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Engineering & Scientific Consulting

Amir Jokar, Ph.D., P.E., CFEI, ASHRAE Fellow

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Professional Profile

Dr. Jokar specializes in thermodynamics, fluid mechanics, heat transfer, and heating, ventilation, air-conditioning and refrigeration (HVAC&R) systems. He has more than 22 years of work experience both in industry and academia.

At Exponent, Dr. Jokar has worked on a variety of projects with applications related to air conditioning and refrigeration systems, including low Global Warming Potential (GWP) flammable refrigerants, data center cooling and ventilation, geothermal HVAC systems, compressor failures, refrigerators and vending machines, supermarket and industrial coolers and freezers, food facility ammonia systems, heat transfer equipment, valve design, natural gas and solar power generation plants, boilers, furnaces, kitchen ovens, household washers and dryers, hot water heaters, pipe freezes and bursts, and insulation materials.

Dr. Jokar has extensively investigated and assessed smoke and thermal damage and fire particulate (e.g., ash, char, soot) distribution and contamination from wildfires and structure fires, as well as their impact on building materials and contents. He has also collaborated on other multi-disciplinary projects involving residential and industrial fires, vehicle thermal failures, carbon monoxide poisoning, mold/odor issues in automotive and residential cooling systems, thermal management of electronics and power cables, heat transfer analysis of burn injuries, and oil refinery design and contamination issues. His work experience includes experimentation as well as simulation using computational thermal/fluid dynamics (CFD) techniques. He has testifying experience with several cases in and out of the state of California.

In academia, Dr. Jokar conducted research for industry-sponsored projects and obtained competitive grants as the principal investigator. He conducted an experimental study of carbon dioxide condensation in chevron-angle plate geometry exchangers sponsored by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), as well as a computational analysis and experimental design of a microchannel electronics cooler for high-power semiconductor diode laser applications sponsored by Washington Technology Center. Dr. Jokar also conducted comprehensive research during his doctoral study to evaluate and analyze a dual-loop automotive heat pump-air conditioning system. He was the recipient of the ASHRAE New Investigator Award to study heat transfer and fluid flow of nanofluids in micro/mini-channel heat exchangers. He developed several courses and labs on thermo/fluids, including advanced courses on thermal systems and electronics cooling.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Kansas State University, 2004

M.S., Mechanical Engineering, Amirkabir University of Technology, Iran, 1998

B.S., Mechanical Engineering, Sharif University of Technology, Iran, 1995

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Fellow, American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), 2026

Distinguished Service Award (DSA), American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), 2017

New Investigator Award, American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), 2009

Instructor Award, Mechanical Engineering, Kansas State University, 2004

Licenses and Certifications

Professional Engineer Mechanical, California, #35422

40-Hour Hazardous Waste Operation and Emergency Response Certification (HAZWOPER)

Certified Fire and Explosion Investigator (CFEI)

Professional Affiliations

American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Committee Member

• Technical Activities Committee (TAC) section 1 head, 2015-2019

• TC 1.3; Heat Transfer and Fluid Flow (chair 2013-2015, vice chair 2013-2015, vice chair 2011- 2013, program subcommittee chair 2008-2011, voting/corresponding member since 2011)

• TC 8.5; Liquid to Refrigerant Heat Exchangers (chair 2008-2010, program subcommittee chair 2005-2008, voting/corresponding member since 2011)

• TC 8.4; Air-to-Refrigerant Heat Transfer Equipment (corresponding member since 2011)

• TC 5.6; Control of Fire and Smoke (corresponding member since 2011)

• TC 1.13; Optimization (corresponding member since 2009)

• TC 3.1; Refrigerants and Secondary Coolants (corresponding member since 2014)

• SSPC 188 (Standard); Legionellosis: Risk Management for Building Water Systems (2020-2024)

• Local Chapter, Orange Empire, CA (2012-present)

American Society of Mechanical Engineers (ASME) Committee Member

• Associate Editor; Journal of Thermal Science and Engineering Applications (2015-2019)

• HTD K10; Heat Transfer Equipment (2007-present)

• HTD K16; Heat Transfer in Electronic Equipment (2008-2010)

• Local Chapter, Orange County, CA (2012-present)

National Fire Protection Association (NFPA)

• NFPA 87; Standard for Fluid Heaters (member since 2012)

American Society of Automotive Engineers (SAE), member since 2001

International Association of Wildland Fire (IAWF), member since 2016

Associate Editor: Heat Transfer Engineering, an International Journal (2020-present)

Languages

Persian

Publications

Jaimes D, Jokar A. New developments on investigating the ignition propensity of mildly-flammable refrigerants. Proceedings, ASHRAE Annual Conference, art no. IN-24-C032, Indianapolis, IN, 2024.

