Aiman Alshare, PhD
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Education

Ph.D. in Mechanical Engineering, May 2007
University of Minnesota-Twin cities, Minneapolis, Minnesota

M.S. in Mechanical Engineering, May 1989
South Dakota State University, Brookings, South Dakota

B.S. in Mechanical Engineering, May 1987
South Dakota State University, Brookings, South Dakota
Minor: Mathematics

Industrial Experience

Quality Engineer Oct 2001-Mar 2002
Twin City Die Castings Company, Minneapolis, MN

- Responsible for Polaris engines casts NCR's and customer quality issues.
- Collaboration with process engineering and tool-room in implementing containment, corrective and preventative actions
- Development of FMEA, control plans and in-process procedure for new products.

Measurement and Quality Engineer April 2001-March 2002
Hutchinson Technology Inc, Plymouth, Minnesota

- Project Leader for the development of in-process vision inspection system through coordinating the activities of machine design, controls, and machine vision engineering. Tasks include determination of equipment design specification, timeline, budget, and concept prototyping
- Research and evaluate new technologies for continual improvement of measurement systems capabilities
- Utilizing the NCR system and working with process engineering to find root cause and implement containment and corrective actions
- Improvement of process capabilities and utilizing statistical quality tools and capability indices.

- Anchor for internal and external customer interface

Process Development Engineer Sep 1992-Aug1995
Hutchinson Technology Inc, Hutchinson, Minnesota

- Development of processes, equipment, and tooling for new suspension assemblies
- Participated in cross-functional design team to assure that the new product meet cost, capability and output goals
- Development of project plans with justification, objectives, benchmarks, critical reviews, deliverables, completion criteria and time line
- Trained manufacturing on new processes, equipment, and tooling
- Research and application of new technologies to meet new product lines and measurement needs
- Mentor and trainer of two co-op students

Teaching Experience

Teaching

German-Jordanian University, Amman, Jordan

Auto CAD, Thermodynamics, Fluid Mechanics, Heat Transfer, Probability and Statistics for Engineers Sep 2008-Oct 2009

Pneumatics and Hydraulics, Thermodynamics, Fluid Mechanics, Heat Transfer, Instrumentation and Measurements Lab Sep 2010- June 2015

Teaching Assistant

Department of Mechanical Engineering, University of Minnesota, Minneapolis, MN

- Thermodynamics, fluid mechanics, heat transfer, and

  Gas turbines April 2002-May 2007

- Numerical heat transfer and fluid flow I, II, and III (Patankar CFD series) and Thermal-fluid courses Sep 1996- April 2000

Department of Mathematics, University of Minnesota, Minneapolis, MN

- Industrial Mathematics I & II and calculus. Sep 1998- April 2000

Department of Mechanical Engineering, South Dakota State University, Brookings, SD Jan 1987-May 1989

- Thermodynamics, fluid mechanics, and heat transfer, computer application in Mechanical engineering

Military Experience

Jordan Armed Forces *March 1990-Jan 1992*

- Teaching assistant, Jordan University of Science and Technology (one year)

Administrative Experience

- Mechatronics Department Chair, School of Technical Sciences, German Jordanian University Oct 2010-Oct 2011

Research Experience

Post Doctoral Associate, *May 2007- Aug 2008*
Research Associate *Oct 2009- Aug 2010*

- Modeling of passive micro mixers for lab on chip applications
- Modeling of gaseous slip flow and heat transfer in wavy microchannel and microcavities for MEMS applications.

- Modeling and experiments of liquid flow in passive micromixer for Lab-on-chip applications.

- Hourly dynamic simulations of solar ejector cooling system.

- Investigation of temperature regulation of rooftop photovoltaic panels by simulating flows and heat transfer in inclined channels.

- Modeling of separation control using plasma actuators on low-pressure turbine airfoil with passing wakes.

- Modeling the fluid mechanics in solar hydrogen reactor. The hydrolysis process is a second step of the solar reactor, which the production of hydrogen by splitting the steam using Zinc nanoparticles

- Mentor and trainer of Master thesis student from the Swiss Federal Institute of Technology (ETH) Modeling 2nd step in thermo chemical cycle.

