc. of Sustaining Europe Cultural Heritage*, London, England, September 2004.

## **CONFERENCE AND SEMINAR PRESENTATIONS**

1. Abdelaziz, O., Chair for Seminar 6 "Optimized Control Systems for Thermal Comfort and Energy Management". 2020 ASHRAE Virtual Conference, June 29 - July 2, 2020
2. Abdelaziz, O., El Assad, B., and Nielsen, O., Webinaire international: Réfrigérants alternatifs pour les Pays à Haute Température Ambiante (HTA), hosted by UN Environment Program and UNIDO in cooperation with ASHRAE, June 17<sup>th</sup>, 2020.

3. Abdelaziz, O., El Assad, B., and Nielsen, O., International Webinar on Alternative Refrigerants for High Ambient Temperature (HAT) Countries, hosted by UN Environment Program and UNIDO in cooperation with ASHRAE, June 10<sup>th</sup>, 2020.
4. Abdelaziz, O., “Multi-Objective Design Optimization of Air-Cooled Condensers Operating with Low-GWP Refrigerants”, Seminar 11. 2019 ASHRAE Annual Conference, June 22 - 26, 2019, Kansas City, MO
5. Abdelaziz, O., Chair for Seminar 21 “Heat Exchangers Circuit Optimization”. 2019 ASHRAE Annual Conference, June 22 - 26, 2019, Kansas City, MO
6. Abdelaziz, O., Chair for Seminar 32, “State of the Art in Moist Air Properties Calculations”, 2018 ASHRAE Annual Conference, June 23 - 27, 2018, Houston, TX
7. Abdelaziz, O., Moderator for Debate 2 “Low GWP Refrigerants in Heat Exchange Equipment”, 2018 ASHRAE Winter Conference, January 20 - 24, 2018, Chicago, IL
8. Abdelaziz, O., “Testing Results from ORNL-US DOE Project”, International Roundtable Meeting on Risk Assessment Model for the use of low-GWP Refrigerants in High Ambient Temperature Countries, 3-4 October 2017 – Kuwait, organized by UNEP, UNIDO, and Kuwait EPA
9. Abdelaziz, O., “Status of Research for Safety Standards Organizations Establishing a more Robust Fact Base about the properties and use of Flammable Refrigerants”, Workshop on safety standards relevant to the safe use of low global-warming-potential (GWP) alternatives, 39<sup>th</sup> Open Ended Working Group (OEWG) Meeting, July 10<sup>th</sup>, 2017, Bangkok, Thailand. <http://conf.montreal-protocol.org/meeting/workshops/safety-and-standards/presession/SitePages/Home.aspx>
10. Abdelaziz, O., Geoghegan, P., and Kunc, V., “Strategic Vision for Additive Manufacturing Applied to Thermal Applications” Invited Tech-Talk Session (TT-1), ITherm 2017, May 30 – June 2, 2017, Orlando, FL.
11. Abdelaziz, O., “Alternative Refrigerants for Air Conditioning in Hot Climates”, **Keynote Presentation**, Second International Conference on Energy and Indoor Environment for Hot Climates: Outdoor Cooling Technologies, Challenges, and Opportunities for the Hot Climates, February 26<sup>th</sup> - 27<sup>th</sup>, 2017, Doha, Qatar.
12. Abdelaziz, O., “Next Generation Refrigerants”, Invited Presentation, Session 2A, Sustainable Technologies for Stationary Air Conditioning Workshop, 1 February, 2017, Las Vegas, NV. <http://www.ccacoalition.org/en/events/sustainable-technologies-stationary-air-conditioning-workshop>
13. Abdelaziz, O., “ORNL Research Effort on Charge Limits for Various Types of Equipment Employing Flammable Refrigerants”, Seminar 64, 2017 ASHRAE Winter Conference, January 28 - February 1, 2017, Las Vegas, NV
14. Abdelaziz, O., “Key Findings of the US-DOE High Ambient Testing Projects”, AHR Expo Technical Seminar “Lower-GWP Alternatives for High Ambient Conditions; Are We Ready?”, January 31<sup>st</sup>, 2017, Las Vegas, NV.
15. Abdelaziz, O. and Baxter, V. organized a workshop on the evaluation of safe refrigerant charge limits for alternative refrigerants with different ASHRAE flammability designation (A2L, A2, and A3) in ASHRAE Headquarters, Atlanta, GA, October 24<sup>th</sup>, 2016
16. Abdelaziz, O. and Baxter, V., Current and Future AC Technologies. Invited participation at the EGRD Workshop on Space Cooling Technologies, Paris, France, May 17-18, 2016
17. Abdelaziz O. and Eltalouny A. organized a workshop during the 38<sup>th</sup> Open Ended Working Group Meeting (OEWG) to discuss the results of ORNL studies on alternative lower GWP refrigerants for R-22 and R-410A air conditioning systems in high ambient temperature environments and compare results with other international efforts including