Shokrabadi M, Shusto L, Hunt J, Jokar A, Osteraas J. Investigation techniques and analysis of damage patterns in building structures due to wildfires. Proceedings, 10th Congress on Forensic Engineering, pp. 390-400, Seattle, WA, 2024.

Jokar A, Posson M, Malzahn D. Wildfire particulate deposition investigation and assessment in buildings. Proceedings, Fire and Climate Conference by International Association of Wildland Fire, Pasadena, CA, 2022.

Jokar A, O'Hern S, Anderson D, Cundy M, Ogle R. Flammable Refrigerants: performance comparison, safeties and lessons learned. Proceedings, ASHRAE Winter Conference, art no. AT-2019-C063, Atlanta, GA, 2019.

Jokar A, Wade RL, Posson M, Bennett P. Impact of wildfire particulate on common building materials. Proceedings, 2nd International Smoke Symposium, art. no. 3807, Long Beach, CA, 2016.

Jokar A, Christiansen EW, Reza A. Refrigeration systems failures due to sudden evaporation and condensation phenomena. Proceedings, ASHRAE Annual Conference, art. no. SE-14-C015, Seattle, WA, 2014.

Wade RL, Jokar A, Cydzik K, Dershowitz A, Bronstein R. Wildland fire ash and particulate distribution in adjacent residential areas. International Journal of Wildland Fire 2013; 22 (8):1078-1082.

Jokar A, O'Halloran SP. Heat transfer and fluid flow analysis of nanofluids in corrugated plate heat exchangers using computational fluid dynamics simulation. Journal of Thermal Science and Engineering Applications 2013; 5 (1), art. no. 011002.

Ayub Z, Khan MS, Jokar A, Khan TS, Hayes N. Recent developments in plate exchangers - Ammonia/Carbon Dioxide cascade condensers. Heat Transfer Engineering 2013; 34 (5-6): 401-408.

Jokar A, Christiansen EW. Condensation induced shock in thermal/fluid systems. ASME Heat Transfer/Fluids Engineering Summer Conference; HT2012, art. no. 58117, Puerto Rico, USA, 2012.

Jokar A, Wade RL, Tu WJ. Effects of wildfire ash on thermal performance of attic insulation batts. Proceedings, ASME Heat Transfer/Fluids Engineering Summer Conference; HT2012: art. no. 58118, Puerto Rico, USA, 2012.

Hayes N, Jokar A, Ayub Z. Study of carbon dioxide condensation in Chevron plate exchangers; Pressure drop analysis. International Journal of Heat and Mass Transfer 2012; 55:2916-2925.

Hayes N, Jokar A, Ayub Z. Study of carbon dioxide condensation in Chevron plate exchangers: Heat transfer analysis. International Journal of Heat and Mass Transfer 2011; 54:1121-1131.

O'Halloran S, Jokar A. CFD simulation of single-phase flow in plate heat exchangers. ASHRAE Transactions 2011; 117 (Part 1): 147-155.

Jokar A. Thermal/fluid systems design with an innovative teaching method. International Journal of Mechanical Engineering Education 2011; 39(4):275-290.

Dix J, Jokar A. Fluid and thermal analysis of a microchannel electronics cooler using computational fluid dynamics. Applied Thermal Engineering 2010; 30(8-9):948-961.

Jokar A, Eckels SJ, Hosni MH. Single phase flow in mesochannel compact heat exchangers for air conditioning applications. Heat Transfer Engineering 2010; 31(1):3-16.

Jokar A, Solovitz S. Thermo/fluids curriculum development in a new mechanical engineering program. Proceedings, ASME International Mechanical Engineering Congress; IMECE2010, art. no. 37001(6): 155-162, Vancouver, BC, Canada 2010.

Jokar A, Hayes N, Ayub Z. Recent developments in CO2 cascade condensers. Proceedings, Sustainable Refrigeration and Heat Pump Technology Conference (International Institute of Refrigeration), Stockholm, Sweden, 2010.

Solovitz S, Jokar A. Micro-particle image velocimetry visualization of water flow in a complex micro-heat exchanger. Journal of Flow Visualization and Image Processing 2009; 16(3):221-236.

Hayes N, Jokar A. Dynalene/water correlations to be used for condensation of CO2 in Brazed Plate Heat Exchangers. ASHRAE Transactions 2009; 115(2):599-616.

Cortez M, Jokar A. Development and testing of a prototype heat sink within a wind tunnel for use in an engineering course. Proceedings, ASME International Mechanical Engineering Congress; IMECE2009, art. no. 12084 (9-Part B): 983-989, Lake Buena Vista, FL, 2009.