- Cooling of Building integrated photovoltaic: Experiment and Simulation

- Investigation of stenosis steady and pulsatile flow in arteries subjected to magnetic field

- Biogas production from animal and solid waste by anaerobic conversion process

- Investigation of low Reynolds number flows through micro-orifices using Volume of Fluid Model (VOF) for utilization of vegetable oil as alternative fuel

Research Assistant *April 2002-May 2007*

- Developing a code, based on finite volume for micro-scale and macro-scale simulation of fluid flow and heat transfer in large scale equipment utilizing a homogeneous Porous Continuum Model (PCM)

- Applying Direct Numerical Simulation on Continuum Model (CM) to validate the solutions obtained using PCM

Journal & Refereed Papers

Computational Modeling of Gaseous Flow and Heat Transfer in a Wavy Microchannel, **Aiman Alshare**, Wael Al-Kouz, Suhil Kiwan, Ammar Al-Khalidi, Montasir Hader, Jordan Journal of Mechanical and Industrial Engineering, 2016, Inpress.

Simulations of Magnetohemodynamics in Stenosed Arteries in Diabetic or Anemic Models, **Aiman Alshare**, Bourhan Tastoush, Computational and Mathematical Methods in Medicine, 2016, Article ID 8123930, 13 pages.

Passive Micromixers with Interlocking Semi-Circle and Omega-Shaped Modules: Experiments and Simulations, Ala'aldeen Al-Halhouli, **Aiman Alshare**, Mukeet Mohsen, Maher Matar, Andreas Dietze and Stephanus Büttgenbach, Micromahcines, 2015, 6, pp.953-968.

Hourly dynamic simulation of solar ejector cooling system, Bourhan Tashtoush, **Aiman Alshare**, Saja Al-Rifai, Energy Conversion and Management, Vol. 100, August, 2105, Pages, 288-299.

Performance study of ejector cooling cycle at critical mode under superheated primary flow, Bourhan Tashtoush, **Aiman Alshare**, Saja Al-Rifai, Energy Conversion and Management, Vol 94, April 2015, Pages, 300-310.

The potential of using olive cake in power generation in Palestinian territories, Tareq Abu Hamed, Linda Ismail, **Aiman Alshare**, International Journal of Sustainable Energy, March 2015.

Computational modeling of non-Newtonian blood flow through stenosed arteries in the presence of magnetic field, **Aiman Alshare**, Bourhan Tashtoush, Hossam Khaleel, ASME Journal of Biomechanical Engineering, Volume 135, Issue 11, Pages 114503-114509, September 2013.

Modeling of Unsteady and Steady Fluid Flow, Heat Transfer, and Dispersion in Porous Media Using Unit Scale, **Aiman Alshare**, Paul J. Strykowski, Terry W. Simon, International Journal of Heat and Mass Transfer, Volume 53, Issues 9-10, Pages 2294-2310, April 2010.

Simulation of Flow and Heat Transfer in a Serpentine Heat Exchangers Having Dispersed Resistance with Porous-Continuum and Continuum Models, **Aiman Alshare**, Terry W. Simon, and Paul J. Strykowski, International Journal of Heat and Mass Transfer, Volume 53, Issues 5-6, Pages 1088-1099, February 2010.

Composite Relation for Laminar Free Convection in Inclined Channels with Uniform Heat Flux Boundaries, Gur Mittelman, **Aiman Alshare**, Jane Davidson, International Journal of Heat and Mass Transfer, Volume 52, Issues 21-22, Pages 4689-4694, October 2009.

A Model and Heat Transfer Correlation for Rooftop Integrated Photovoltaics with a Passive Air Cooling Channel, Gur Mittelman, **Aiman Alshare**, Jane H. Davidson, Solar Energy, Volume 83, Issue 8, Pages 1150-1160, August 2009.

Study of a Quench Device for Synthesis and Hydrolysis of Zn Nanoparticles: Modeling and Experiments, Tareq Abu Hamed, Luke Venstrom, **Aiman Alshare**, Marc Brülhart, and Jane H. Davidson. Journal of Solar Energy Engineering, Volume 131, Issue 3, 031018, August 2009.

Conference Papers

Passive Cooling of Building Integrated Photovoltaic: Experiment and Modeling, **Aiman Alshare**, Tareq Abu Hamed,ISES-Europe solar Conference, September, 2012, Rijeka, Croatia.