- PRAHA-I and AHRI AREP. Dr. Abdelaziz also discussed the “Future of Air Conditioning” study and presented key findings to the audience.
18. Abdelaziz, O., “ORNL Magnetic Refrigeration Exhibit”, National Lab Science Day on The Hill, Washington D.C., April 20<sup>th</sup> 2016:  
<https://www.flickr.com/photos/argonne/sets/72157666751298010/>,
  19. Abdelaziz, O., “Evaluation of Alternative Refrigerants for High Ambient Applications”, Conference Paper Session 5, 2016 Winter Conference, January 23-27, Orlando, FL
  20. Abdelaziz, O., Chair for Seminar 22 “Innovative Design, Materials and Manufacturing Techniques for Heat/Mass Exchangers”, 2016 Winter Conference, January 23-27, Orlando, FL
  21. Abdelaziz, O., Chair for Seminar 48 “Advanced Non-Vapor Compression Cycles”, 2016 Winter Conference, January 23-27, Orlando, FL
  22. Abdelaziz, O. and Carvalho, S., organized a side event during the 27<sup>th</sup> Montreal Meeting of the Parties to present the final results from the ORNL study on “alternative lower GWP refrigerants for R-22 and R-410A for mini-split Air conditioning systems in high ambient temperature environments”, Dubai, UAE, November 1<sup>st</sup>, 2015
  23. Abdelaziz, O., “Alternative lower GWP refrigerants for R-22 and R-410A for mini-split Air conditioning systems in high ambient temperature environments”, **Keynote presentation**, 5<sup>th</sup> Symposium on Alternative Refrigerants for High Ambient Temperature Countries, Dubai, UAE, October 31<sup>st</sup>, 2015
  24. Abdelaziz, O., “Review of Psychrometric Chart and Table”, Workshop 2, 2015 ASHRAE Annual Conference., June 27-July1, Atlanta, GA
  25. Abdelaziz, O., Chair for Seminar 29 “State-of-the-Art Heat Exchangers: Novel Visualization and Design Concepts”, Workshop 2, 2015 ASHRAE Annual Conference., June 27-July1, Atlanta, GA
  26. Abdelaziz, O., “Novel Frost Handling Techniques Using Air Bearing Heat Exchangers for Household Refrigerators (AT-15-C044)”, Conference Paper Session 14, 2015 ASHRAE Annual Conference., June 27-July1, Atlanta, GA
  27. Abdelaziz, O., Chair for Conference Paper Session 11 “Advances in Cooling Heat Exchangers and Refrigerants”, 2015 Winter Conference, January 24-28, Chicago, IL
  28. Abdelaziz, O., “Development of Versatile Compressor Modeling Using Approximation Techniques for Alternative Refrigerants Evaluation (NY-14-C014)”, Conference Paper Session 4, 2014 ASHRAE Winter Conference, New York, NY, Jan 18-22
  30. Abdelaziz, O., “Air Source Heat Pumps: Recent Development in USA” **Keynote presentation**, Second Asia Air Source Heat Pump Development Forum, China 2013, Wuxi, China, June 19 – 20, 2013.
  31. Abdelaziz, O., Rice, C.K., Shen, B., “Auto-Calibration and Control Strategy Determination for a Variable-Speed Heat Pump Water Heater Using Optimization”, 2013 ASHRAE Winter Conference, Dallas, TX, January 25 – 30, 2013.
  32. Abdelaziz, O., “Roadmap Towards Lower GWP Alternative Solutions for HVC&R”, SEMINAR 34 -- INDUSTRY-WIDE EFFORTS TO EVALUATE LOWER GWP REFRIGERANTS 2013 ASHRAE Winter Conference, Dallas, TX, January 25 – 30, 2013.
  33. Abdelaziz, O., Maginn, E., Morrison, D., “Ionic Fluid Design for Absorption Heat Pump Applications”
  34. Abdelaziz, O., Sharma, V., Fricke, B., “Evaluation of Alternative Refrigerant Performance in Air to Refrigerant HXs”, Seminar 34 – Industry Wide Effort to Evaluate Lower GWP Refrigerants, 2013 ASHRAE Winter Conference, Dallas, TX, January 25 – 30, 2013.
  35. Abdelaziz, O., Qu, M., “Solar Absorption Cooling Technologies for Air Conditioning in Sunny Countries”, 48th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit



- and 10th International Energy Conversion Engineering Conference, Atlanta, GA, July 29 – August 01, 2012.
36. Abdelaziz, O., Wang, K., “Physical Properties of the Lithium Bromide + 1, 2-Propanediol Aqueous Solution”, 2012 ASHRAE summer conference, San Antonio, TX, June 23-27, 2012.
  37. Abdelaziz, O., Forum: Low GWP Refrigerants: Current Status and Future Path. 2012 ASHRAE Winter conference, Chicago, IL, January 21-25, 2012.
  38. Boyd Evans, David West, Anne Mallow, and Omar Abdelaziz, Feasibility Analysis of Magnetic Refrigeration for Systems Having Over 35 kW Cooling Capacity, 2012 ASHRAE Winter conference, Chicago, IL, January 21-25, 2012.
  39. Abdelaziz, O., Next Generation Heat Exchangers for Net-Zero Design, 2011 ASHRAE Winter Conference, Las Vegas, NV, January 29 - February 2, 2011.
  40. Abdelaziz, O., Wang, K., Kisari, P., and Vineyard, E., Achieving Zero Energy Design with Absorption Cooling, 2011 ASHRAE Winter Conference, Las Vegas, NV, January 29 - February 2, 2011.
  41. Hwang, Y., Abdelaziz, O., Aute, V., Radermacher, R., “Novel Heat Exchanger Design Using Approximation Assisted Optimization”, SAE 2010, Automotive Refrigerant and System Efficiency Symposium July 13 – 15, 2010 Scottsdale, Arizona USA, July 15, 2010
  42. Abdelaziz, O, Shen, B., Rice, C.K., 2010 “Engineering Optimization: From Intuition to Systematic Techniques”, 2010 ASHRAE Annual Conference, Albuquerque, NM, June 26-30, 2010.
  43. Hwang, Y., Radermacher, R., Azarm, S., Abdelaziz, O., Saleh, K., Aute, V., 2009, “Novel Heat Exchangers Design and Optimization using Multi-Scale, Multi-Physics Approximation Assisted Optimization”, Interagency Advanced Power Group (IAPG), Mechanical Working Group and Electrical Systems Working Group Meetings, Philadelphia Naval Business Center, Philadelphia, PA 19112, May 4-8, 2009.
  44. Abdelaziz, 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.

## **PUBLIC TECHNICAL REPORTS**

1. Abdelaziz, Omar, Nigel Cotton, and Pierre Cazelles. Guidance Report on net benefits and cost for energy efficient refrigeration design options. 65 pages, UNIDO (United Nations Industrial Development Organization)/Kigali Cooling Efficiency Program. Publication date: 2020/05. <https://www.unido.org/cera>
2. Booten, Charles, Mann, Margaret, Momen, Ayyoub, and Abdelaziz, Omar. "Critical Material Supply Chain Analysis: Magnetocalorics". NREL/TP-5500-75163. National Renewable Energy Laboratory, Golden, CO, USA, 2020. <https://doi.org/10.2172/1659867>.
3. Booten, Charles W., Nicholson, Scott R., Mann, Margaret K., and Abdelaziz, Omar. "Refrigerants: Market Trends and Supply Chain Assessment". NREL/TP-5500-70207. National Renewable Energy Laboratory, Golden, CO, USA, 2020. <https://doi.org/10.2172/1599577>.
4. Elatar, Ahmed, Abuheiba, Ahmad, Patel, Viral K., Edwards, K, Baxter, Van D., Abdelaziz, Omar, and Zhang, Mingkan. "Risk Assessment of Catastrophic Leak Of R-452b From Package Unit into A Residential Space". ORNL/TM-2019/1331. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2019. <https://doi.org/10.2172/1606923>.
5. Abdelaziz, Omar, Abu-Heiba, Ahmad, Baxter, Van D., Edwards, Dean, Elatar, Ahmed, Finney, Charles E.A., Patel, Viral K., Stoyanov, Miroslav K., and Zhang, Mingkan.