Saffaraval F, Jokar A. Development of an R245fa electronics cooling system for high heat flux applications. Proceedings, ASME International Mechanical Engineering Congress; IMECE2009, art. no. 12076 (9-Part C): 1741-1747, Lake Buena Vista, FL, 2009.

Suffield S, Jokar A. Modeling the flow of a liquid droplet diffusing into various porous media for inkjet printing applications. Proceedings, ASME International Mechanical Engineering Congress; IMECE2008, art. no. 68151 (10-Part B): 1013-1022, Boston, MA, 2008.

Dix J, Jokar A, Martinsen R. Enhanced microchannel cooling for high-power semiconductor diode lasers. Proceedings, SPIE Photonics West Conference; LASE2008-6876: art. no. 687606, San Jose, CA, 2008.

Dix J, Jokar A, Martinsen R. A microchannel heat exchanger for electronics cooling applications. Proceedings, 6th International Conference on Nanochannels, Microchannels, and Minichannels; ICNMM2008 (Part B):1935-1936, Darmstadt, Germany, 2008.

Jokar A, Hosni MH, Eckels SJ. Mesochannel compact heat exchangers for automotive air conditioning applications. Proceedings, 6th International Conference on Nanochannels, Microchannels, and Minichannels; ICNMM2008 (Part B): 1937-1938, Darmstadt, Germany, 2008.

Jokar A. A hands-on approach to teaching thermal systems design. Proceedings, ASME International Mechanical Engineering Congress; IMECE2007, art. no. 41540 (7): 163-171, Seattle, WA, 2007.

Dix J, Jokar A, Martinsen R. Computational modeling for a microchannel electronics cooler. Proceedings, ASME International Mechanical Engineering Congress; IMECE2007, art. no. 42971 (5): 87-94, Seattle, WA, 2007.

Jokar A, Hosni MH, Eckels SJ. Dimensional analysis for the evaporation and condensation of refrigerant R134a in minichannel plate heat exchangers. Applied Thermal Engineering 2006; 26: 2287-2300.

Jokar A. Integration of computational fluid dynamics and experimentation in undergraduate fluid mechanics. Proceedings, ASME International Mechanical Engineering Congress; IMECE2006, art. no. 15256 (Mechanical Engineering Education), Chicago, IL, 2006.

Jokar A, Eckels SJ, Hosni MH. New generation integrated automotive thermal system. SAE Future Transportation Technology Conference; FTT, art. no. 01-3476, Chicago, IL, 2005.

Jokar A, Hosni MH, Eckels SJ. Correlations for heat transfer and pressure drop of glycol-water and air flows in minichannel heat exchangers. ASHRAE Transactions 2005; 111(2):213-224.

Jokar A, Hosni MH, Eckels SJ. Themal-fluid characteristics of an automotive radiator used as the external heat exchanger in an auto air conditioning system. Proceedings, ASME Heat Transfer Summer Conference; HT2005, art. no. 72061 (4): 315-323, San Francisco, CA, 2005.

Jokar A, Hosni MH, Eckels SJ. A heat pump for automotive applications. 8th International Energy Agency Heat Pump Conference, Session: 7, Las Vegas, NV, 2005.(Published in IEA-HP newsletter 2005; 22).

Jokar A, Eckels SJ, Hosni MH, Gielda TP. Condensation heat transfer and pressure drop of the brazed plate heat exchangers using R134a. Journal of Enhanced Heat Transfer 2004; 11(2):161-182.

Jokar A, Eckels SJ, Hosni MH. Thermo-hydrodynamic of the evaporation of refrigerant R134a in brazed plate heat exchangers. Proceedings, ASME Heat Transfer/Fluids Engineering Summer Conference; HT-FED04, art. no. 56573(3):211-220, Charlotte, NC, 2004.

Jokar A, Eckels SJ, Hosni MH. Evaluation of heat transfer and pressure drop for the heater-core in an automotive heat pump system. Proceedings, ASME International Mechanical Engineering Congress; IMECE2004, art. no. 60824 (375-2):57-65, Anaheim, CA, 2004.

Peer Reviews

National Science Foundation Panelist, Thermal Transport Processes

Heat Transfer Engineering (Associate Editor; 2020-present)

Journal of Thermal Science and Engineering Applications (Associate Editor; 2015-2019)

Applied Thermal Engineering

Journal of Heat Transfer

Heat Transfer Research

Experimental Thermal and Fluid Science

Journal of Enhanced Heat Transfer

Journal of Electronic Packaging

International Journal of Refrigeration

Chemical Papers, International Journal

International Journal of Energy

Energy Conversion and Management

Special Topics & Reviews in Porous Media, An International Journal

Conferences: ASHRAE, ASME, ASEE, ITherm, InterPACK, HEFAT