

# Curriculum Vitae

## **Personal data**

Last name: Kosmadakis

First name: George

Nationality: Greek

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## **Studies**

March 2005–June 2011: Ph.D. Thesis in School of Mechanical Engineering, Internal Combustion Engines Laboratory, National Technical University of Athens, Greece. Title: “*Development of a computational fluid dynamics code for the simulation of transport phenomena and their effect on the operation and emissions of internal combustion engines with hydrogen as a fuel*”. (<http://dspace.lib.ntua.gr/handle/123456789/4608>).

October 2003–October 2004: M.Sc. course “*Energy production and management*” (National Technical University of Athens, Greece)

1998–2003: Diploma of Mechanical Engineering, School of Mechanical Engineering, National Technical University of Athens, Greece.

## **Languages**

- Greek (native)
- English (fluent, Certificate of Proficiency, Cambridge, 1998).
- German (good, Zeugnis-Zentrale Mittelstufenprüfung, Goethe-Institut, 2001).

## **Work and academic experience**

2006 – present: Research Associate at the Department of Natural Resources & Agricultural Engineering, Laboratory of Agricultural Machinery Athens, Agricultural University of Athens, Greece.

2011 – present: Research Associate at the School of Mechanical Engineering, National Technical University of Athens, Greece. Internal Combustion Engines Laboratory.

# Curriculum Vitae

2005 – 2011: Research Assistant at the School of Mechanical Engineering, National Technical University of Athens, Greece. Internal Combustion Engines Laboratory.

March 2005–October 2011: Teaching assistant at the School of Mechanical Engineering, National Technical University of Athens. Course: Internal Combustion Engines I (undergraduate), lectures, workshop, exams correction.

September–October 2002: Company: ABB SA (Greece), position: Trainee, Mechanical Engineer (operation, maintenance and service of turbo-chargers).

## ***Scholarships-awards***

1. 2014-15: Renewable Energy Journal Reviewer Award 2014, 2015.
2. 2014: Outstanding Reviewer of Journal of Energy Engineering.
3. 2007–2012: “Thomaidio Award for the Advancement of Science and Arts”, for the publication of outstanding research papers in International Scientific Journals.
4. 2005–2011: Ph.D. research scholarship awarded by the Greek State Scholarships Foundation in the field of “Emissions of Internal Combustion Engines”.

## ***Computer skills***

MS Office, Tecplot, Autocad, 3D Studio, Solidworks 2013, Compaq/Intel Visual Fortran, Grapher, Matlab, Trnsys, EES, Refprop.

## ***Research interests and activities***

1. Computational Fluid Dynamics (CFD) and numerical combustion models
2. Internal combustion engines
3. Hydrogen combustion and use
4. Numerical simulations of energy systems
5. Solar thermal energy
6. Desalination technologies, in particular reverse osmosis units and energy recovery
7. Organic Rankine cycle
8. Heat and mass transfer

## Curriculum Vitae

9. Invited reviewer in International Journals and Conferences: Energy, Solar Energy, Applied Energy, Energy Conversion and Management, Energy Policy, Journal of Membrane Science, International Journal of Thermal Sciences, Desalination and Water Treatment, SAE International, ASME/Journal of Solar Energy Engineering, ASME/IMECE2011, Environmental Engineering and Management Journal, ECOS 2012-2013, Applied Thermal Engineering, Applied Mathematical Modelling, Journal of Combustion, Energies, International Journal of Hydrogen Energy, ASME/Turbo Expo 2013, Journal Environment Protection Engineering, Computational Thermal Sciences, Journal of Energy Engineering, Journal of Electrical and Electronics Engineering Research, International Journal of Sustainable Energy, Qatar Foundation, Energies, AIMS Energy, Energy Technology, International Journal of Green Energy, Journal of Power and Energy, Sustainable Energy Technologies and Assessments, Journal of Cleaner Production, Renewable Energy, The Scientific World Journal, Journal of the Energy Institute, Entropy, ASME-ORC2015, Ocean Engineering, Frontiers/Solar Energy, Sustainability, Flow Turbulence and Combustion, Journal of Process Mechanical Engineering.
10. Review Editor in International Journal Frontiers in Energy Research – Solar Energy, since 2013.
11. Review Editor in International Journal Frontiers in Mechanical Engineering – Engine and Automotive Engineering, since 2015.
12. Member of the Editorial Board of Int. Journal Energies, since 2015 (<http://www.mdpi.com/journal/energies/editors>).