- "Methodology for Estimating Safe Charge Limits of Flammable Refrigerants in HVAC&R Applications - Part 2". ORNL/TM-2018/1066. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2019. <https://doi.org/10.2172/1506800>.
6. Baxter, Van D., Abdelaziz, Omar, Abu-Heiba, Ahmad, Edwards, K. Dean, Elatar, Ahmed F., Finney, Charles E. A., Patel, Viral K., and Zhang, Mingkan. "Milestone Report BTO 3.2.2.25 – Methodology for Estimating Safe Charge Limits of Flammable Refrigerants in HVAC&R Applications – Part 1". ORNL/TM-2018/804. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2018. <https://doi.org/10.2172/1460212>.
  7. Sikes, Karen, Blackburn, Julia, Abdelaziz, Omar, Mehdizadeh Momen, Ayyoub, and Abu-Heiba, Ahmad. Fri . "Bringing Solid-State Magnetocaloric Cooling to the Market: A Commercialization Plan". ORNL/SPR-2017/547. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2017. <https://doi.org/10.2172/1435268>.
  8. Fricke, Brian A., Vishaldeep Sharma, and Omar Abdelaziz. Low Global Warming Potential Refrigerants for Commercial Refrigeration Systems. No. ORNL/TM-2017/289; CRADA/NFE-11-03242. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2017. <https://doi.org/10.2172/1376485>.
  9. Radermacher, Reinhard, Bacellar, Daniel, Aute, Vikrant, Huang, Zhiwei, Hwang, Yunho, Ling, Jiazhen, Muehlbauer, Jan, Tancabel, James, Abdelaziz, Omar, and Zhang, Mingkan. "Miniaturized Air-to-Refrigerant Heat Exchangers". DOE-UMD-EE-00006114. University of Maryland, College Park, MD, USA, 2017. <https://doi.org/10.2172/1358252>.
  10. Shen, Bo, and Abdelaziz, Omar. "Select Components and Finish System Design of a Window Air Conditioner with Propane". ORNL/TM-2017/179. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2017. <https://doi.org/10.2172/1355889>.
  11. Gluesenkamp, Kyle R., Abdelaziz, Omar, Patel, Viral K., Mandel, Bracha T., and de Almeida, Valmor F.. "High Efficiency Water Heating Technology Development Final Report, Part II: CO<sub>2</sub> and Absorption-Based Residential Heat Pump Water Heater Development". ORNL/TM-2016/291. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2017. <https://doi.org/10.2172/1356888>.
  12. Shen, Bo, Baxter, Van D., Abdelaziz, Omar, and Rice, C. Keith. "Finalize field testing of cold climate heat pump (CCHP) based on tandem vapor injection compressors". ORNL/TM-2017/176. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2017. <https://doi.org/10.2172/1357984>.
  13. Shen, Bo, Abdelaziz, Omar, Shrestha, Som S., and Elatar, Ahmed F.. "Compare optimized performance results for packaged RTU using all alternative refrigerants FY17 1st Quarter Milestone Report". ORNL/TM-2017/12. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2017. <https://doi.org/10.2172/1348340>.
  14. Abdelaziz, Omar, Shrestha, Som S., Shen, Bo, Linkous, Randall Lee, Goetzler, William, Guernsey, Matt, and Bargach, Youssef. "Alternative Refrigerant Evaluation for High-Ambient-Temperature Environments: R-22 and R-410A Alternatives for Rooftop Air Conditioners". ORNL/TM-2016/513. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2016. <https://doi.org/10.2172/1326522>.
  15. Goetzler, William, Guernsey, Matt, Young, Jim, Fujrman, Jay, and Abdelaziz, Amar. "The Future of Air Conditioning for Buildings". DOE/EE-1394. Navigant Consulting, Burlington, MA, USA, 2016. <https://doi.org/10.2172/1420235>.
  16. LaClair, T. J., Gao, Zhiming, and Abdelaziz, Omar. "Bench Testing Results for the Electrical PCM-Assisted Thermal Heating System (ePATHS)". ORNL/TM-2016/175, Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2016. <https://doi.org/10.2172/1260087>.
  17. Sikes, Karen, Blackburn, Julia, Grubbs, Tyler, Abdelaziz, Omar, and Momen, Ayyoub. "Market Assessment for Residential Refrigerator-Freezer with Novel Rotating Heat



