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## Dr. Atia E. Khalifa

Professor

Mechanical Engineering Department, Interdisciplinary Research Center for Renewable Energy and Power Systems (IRC-REPS)

King Fahd University of Petroleum & Minerals, Dhahran Saudi Arabia

### Executive Summary:

Experimental and the theoretical research on water desalination with focus on membrane distillation and humidification-dehumidification processes, renewable energy utilization, solar cooling, pumping machinery, flow induced instabilities, leak detection in pipelines, internal combustion engines and oxy-combustion. My research work ( experimental, analytical, and simulation) aims to serve the society by developing new processes or products for better human life. Exploring new techniques and testing new ideas are the focus of my research to impact the community. Training the graduate and undergraduate students remains a goal of my activities. In addition, research activities and experience are used in teaching for better educational outcomes.

### Education:

- PhD Mechanical Engineering, King Fahd University of Petroleum & Minerals (KFUPM), Dhahran Saudi Arabia, 2009.
- MS Mechanical Engineering, King Saud University (KSU), Saudi Arabia, Riyadh, 2005.
- BS Mechanical Power Engineering, Menoufia University, Shebin El-Kom, Egypt, 1998.

## Distinguished Projects

1. Development of a Solar Cooling Absorption System for Space Cooling and Water Desalination
2. Integrated Membrane Distillation and Bubble Column Dehumidifier – A New Energy-efficient Solar-powered Water Desalination System.
3. Solar Multistage Water Gap Membrane Distillation System for Water Desalination-Performance and Optimization.
4. Innovative Flux-Enhanced Water Gap Membrane Distillation System for Water Desalination
5. Solar-Heated Multistage Membrane Distillation system for Water Desalination.
6. Fundamental Study on Seawater Desalination by Membrane Distillation - A New Emerging Technology.
7. Investigating the Effect of Impeller Blade Exit on Pressure Fluctuations inside a Double-Volute Pump.
8. Development of a dual-stage lean premixed (DLPM) burner of ultra-low emissions for gas turbine combustion applications.
9. Hybridization of MSF with HDH and MD Desalination Process for Performance Improvement and Mitigation of Environmental Impact.
10. Development Of Highly Efficient Membranes For Desalination Of Synthetic Produced Water.
11. Eco-Friendly Cleaning Methods for the Restoration of the Performance of Reverse Osmosis Membranes.
12. Innovative Sustainable Water Desalination system using a heat pump with conventional or solar energy.
13. Development of a carbon-free fire-tube boiler.
14. Combustion characteristics and Emissions of a HCCI-DI Diesel Engine Running with a Bio-Fuel Suitable for Saudi Arabian Environment.
15. Development of leak and contamination sensors for water pipeline networks, KFUPM-MIT joint projects.
16. Flow induced vibration analysis for boiler feed pump.

## Research Summary

- 30 Funded project
- 5 projects with industry
- 50 journal publications
- 20 international conferences
- 6 awarded US patents
- Advising 20 MS theses, and 5 PhD dissertation
- Reviewer for high impact international journals
- Short course, workshops, and research visits
- Seminars, presentations, and scientific meetings
- Undergraduate research committee and coordination
- College research committee
- Research consultancy- outside KFUPM
- Citations : 907
- H-Index : 16

## Skills and Expertise

- Water desalination, development of new designs and enhanced processes.
- Modelling and CFD simulations.
- Experimental Design and instrumentation.
- Sensing and Data acquisitions
- Energy Efficiency and cost analysis.
- Solar energy applications, modeling and testing.
- Thermal sciences and fluid mechanics
- Innovation and developments