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References:

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**4th INTERNATIONAL CONFERENCE ON
RENEWABLE ENERGY RESEARCH AND
APPLICATIONS (ICRERA 2025)
October 27–30, 2025, Vienna, AUSTRIA**

ASHRAF MOHAMED ZAKI JAHLAN

Assistant Lecturer

Minia University-Faculty of Engineering- Mechanical Power and Energy
Department.

EDUCATION

Minia University-Faculty of Engineering- Mechanical Power and Energy Department
2007 - [To] - 2012

[B.SC, Mechanical Power & Energy Dept. *I completed my bachelor's degree in
mechanical Power and Energy engineering with very good [2012 class, first rank with
Hons (84.22%)]*

Minia University-Faculty of Engineering-Mechanical Power and Energy
2012 - [To] - 2017

I obtained my MSc. degree in the field of Refrigeration and Air Conditioning
(Indirect Evaporative Cooling) on 15 of August 2017

King Fahd University of Petroleum and Minerals 9/2022 [to] until now
PhD candidate in Mechanical Engineering Department

WORK EXPERIENCE

Minia University, Demonstrator

2012-[To] - 2017

Minia University, Assistant Lecturer

2017-[To]-Until Now

Job-related skills

I have about 6 years of teaching many courses in Faculty of Engineering, Minia
University from November 2012 until the moment:

- Refrigeration and Air Conditioning (Specialization)
- Cryogenics
- Thermodynamics
- Renewable Energy
- Fluid Mechanics
- Hydraulic machines
- Heat transfer
- Industrial Ventilation
- Mechanical Drawing using Computer

Research Interest

Refrigeration and Air conditioning Processes, Prediction of Energy consumption
for Buildings (ML), Energy storage, HVAC- CFD Modeling

Summary:

Ashraf Mohamed Zaki Jahlan is a dedicated academic and researcher with a strong
foundation in mechanical power and energy engineering, reinforced by over a decade of
teaching and research experience at Minia University and ongoing Ph.D. studies at King
Fahd University of Petroleum and Minerals. His work demonstrates a deep commitment to
advancing energy efficiency, HVAC optimization, and the application of machine learning
in thermal systems. Through numerous publications in reputable journals and continuous
engagement in both experimental and computational research, he has contributed
significantly to the fields of indirect evaporative cooling and sustainable energy systems. His
professional journey reflects a balance of academic excellence, innovative research, and
a passion for developing solutions that address modern energy and environmental
challenges

Paper abstract:

Paper ID: 140

Paper title: Adaptive hybrid ANFIS-PSO approach for Indirect Evaporative Cooling
Performance Prediction

Nowadays, Sustainable strategies for reducing energy consumption are vital for green
development, with indirect evaporative cooling (IEC) systems offering an efficient
alternative for maintaining indoor thermal comfort. This study focuses on modeling the
performance of an IEC energy recovery counter flow system using intelligent neuro-fuzzy
techniques. Experimental data, collected under typical operating conditions in an air
conditioning laboratory, were enhanced with feature engineering based on inlet air
temperature, relative humidity, and air velocity. Two advanced models, standard Adaptive
Neuro-Fuzzy Inference System (ANFIS) and ANFIS optimized by Particle Swarm Optimization
(ANFIS-PSO) were developed and compared. Results demonstrate that ANFIS-PSO
significantly outperforms the classic ANFIS, achieving a test R^2 of 0.9916, MAE of 0.0151, and
RMSE of 0.0212. In contrast, the standard ANFIS achieved a test R^2 of 0.8136, MAE of 0.0666,
and RMSE of 0.0999. These findings highlight the effectiveness of PSO-based optimization in
improving model accuracy, emphasizing the practical value of the ANFIS-PSO model for
efficient IEC system design and operation in demanding climates.