- Exchanger". ORNL/TM-2016/92. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2016. <https://doi.org/10.2172/1253251>.
18. Shen, Bo, Abdelaziz, Omar, Baxter, Van, and Rice, C. Keith. "High Performance Cold Climate Heat Pump (CCHP) – Final Report". Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2015. <https://doi.org/10.2172/1238262>.
  19. Abdelaziz, Omar, Som Shrestha, Jeffrey Munk, Randall Linkous, William Goetzler, Matthew Guernsey, and Theo Kassuga. "Alternative refrigerant evaluation for high-ambient-temperature environments: R-22 and R-410A alternatives for mini-split air conditioners." ORNL/TM-2015-536. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2015. <https://doi.org/10.2172/1223676>.
  20. Abdelaziz, Omar, Munk, Jeffrey D., Shrestha, Som S., Linkous, Randall Lee, Goetzler, William, Guernsey, Matt, and Kassuga, Theo. "Alternative Refrigerant Evaluation for High-Ambient Temperature Environments: R-22 and R-410A Alternatives for Mini-Split Air Conditioners". ORNL/TM-2015/351. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2015. <https://doi.org/10.2172/1209213>.
  21. Shrestha, Som, Sharma, Vishaldeep, and Abdelaziz, Omar. "Test Report #33: Compressor Calorimeter Test of R-410A Alternative: R-32/R-134a Mixture Using a Scroll Compressor". Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2014. <https://doi.org/10.2172/1130959>.
  22. Shrestha, Som S, Sharma, Vishaldeep, and Abdelaziz, Omar. "Compressor Calorimeter Test of R-410A Alternative: R-32/134a Mixture Using a Scroll Compressor". ORNL/TM-2013/414. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2014. <https://doi.org/10.2172/1131502>.
  23. Baxter, Van D, Groll, Dr. Eckhard A., Abdelaziz, Omar, Shen, Bo, Groff, Mr. Gerald, Sikes, Karen, and Khowailed, Gannate. "IEA HPP Annex 41 Cold Climate Heat Pumps: Task 1 Report Literature and Technology Review". ORNL/TM-2013/472. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2013. <https://doi.org/10.2172/1097492>.
  24. Shrestha, Som S, Sharma, Vishaldeep, and Abdelaziz, Omar. "Compressor Calorimeter Test of R-404A Alternatives ARM-31a, D2Y-65, L-40, and R32 + R-134a Mixture using a Scroll Compressor". ORNL/TM-2013/156. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2013. <https://doi.org/10.2172/1089777>.
  25. Shrestha, Som S, Mahderekal, Isaac, Sharma, Vishaldeep, and Abdelaziz, Omar. "Compressor Calorimeter Test of R-410A Alternatives R-32, DR-5, and L-41a". ORNL/TM-2013/292. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2013. <https://doi.org/10.2172/1089800>.
  26. Sikes, Karen, Khowailed, Gannate, and Abdelaziz, Omar. "Preliminary Market Assessment for Cold Climate Heat Pumps". ORNL/TM-2011/422. Oak Ridge National Laboratory, Oak Ridge, TN, USA, 2011. <https://doi.org/10.2172/1038074>.