### **Research projects**

- 01/04/2013 – 31/10/2015: Development of a small-scale low-temperature supercritical organic Rankine cycle with optimized scroll expander and evaporator. [*SUPERCRITICAL-ORC*]. Financed by the Greek government. Contract No. 11SYN7-278 (SYNERGASIA 2011).
- 01/05/2015 – 30/10/2015: Experimental investigation of organic Rankine cycle. In the framework of a mobility project, financed by KIC InnoEnergy SE.

# Curriculum Vitae

- 01/07/2015 – 30/09/2015: Industrial design of an ORC engine. In the framework of the project “Innovation and Entrepreneurship - Exploitation of Research at the AUA”. Financed by NSRF 2007-2013.
- 01/01/2014 – 31/05/2015: Renewable Energy Sources Transforming Our Regions - Hydro (RESTOR). Intelligent Energy Europe, contract no. IEE/11/957.
- 01/01/2013 – 31/12/2014: Improving the performance of concentrating PV by exploiting the excess heat through a low temperature supercritical organic Rankine cycle [CPV/RANKINE]. Project funded by the European Commission. FP7-SME-2012. Grant agreement No. 315049.
- 01/03/2011 – 15/12/2014: Development and experimental evaluation of an autonomous two-stage solar organic Rankine cycle for reverse osmosis desalination of seawater [TWO-STAGE RO-RANKINE]. Financed by the Greek government. Contract No. 09SYN32-982 (SYNERGASIA 2009).
- 01/10/2008 – 30/09/2010: Promotion of Renewable Energy for Water production through Desalination (ProDes). Intelligent Energy Europe, Contract No. IEE/07/781/SI2.499059.
- 01/01/2007 – 31/03/2008: Improvement of organic solar Rankine RO system performance by in depth investigation and assessment of physical and technical parameters strongly affect on. Scientific and Technological cooperation between Greece and US financed by the Greek government. (05NON-EU-219).

## **Participation in conferences**

- 20<sup>th</sup> International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2007), June 25–28 2007, Padova, Italy.
- 23<sup>rd</sup> International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2010), June 14–17 2010, Lausanne, Switzerland.
- 1<sup>st</sup> International Seminar on ORC Power Systems (ORC2011), Delft, The Netherlands, 22-23 September 2011.

## Curriculum Vitae

- 2<sup>nd</sup> International Seminar on ORC Power Systems (ASME-ORC2013), Rotterdam, The Netherlands, 7-8 October 2013.
- Industrial Technologies 2014 Int. Conference (IndTech2014), Athens, Greece, 9-11 April 2014.
- Global Conference on Global Warming (GCGW-15), 24-27 May 2015, Athens, Greece.
- 3<sup>rd</sup> International Seminar on ORC Power Systems (ASME-ORC2015), Brussels, Belgium, 12-14 October 2015.
- Equity Investment Forum: From Venture Capital to Stock Exchange. The Equity route. 7-8 December 2015, Athens Hilton Hotel, Greece.

### ***Presentations in seminars***

- “Renewable Energy Technologies and Desalination”, seminar in Agricultural University of Athens (AUA), organized by CRES, within PRODES project. Presentation: “Solar Rankine Cycle Systems for Desalination”, 30<sup>th</sup> October 2009.
- “Promotion of Renewable Energy for Water production through Desalination for sustainable development”, seminar in Agricultural University of Athens (AUA), organized by Hellas Energy, within PRODES project. Presentation: “Solar organic Rankine cycle for seawater desalination”, 29<sup>th</sup> March 2010.
- “NSRF 2007-2013: Innovative actions in AUA - Strengthening research, infrastructure development, education and employment of human capital”, seminar in Agricultural University of Athens (AUA), organized by ELKE AUA. Presentation of «SYNERGASIA 2009 project»: “Development and experimental evaluation of an autonomous two-stage solar Organic Rankine cycle for reverse osmosis seawater desalination”, 29<sup>th</sup> November 2011.

### ***Publications in scientific Journals/conferences’ proceedings***

1. Rakopoulos CD, Kosmadakis GM, Pariotis EG. Evaluation of a new CFD Model for Internal Combustion Engines using Hydrogen under Motoring Conditions, In: Proceedings of the 20<sup>th</sup> International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2007), June 25–28 2007, Padova, Italy, Vol. I, pp. 113–22.