Design of a Quench Device for Simultaneous Synthesis and Hydrolysis of Zn Nanoparticles: Flow Modeling and Initial Experiments, **Aiman Alshare**, Tareq Abu Hamed, Marc Brülhart, and Jane H. Davidson (Submitted February 2008 to ASME 2nd International Conference on Energy Sustainability, August 2008, Jacksonville, FL, USA)

Passive Cooling of Rooftop Integrated Photovoltaics, Gur Mittelman, **Aiman Alshare**, Jane H. Davidson (American Solar Energy Society, Solar 2008 conference, May 2008, San Diego, CA, USA)

Reports

Separation Control using Plasma Actuators on Low-Pressure Turbine Airfoils with Low-Pressure Turbine Airfoils with Passing Wakes, Terrence Simon, Uwe Korshagen, Douglas Ernie, **Aiman Alshare**, Guang Yang, Debashish Burman, Meenakshi Mamunuru, DartKen Poon, Song Guo, NASA Glenn Research Center-Annual Report, January-December 2007

Presentations & Posters

Photovoltaic deployment prospects and regulatory challenges in Jordan, **Aiman Alshare**, EMIS FORUM, Solar Energy and Energy Efficiency, June 25-26th, 2012 Tunis, Tunisia

Frontiers of Chemical Sciences V, Research and Education in the Middle East, Malta Conference Foundation, UNESCO, Dec. 4-9, 2011, Paris, France.

A Two-step Solar Thermochemical Process to Produce Hydrogen From Water. Luke Venstrom, Julia Haltiwanger, Tareq AbuHamed, **Aiman Alshare**, Marc Brülhart, and Jane Davidson. The Midwest's Premier Energy, Economic and Enviromental Conference,University of Minnesota, Minneapolis, Minnesota November 10, 2008

Synthesis and Hyrdrolosis of Zinc Nano-particles: A Study of Quench Device Modeling and Experiments. **Aiman Alshare**, Tareq AbuHamed, Julia Haltiwanger, Luke Venstrom, Marc Brülhart, and Jane Davidson. Nanostructured Advanced Materials, University of Jordan, Amman, Jordan, National Science Foundation, Washington, DC November 10-13, 2008.

Solar Thermochemical Hydrogen via a 2-step Water Splitting Cycle. Tareq AbuHamed, Julia Haltiwanger, **Aiman Alshare**, Luke Venstrom, Marc Brülhart, and Jane Davidson. The Midewest's Premier Energy, Economic and Environment Conference, November 2007, Minneapolis, MN, USA

Microscopic and Macroscopic Modeling of Fluid Flow and Heat Transfer in Spatially Periodic Porous Media, **Aiman Alshare**, Terry W. Simon, Paul J. Strykowski, Institute of Technology poster, June 2006, University of Minnesota, Minneapolis, MN, USA

Microscopic Simulation of Fluid Flow and Heat Transfer in Isotropic and Anisotropic Porous Media, **Aiman Alshare**, Terry W. Simon, Paul J. Strykowski, Institute of Technology poster, June 2005, University of Minnesota, Minneapolis, MN, USA

Advising

Co-advisor, "Dynamic hourly simulations of solar ejector cooling system for Jordanian climate using TRNSYS. M.S. thesis, January 2015, Jordan University of Science and Technology, Irbid, Jordan

PROGRAMMING/SOFTWARE SKILLS
Workbench products (ANSYS, FLUENT, FE Modeler) COMSOL multiphysics, TRNSYS, EES and GAMBIT
FORTRAN, C++, MATLAB, TECPLOT, LATEX
Statistical: MININTAB, Statgraphics
Skills in Statistical Process Control, Design and Analysis of Experiments, Taguchi DOE, Regression Analysis, Measurement System Analysis, Gage R&R, Quality Philosophy and Tools.
Project Management, Basic Supervision, Machine Vision I, II, Machine Vision Optics and Light, GD &T, FMEA, Control Plans, ASQ Inspection Audit Plans.

Teaching Experience
Teaching: Thermodynamics, Fluid Mechanics, Heat Transfer, Hydraulics and Pneumatics, Measurements and Instrumentation lab, AutoCAd, Probability and Statistics for Engineers, Gas Turbines.
Teaching Assistant: Thermodynamics, Fluid Mechanics, Heat Transfer, Gas Turbines, Numerical Heat Transfer and Fluid Flow I, II, and III (CFD graduate level series)

Current Research Interests
Renewable Energy: Air solar heater simulation and experiments. Solar ejector cooling experiments. Simulation of double glazed trough receiver. Modeling of solar cavity receiver. Assessment of biogas potential in Jordan. Turbulent modeling of ejector performance. Gaseous flow in microchannels and cavities. Liquid passive micromixers.

Biomedical: Modeling of pulsatile flow in arteries subjected to magnetic field. Cancerous tissue therapy via nanoparticle heating

Joint supported projects

Jordan University of Science and Technology, Co-PI, *Passive Solar ejector cooling system, simulations and experiments. 2014-current (105,000 JD budget)*