## PATENTS

1. Gao, Z., Abdelaziz, O., LaClair, T. L., "Portable refrigerant charge meter and method for determining the actual refrigerant charge in HVAC systems", US Patent number: 9726410, Date of Patent: 8/8/2017.
2. S. Moghaddam, D. Chugh, R. Nasr Isfahani, S. Bigham, A. Fazeli, D. Yu, M. Mortazavi, and O. Abdelaziz, Open Absorption Cycle for Combined Dehumidification, Water Heating, and Evaporating Cooling, WO2015116362 A1, US10151498B2.
3. Momen, A. M., Abdelaziz, O., Vineyard, E. A., "Magnetocaloric Refrigeration using Fully Solid-State Working Medium" US10443905B2
4. Bamdad Bahar, William Parmelee, Luyu Jin, Omar Abdelaziz Ahmed Abdelaziz, "Heat pumps utilizing ionic liquid desiccant", US10386084B2

5. Bo Shen, Edward Allan Vineyard, Omar Abdelaziz, “Method and device for controlling heat pump”, US10598418B2
6. Ayyoub Mehdizadeh Momen, Kyle J. Gluesenkamp, Omar A. Abdelaziz, Edward A. Vineyard, Ahmed Abu-Heiba, Adewale O. Odukamaiya, “Near isothermal combined compressed gas/pumped-hydro electricity storage with waste heat recovery capabilities”, US10519923B2

## **INVENTION DISCLOSURES**

1. Flexible–Actively Controlled Heat Exchanger Based on Thin–Film Technology; University of Maryland PS-2007-051.
2. Compact Mini–Channel Heat Exchangers; University of Maryland PS-2007-116.
3. A New Multiscale Approach to Design Novel Heat Exchangers; University of Maryland PS-2008-033.
4. Absorption Heat Pump Water Heater; Oak Ridge National Laboratory IDSA 2389 2010 – Provisional Patent filed.
5. O. Abdelaziz, R. Radermacher, Integrated Hot/Cold Thermal Battery for Direct Air Heating/Cooling, DOE S-Number: S-124,218; ORNL Invention Disclosure Number: 201102660 and University of Maryland PS-2011-065 – Provisional Patent filed; UMD Invention of the Year Finalist.
6. S. Graham Jr., A. Mallow, O. Abdelaziz, K. Kalaitzidou, Stability Enhancement of Paraffin/Exfoliated Graphite Nanoplatelet Composites for Latent Heat Thermal Storage Systems, DOE S-Number S-124,501, ORNL Invention Disclosure Number: 201202927 and GTRC ID 6185.
7. O. Abdelaziz, Counter Flow Heat Storage and Recovery System, DOE S-Number: S-124,399; ORNL Invention Disclosure Number: 201202831
8. O. Abdelaziz, P. Garland, M. Qu, H. Yin, Heat Recovery Absorption Heat Pump, DOE S-Number: S-124,500; ORNL Invention Disclosure Number: 201202926, PRF Reference #2013-QU-66354.
9. O. Abdelaziz, R. Radermacher, J. Ling, Heat Pump Thermal Storage Systems, DOE S-Number: S-124,719; ORNL Invention Disclosure Number: 201303131
10. K. Gluesenkamp, O. Abdelaziz, Back-to-Back Rotating Heat Exchangers for High Performance Air-to-Air Heat Transfer, DOE S-Number: S-124,781; ORNL Invention Disclosure Number: 201303190
11. A. Mehdizadeh Momen, E. A. Vineyard, K. Gluesenkamp, O. Abdelaziz, High-Efficiency Ground-Level Pumped-Hydro Electricity Storage, DOE S-Number: S-124,766; ORNL Invention Disclosure Number: 201303175
12. Open Absorption Cycle for Combined Dehumidification, Water Heating, and Evaporative Cooling, UF#14820; (UT-Battelle Invention Number 20133130)
13. Heat Pump Thermal Storage Systems, UT-Battelle Invention Number 201303131
14. A. Mehdizadeh Momen, O. Abdelaziz, Sandia Heat Exchanger Modification for Condenser Applications, DOE S-Number: S-124,839; ORNL Invention Disclosure Number: 201403230
15. A. Mehdizadeh Momen, O. Abdelaziz, Sandia Heat Exchanger Modification for Evaporator Applications, DOE S-Number: S-124,840; ORNL Invention Disclosure Number: 201403231
16. A. Mehdizadeh Momen, E. A. Vineyard, O. Abdelaziz, Magnetocaloric Refrigeration using Solid Working Medium, DOE S-Number: S-124,874; ORNL Invention Disclosure Number: 201403263