## Curriculum Vitae

2. Rakopoulos CD, Kosmadakis GM, Pariotis EG. Evaluation of a new computational fluid dynamics model for internal combustion engines using hydrogen under motoring conditions. *Energy* 2009;34(12):2158–66.
3. Pariotis EG, Kosmadakis GM, Hountalas DT, Rakopoulos CD. Comparing the results obtained from a CFD and a Quasi-dimensional model used to investigate the effect of various piston bowl geometries of a HSDI Diesel engine under motoring conditions. In: Proceedings of the 21<sup>st</sup> International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2008), June 24–27 2008, Kraków, Poland, Vol. I, pp. 309–20.
4. Rakopoulos CD, Kosmadakis GM, Pariotis EG. Investigation of piston bowl geometry and speed effects in a motored HSDI diesel engine using a CFD against a quasi-dimensional model. *Energy Convers Manage* 2010;51(3):470–84.
5. Rakopoulos CD, Kosmadakis GM, Pariotis EG. Critical evaluation of current heat transfer models used in CFD in-cylinder engine simulations and establishment of a comprehensive wall-function formulation. *Appl Energy* 2010;87(5):1612–30.
6. Rakopoulos CD, Kosmadakis GM, Pariotis EG. Simulation of a motored internal combustion engine using an improved CFD code. In: Proceedings of the 23<sup>rd</sup> International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2010), June 14–17 2010, Lausanne, Switzerland, Paper No. 295.
7. Rakopoulos CD, Kosmadakis GM, Dimaratos AM, Pariotis EG. Investigating the effect of crevice flow on internal combustion engines using a new simple crevice model implemented in a CFD code. *Appl Energy* 2011;88(1):111–26.
8. Rakopoulos CD, Kosmadakis GM, Pariotis EG. Evaluation of a combustion model for the simulation of hydrogen spark-ignition engines using a CFD code. *Int J Hydrogen Energy* 2010;35(22):12545–60.
9. Komninos NP, Kosmadakis GM. Heat transfer in HCCI multi-zone modeling: validation of a new wall heat flux correlation under motoring conditions. *Appl Energy* 2011;88(5):1635–48.
10. Rakopoulos CD, Kosmadakis GM, Demuyneck J, De Paepe M, Verhelst S. A combined experimental and numerical study of thermal processes, performance

## Curriculum Vitae

- and nitric oxide emissions in a hydrogen-fueled spark-ignition engine. *Int J Hydrogen Energy* 2011;36(8):5163–80.
11. Pariotis EG, Kosmadakis GM, Rakopoulos CD. Comparative analysis of three simulation models applied on a motored internal combustion engine. In: Proceedings of the 24<sup>th</sup> International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2011), July 4–7 2011, Novi Sad, Serbia.
  12. Kosmadakis G, Manolakos D, Kyritsis S, Papadakis G, Bouzianas K. Design of an autonomous, two stages solar organic Rankine cycle system for reverse osmosis desalination. In: Proceedings of the 1<sup>st</sup> conference on environmental management, engineering, planning and economics (CEMEPE 2007), Skiathos island, Greece, 24–28 June 2007, pp. 1267–72.
  13. Kosmadakis G, Manolakos D, Kyritsis S, Papadakis G. Comparative thermodynamic study of refrigerants to select the best for use in the high-temperature stage of a two-stage organic Rankine cycle for RO desalination. *Desalination* 2009;243(1–3):74–94.
  14. Kosmadakis G, Manolakos D, Kyritsis S, Papadakis G. Simulation of an autonomous, two stage solar organic Rankine cycle system for reverse osmosis desalination. *Desalination and Water Treatment* 2009;1(1-3):114–27.
  15. Kosmadakis G, Manolakos D, Kyritsis S, Papadakis G. Economic assessment of a two-stage solar organic Rankine cycle for reverse osmosis desalination. *Renewable Energy* 2009;34(6):1579–86.
  16. Manolakos D, Kosmadakis G, Kyritsis S, Papadakis G. Identification of behaviour and evaluation of performance of small scale, low-temperature Organic Rankine Cycle system coupled with a RO desalination unit. *Energy* 2009;34(6):767–74.
  17. Manolakos D, Kosmadakis G, Kyritsis S, Papadakis G. On site experimental evaluation of a low-temperature solar organic Rankine cycle system for RO desalination. *Solar Energy* 2009;83(5):646–56.
  18. Kosmadakis G, Manolakos D, Papadakis G. Parametric theoretical study of a two-stage solar organic Rankine cycle for RO desalination. *Renewable Energy* 2009;35(5):989–96.

