Georgios Mavromatidis

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Education

2013–Present **PhD Candidate**, *Department of Architecture, Chair of Building Physics, ETH Zürich*, Switzerland.

PhD Title: "Design of urban energy systems under uncertainty" *Supervised by:* Prof. Dr. Jan Carmeliet

Summary: In the core of the PhD research, the energy hub modelling concept is used for the optimal design of urban energy systems employing optimization (MILP) techniques. However, several sources of uncertainty exist in the inputs of an urban energy model e.g. due to intermittent renewables or uncertain energy demand levels. For that reason uncertainty and sensitivity analysis techniques are initially employed to investigate the impacts of the uncertain sources to the optimal urban energy system design and to identify the most influencing, uncertain parameters. Finally, the most influencing parameters are used as inputs for techniques for optimization under uncertainty, such as stochastic and robust optimization. These are applied in order to select a single, optimal energy hub design that will be able to supply the energy demands in all cases, considering different decision making criteria.

Parallel activities: *Zernez Energia 2020 project* – Main tasks: Technoeconomic modelling of a Swiss village's energy system and scenario analysis for the achievement of a carbon neutral energy supply utilizing only local, renewable energy sources. More info at: `http://www.zernezenergia2020.ch`

2011–2012 **MSc in Sustainable Energy Futures**, *Imperial College London*, UK.

Overall Grade: Distinction, Awarded Prize for best overall student of the year from a cohort of 40 students

MSc Thesis: "Diagnostic tools of energy performance for supermarkets using Artificial Neural Network algorithms" *Supervised by:* Prof. Nilay Shah and Dr. Salvador Acha

2005–2010 **MEng in Mechanical Engineering**, *Aristotle University of Thessaloniki*, Greece.

Overall Grade: Excellent (8.94/10.00), 1st place of success in the degree awarding ceremony from a cohort of 120 students

Diploma Thesis: "Investigation of the operational impact of Phase Change Materials (PCMs) in domestic refrigerators" *Supervised by:* Prof. Agis M. Papadopoulos

Experience

2012-2013 **Research Assistant**, *Department of Chemical Engineering, Imperial College London*, UK.

Projects involved include:

- Imperial College – Sainbury's partnership which aims at reducing the carbon footprint of supermarkets by implementing novel energy strategies that respond to the effects of climate change and increasing energy prices. Main tasks:
  - Engaging with Sainsbury's Engineering and Sustainability division as well as with the different technology companies that provide supermarket solutions. The purpose is to understand Sainsbury's needs and requirements of all its systems, designing a solution based on technical requirements and budget targets.
  - Design of zero carbon supermarkets both for the electricity and thermal energy use
- ARES Prototype (**A**gent–Based **R**esource **E**conomic **S**imulator): The aim is to model all types of dynamics of an economy and the ecosystems of which it is a part, which we jointly refer to as the human ecosystem. The spatial scale is a city and its hinterland, as an open system with mass and energy flows from and to the outside world. Within these boundaries, the objective is to simulate a functioning society, its relevant building blocks, dynamic entities, and transfers. The model is built using NetLogo.

2010–2011 **Research Assistant**, *Laboratory of Heat Transfer and Environmental Engineering (LHTEE), Department of Mechanical Engineering, Aristotle University Thessaloniki*, Greece.

Main research projects carried out include:

- Evaluation of night time electricity tariffs for refrigeration purposes, Coordinator: AUT – A.M. Papadopoulos, Research Leader: AUT – A.M. Papadopoulos, Funded by: Bosch & Siemens Hausgeräte GmbH, 2009-2010.
- Thermodynamic analysis of a solar operated domestic absorption refrigerator, Coordinator: AUT – A.M. Papadopoulos, Research Leader: AUT –A.M. Papadopoulos, Funded by: Bosch & Siemens Hausgeräte GmbH, 2010-2011.
- Assessment of energy conservation measures in typical buildings according to the geographic and climatic regions, Coordinator: AUT – A.M. Papadopoulos, Research Leader: AUT – A.M. Papadopoulos, Project funded by Centre for Renewable Energy Sources (CRES), 2011.
- Supervision of an undergraduate student's diploma thesis titled "Technoeconomic assessment of CHP installation in AHEPA hospital"

Languages

Greek **Native Speaker**

English **Professional Proficiency**: TOEFL iBT Score: 115/120
Cambridge English: Proficiency (CPE), Grade B