17. A. Mehdizadeh Momen, K. Gluesenkamp, O. Abdelaziz, E. A. Vineyard, S. Shrestha, Heating-Cooling Bed Integrated with the Smart Building's Heating/Air Conditioning Controller, DOE S-Number: S-124,880; ORNL Invention Disclosure Number: 201403269
18. A. Mehdizadeh Momen, E. A. Vineyard, O. Abdelaziz, K. Gluesenkamp, Thermal Storage in Primary Battery with Waste Heat Recovery for Climate Control Load Reduction in BEVs, DOE S-Number: S-124,883; ORNL Invention Disclosure Number: 201403272
19. M. Starke, O. Abdelaziz, R. Jackson, L.M. Tolbert, B. Johnson, Residential Energy Demand and Demand Response Estimation Tool, DOE S-Number: S-124,929; ORNL Invention Disclosure Number: 201403314
20. Z. Gao, O. Abdelaziz and T. J. LaClair, "A Digital, Non-Intrusive Refrigerant Charge Meter for HVAC Systems", DOE S-138,081; ORNL Invention Disclosure Number: 201503452
21. O. Abdelaziz, K. Gluesenkamp, and A. Mehdizadeh Momen, "Separate Sensible and Latent Cooling Using Single Rotating Device with Multiple Fluids", DOE S-138,111; ORNL Invention Disclosure Number: 201503480
22. W. G. Carter, O. Rios, Z. C. Sims and O. Abdelaziz, "Direct Write Additive Manufacturing Method for Heat Exchanger Production Using Al-Ce-X Alloys", DOE S-138,144; ORNL Invention Disclosure Number: 201503512
23. W. G. Carter, O. Rios, Z. C. Sims and O. Abdelaziz, "Electromagnetic Print Nozzle and Power Supply for Direct Write Metallic Additive Manufacturing", DOE S-138,177; ORNL Invention Disclosure Number: 201503545
24. O. Abdelaziz, K. R. Gluesenkamp, A. Mehdizadeh Momen, S. S. Shrestha and E. A. Vineyard, "Heating-Cooling Bed Integrated with the Smart Building's Heating/Air Conditioning Controller", DOE S-124,880; ORNL Invention Disclosure Number: 201403269
25. O. Abdelaziz and A. Mehdizadeh Momen, "Sandia Heat Exchanger Modification for Condenser Applications", DOE S-124,839; ORNL Invention Disclosure Number: 201403230
26. O. Abdelaziz and A. Mehdizadeh Momen, "Sandia Heat Exchanger Modification for Evaporator Applications", DOE S-124,840; ORNL Invention Disclosure Number: 201403231
27. K. R. Gluesenkamp, O. Abdelaziz and M. R. Ally, "Separate Sensible and Latent Cooling with Combined Closed and Open Absorption Cycles", DOE S-138,270; ORNL Invention Disclosure Number: 201603631
28. W. G. Carter, O. Rios, Z. C. Sims and O. Abdelaziz, "Induction Power Supply for Direct Write Metallic Additive Manufacturing", DOE S-138,279; ORNL Invention Disclosure Number: 201603640
29. A. Mehdizadeh Momen, K. R. Gluesenkamp, K. R. Birdwell and O. Abdelaziz, "Inflatable Tunnel for Coolings (ITCools)", DOE S-138,348; ORNL Invention Disclosure Number: 201603706,
30. O. Abdelaziz, A. Mallow, and A. Mehdizadeh Momen, "Developing High Performance Composite Structure from Magnetocaloric Material and Graphite", DOE S-138,351; ORNL Invention Disclosure Number: 201603709
31. B. Shen and O. Abdelaziz, "Methods and Systems to Evaporate Condensate Water from a Rooftop Air Conditioner", DOE S-138,370; ORNL Invention Disclosure Number: 201603725

32. B. Shen, C. K. Rice, O. Abdelaziz and V. Baxter, "System Configuration and Control Strategy of an Air Source Heat Pump Using Tandem Vapor-Injection Compressors", DOE S-NUMBER: S-138,386; ORNL Invention Disclosure Number: 201603739