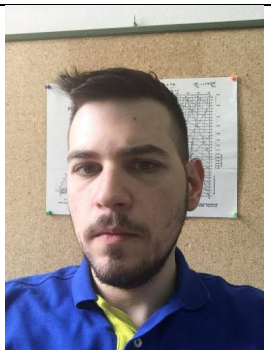
#	**Evangelos Bellos** Ph.D. in Mechanical Engineering (NTUA) Diploma in Mechanical Engineering (NTUA)	
Title:	Ph.D., Post-doctoral Researcher at Thermal Department of School of Mechanical Engineering in National Technical University of Athens, Greece	
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Presentation title:	**Yearly Performance of a Cogeneration System with Nanofluid-Based Thermal Photovoltaic Coupled to a Heat Pump**	

Solar-driven cogeneration system is a promising choice for the building sector in order to produce great amounts of heating and electricity. In this work, a thermal photovoltaic collector (PVT) is coupled to a heat pump which produces space-heating. The heat pump is fed with low-temperature heat input from the PVT, as well as with electricity from the PVT. The system is designed property in order to produce net electricity production for utilization in other applications. More specifically, the examined system includes 10 PVT modules with 2 m2 of collecting area each one while there is also a storage tank with a storage volume of 1 m3. The main innovation of this study is the investigation of nanofluid as the working fluid in the solar collector field. The use of nanofluid is able to enhance both the thermal and the electrical performance of the collector and consequently of the total system. In this work, the examined nanofluid is water/Cu with 2% nanoparticle (Cu) concentration in the base fluid (water). The system is optimized in steady-state conditions and also it is investigated on a daily basis. Six typical days are examined in order to examine typical days from the winter period from November to April. The last step in this work is the yearly evaluation of the examined system with and without nanofluids. The optimization of the system is performed using a multi-objective optimization procedure which utilizes the energy and eth exergy efficiency criteria. According to the final results, it is found that the use of nanofluid enhances the energy and exergy efficiency of the system. More specifically, the energy efficiency enhancement is 4.80% and the exergy efficiency enhancement is 0.66%. Furthermore, it is found that the seasonal space-heating production is 7423 kWh and the seasonal electricity production is 1068 kWh. The final results indicate that the use of nanofluids is an attractive choice for enhancing the performance (energetic and exergetic) of the solar-driven cogeneration systems in the building sector. The thermodynamic analysis is conducted with a developed model in Engineering Equation Solver (EES) while the dynamic modeling is performed by solving the differential equations of the storage tank during the daily operation.

CV:

Dr. Evangelos Bellos
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Education:

- Diploma in Mechanical Engineering, National Technical University of Athens, 2012, Grade: 9.61/10
- Ph.D. in the School of Mechanical Engineering, National Technical University of Athens, 2016. Title: Exploitation and optimization of solar thermal systems in buildings

Experience

- Post-doctoral Researcher in School of Mechanical Engineering at National Technical University of Athens (January 2017 - Today)
- Teaching assistance at the following course in in School of Mechanical Engineering at National Technical University of Athens from 2013: “Refrigeration basic principles” and “Thermal Behavior”.
- Internship in PPC Renewables (Ma-July 2012).

Research interests

- Thermal and optical analysis of concentrating solar collectors
- Optimization of solar thermal systems for building applications with emphasis in trigeneration systems
- Investigation of refrigeration, HVAC, electricity production system with emphasis in absorption chillers, heat pumps and Organic Rankine Cycle.

Scientific work

- 92 Publications in scientific journals and 32 publications in conference proceedings.
- Reviewer in 60 Journals with totally 650 reviews.
- Assistance in the supervision of 30 diploma thesis in School of Mechanical Engineering at National Technical University of Athens under the main supervision of C. Tzivanidis

Programming/Software knowledge
SolidWorks, SolidWorks Flow Simulation, TRNSYS, EES, FORTRAN, Microsoft Office, eQUEST, EES, COMSOL, Matlab

Scholarships/Awards

- Scholarship for post-doc research from Bodossaki foundation
- Dimitrios Chorafas Prize for the best PhD in year 2016 at National Technical University of Athens
- Scholarship for Ph.D studies from Onassis foundation
- 7 Awards for the performance as student at Mechanical Engineering.

Other information:

Member of ASHRAE, Member of Greek Technical Chamber, Member of ISES