Event: **Energy in Buildings Athens Conference 2024**
Date: Saturday November 23, 2023
Place: Grand Hyatt Athens, Hellas

ASHRAE
Hellenic Chapter

#	**Fotios Galanis** Mechanical Engineer, MSc

Title:	PhD Candidate, Applied Thermodynamics Laboratory, Thermal Section, School of Mechanical Engineering NTUA, Athens, Greece
email:	f.galanis@yahoo.gr •
Presentation title:	**Modelling and Experimental Evaluation of an Open Cycle Liquid Desiccant Dehumidification Unit**

In the face of climate change and the pressing need for sustainable solutions, liquid desiccant dehumidification systems (LDDs) present an eco-friendly and energy efficient alternative to conventional air-conditioning methods. Unlike traditional systems, which rely on high energy inputs and refrigerants with significant environmental impacts, LDDs innovative approach eliminates the need for harmful refrigerants and reduces energy consumption by utilizing environmentally benign desiccants, such as lithium chloride, combined renewable sources, such as solar heat, to efficiently control air humidity and temperature. Despite challenges like initial costs and maintenance requirements, ongoing research into optimization of such systems promises to enhance their use in various industrial and residential applications, where precise humidity control and energy efficiency are prioritized.

This study explores the performance of an open cycle liquid desiccant dehumidification system, experimentally validating a non-adiabatic model to predict system behavior. The model integrates advanced thermodynamic analysis, leveraging Python libraries such as iapws and Coolprops for accurate thermodynamic property calculation. Coupled with a data acquisition system employing temperature, humidity and pressure sensors, this setup ensures real-time monitoring and can be used for a calibration of system parameters.

In an era where sustainable building technologies are paramount, LDD's serve as a cornerstone towards greener air-conditioning. This work emphasizes the dual importance of robust modelling and advanced data acquisition methods in advancing the design and deployment of LDDs, contributing to a more sustainable future.

Short CV:	

- Exceptional Performance in the 2018 Panhellenic examinations (19098 points).
- Completed Studies in Mechanical Engineering in NTUA
- PhD candidate in the Laboratory of Applied Thermodynamics laboratory , Thermal Section, School of Mechanical Engineering ,NTUA
  - Research Topic: Modelling, Intelligent Control and Optimization of Micro-grids.
- Experience in techno-economic studies, SCADA design for HVAC systems, optimization techniques
- Multilingual (English C2, German C1, French B2)

CV:	

➢ Education

-*June 2018* Graduate of 2nd High School of Moschato
-*October 2018-October 2024* Pursued Mechanical Engineering Studies at National Technical University of Athens specializing in Ground and Air Transport Vehicles (Integrated Master)
Diploma Thesis: Development of a SCADA system for a LiCl Absorption Refrigeration system. Development and experimental Validation of a Non Adiabatic Model of the Dehumidifier and Regenerator
-*October 2024-Present* PhD Candidate in Applied Thermodynamics Lab, Thermal Section, School of Mechanical Engineering NTUA
Research topic: Modelling , Intelligent Control and Optimization of Micro-grids

➢ Language Skills

-Proficient in English-Level C2 (Michigan ECPE)
-Very good knowledge of German language-Level C1 (Goethe Zertifikat C1)
-Good knowledge of French language-Level B2 (DELF B2)

➢ Work Experience

-*1st September 2022-31st October 2022* Internship in Daikin Hellas, Heating Sector
Contrived a Techno-economic Study regarding the heating costs using various technologies for the winter of 2022-2023. The results of the study were presented in the General Assembly of Daikin Europe
-*October 2024-Present* Involved in EU-List Task 2.4 researching CO2 Assessment Methods for Higher Educational Institutions and Promoting Carbon Footprint Reduction Behaviors
-*September 2018-Present* Mathematics and Physics Teaching for high school students
Also worked for the Poukamisas Tutoring Group in the Department of Kallithea Tzitzifies from September 2023 until July 2024

➢ Digital Skills

-Proficient in MS Office
-Excellent user of Solidworks and LabVIEW software
-Remarkable knowledge of Python Programming Language , specifically for Thermodynamic Analysis and system optimization (libraries such as iapws ,Coolprops and PyTorch)
-Familiar with Matlab Simulink for control system design

➢ Additional Educational Activities

-Participated in Altium Designer for University Students Educational Program
-Attended Online Webinars for SCADA systems and PLC programming specifically for HVAC applications
- Performed Personal Projects using engineering software such as Solidworks, Simulink and LT Spice. ((Magnetic Levitation System using Hall Sensor, 3-D Design of a Quadcopter Drone Frame and Propeller based on Blade Element Theory)

➢ Remarkable Distinctions

-1st rank award in the Municipality of Moschato-Tavros Attica in the 2018 Panhellenic Examinations with a total score of 19098 points
-6th in admission ranking to the Department of Mechanical Engineering NTUA(2018)

➢ Personality

-Excellent communication skills
-Ability to work in team-based projects
-Methodical
-Eager to acquire new skills and knowledge
-Persistent in solving complicated problems and flexible in finding solutions

➢ Miscellaneous Activities

-Youth Bowling National Champion(May 2016)
-Musical Studies at Philippos Nakas Conservatory Story on Jazz Piano and Electric Guitar
-Extreme Sport enthusiast (Windsurfing ,Snowboarding)