Computer skills

Programming Python, R, Matlab, Fortran 90/95, gPROMS, NetLogo

Mathematical programming GAMS, AIMMS

Energy Software EnergyPlus, EnergyPRO, DIgSILENT PowerFactory, RETScreen

Productivity AutoCAD, LaTeX, MS Office

GIS ArcGIS, QuantumGIS

Journal Publications

- Mavromatidis G., Orehounig K., Carmeliet J., (2015) *Evaluation of photovoltaic integration potential in a village.* Solar Energy, In Press, Accepted Manuscript
- Orehounig K., Mavromatidis G., Evins R., Dorer V., Carmeliet J. (2014) *Towards an energy sustainable community: an energy system analysis for a village in Switzerland.* Energy and Buildings, 84, 277-286.
- Mavromatidis G., Acha S., Shah N., (2013) *Diagnostic tools of energy performance for supermarkets using Artificial Neural Networks.* Energy and Buildings, 62, 304-314.

Conference Proceedings

- Mavromatidis G., Orehounig K., Carmeliet J. (2015) *Evaluation Of Solar Energy Integration Potential In A Neighborhood.* 14th International Conference of the International Building Performance Simulation Association (BS2015s), Hyderabad, India, December 7-9.
- Mavromatidis G., Orehounig K., Carmeliet J. (2015) *Climate change impact on the design of urban energy systems.* International Conference Future Buildings & Districts (CISBAT 2015), Lausanne, Switzerland, September 9-11.
- Orehounig K., Mavromatidis G., Derome, D., Carmeliet J. (2015) *'Photovoltaic Panels as a Main Component of Energy Sustainable Communities: Comparative Energy Analysis of a Village Under Swiss and South African Climatic Loads'.* Third Southern African Solar Energy Conference (SASEC 2015), Skukuza, Kruger National Park, South Africa, May 11-13.

- Orehounig K., Mavromatidis G., Evins R., Dorer V., Carmeliet J. (2014) *Predicting energy consumption of a neighborhood using building performance simulation.* Building Simulation and Optimization conference (BSO 2014), London, United Kingdom, June 23-24.
- Mavromatidis G., Evins R., Orehounig K., Dorer V., Carmeliet J. (2014) *Multi-objective optimization to simultaneously address energy hub layout, sizing and scheduling using a linear formulation.* 4th International Conference on Engineering Optimization (ENGOPT 2014), Lisbon, Portugal, September 8-11.
- Acha S., Mavromatidis G., Caritte V., Shah N. (2013) *Effective Low-cost Energy Saving Strategies in Supermarkets: A UK Case Study.* 26th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2013), Guilin, China, July 16-19.
- Acha S., Mavromatidis G., Caritte V., Shah N. (2013) *Techno-economical Technology Assessment for Operational Zero Carbon Supermarkets.* 26th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2013), Guilin, China, July 16-19.
- Mavromatidis G. & Papadopoulos A. M. (2011) *Thermodynamic analysis of a solar operated domestic absorption refrigerator.* Proceedings of the National Conference on Architecture, Energy and Environment in buildings and cities (ARENEP 2011) (A.M. Papadopoulos, ed), Athens, Greece, 3-4 May (in Greek).

Presentations

May 2015 Invited presentation given as part of the HSLU BSc program in Energy Systems Engineering titled *Zernez Energia 2020: Designing an energy sustainable community*, hosted by Hochschule Luzern

Dec 2014 Invited presentation given as part of the EMPA RFA Colloquium Natural Resources and Pollutants + Energy, titled *Energy hub modelling for the optimal integration of solar energy in the built environment*, hosted by EMPA

Oct 2014 Invited presentation given as part of the EMPA Ph.D. + Research Focal Area Seminar, titled *Zernez Energia 2020 - Designing an energy sustainable community*, hosted by EMPA

Feb 2013 Invited lecture given to a graduate class on *Principles of supermarket energy systems*, hosted by Imperial College London

Feb 2013 Invited lecture given to a graduate class on *Artificial Neural Networks for energy monitoring and analysis*, hosted by Imperial College London

Nov 2012 Presentation given at *Climate KIC Professional Education Event*, hosted by Imperial College London

Awards/Distinctions

- Imperial College's Energy Futures Lab Award for best overall student of the year 2011/2012 from a cohort of 40 students
- State Scholarships Foundation Award (IKY) Honorary Scholarships for distinction in my studies during the academic years 2005/06 & 2006/07