## Curriculum Vitae

19. Kosmadakis G, Manolakos D, Kyritsis S, Papadakis G. Design of a two stage Organic Rankine Cycle system for reverse osmosis desalination supplied from a steady thermal source. *Desalination* 2010;250(1):323–28.
20. Manolakos D, Kosmadakis G, Papadakis G, Bouzianas K. Solar desalination system using an ORC and a RO unit. *Modern Technical Review* 2010;217:32-37 (in greek).
21. Kosmadakis G, Manolakos D, Papadakis G. Simulation and economic analysis of a CPV/thermal system coupled with an organic Rankine cycle for increased power generation. *Solar Energy* 2011;85(2):308–24.
22. Kosmadakis G, Manolakos D, Papadakis G. Investigating the double-stage expansion in a solar ORC. Presented in the 1<sup>st</sup> International Seminar on ORC Power Systems (ORC2011), Delft, The Netherlands, 22-23 September 2011.
23. Pariotis EG, Kosmadakis GM, Rakopoulos CD. Comparative analysis of three simulation models applied on a motored internal combustion engine. *Energy Convers Manage* 2012;60:45–55.
24. Kosmadakis GM, Rakopoulos CD, Demuyneck J, De Paepe M, Verhelst S. Experimental and CFD modeling study of combustion and nitric oxide emissions in hydrogen-fueled spark-ignition engine operating in a very wide range of EGR rates. *Int J Hydrogen Energy* 2012;37(14):10917–34.
25. Pariotis EG, Kosmadakis GM, Rakopoulos CD. Effect of heat transfer and crevice flow on the engine performance and NO emissions in a hydrogen-fueled spark-ignition engine. In: *Proceedings of the 1<sup>st</sup> International Conference of Powertrain Modelling and Control (PMC 2012)*, September 4–6 2012, Bradford, UK, Paper No. 324.
26. Li C, Kosmadakis G, Manolakos D, Stefanakos E, Papadakis G, Goswami Y. Performance investigation of concentrating solar collectors coupled with a transcritical organic Rankine cycle for power and seawater desalination co-generation. *Desalination* 2013;318(3):107–17.
27. Kosmadakis GM, Pariotis EG, Rakopoulos CD. Heat transfer and crevice flow in a hydrogen-fueled spark-ignition engine: effect on the engine performance and NO exhaust emissions. *Int J of Hydrogen Energy* 2013;38(18):7477–89.
28. Kosmadakis G, Manolakos D, Papadakis G. Investigation of Multiple Reverse Osmosis Sub-Units Coupled to a Small-Scale Solar Subcritical Organic Rankine Cycle Engine. Presented in the WIN4Life Int. Conference, Tinos island, Greece,



## Curriculum Vitae

- 19-21 September 2013  
([http://www.uest.gr/win4life/images/win4life\\_conference\\_programme.pdf](http://www.uest.gr/win4life/images/win4life_conference_programme.pdf)).
29. Kosmadakis G, Manolakos D, Papadakis G. LOW-concentration PV/t combined with a low temperature supercritical organic Rankine engine for increased power production by exploiting PV waste heat. Presented in the 28<sup>th</sup> European PV Solar Energy Conference and Exhibition (28<sup>th</sup> EU PVSEC), Paris, France, 30 September-4 October 2013.
30. Kosmadakis G, Manolakos D, Ntavou E, Papadakis G. Implementation of a two-stage organic Rankine cycle using scroll expanders operating under variable heat input. Poster presentation in the 2<sup>nd</sup> Int. Seminar on ORC Power Systems (ORC2013), Rotterdam, The Netherlands, 7-8 October 2013 ([http://www.asme-orc2013.nl/program/show\\_slot/14](http://www.asme-orc2013.nl/program/show_slot/14)).
31. Kosmadakis G, Manolakos D, Bouzianas K, Papadakis G. Heat recovery in low-concentration PV/thermal units using a low-temperature supercritical organic Rankine cycle for improved system performance. Oral presentation in the 2<sup>nd</sup> Int. Seminar on ORC Power Systems (ORC2013), Rotterdam, The Netherlands, 7-8 October 2013 (<http://www.asme-orc2013.nl/program/day/1>).
32. Ntavou E, Kosmadakis G, Manolakos D, Papadakis G. Design and implementation of a two-stage organic Rankine cycle, operating under variable heat input. Poster presentation at the Industrial Technologies 2014 Int. Conference (IndTech2014), Athens, Greece, 9-11 April 2014 ([http://www.industrialtechnologies2014.eu/wp-content/uploads/2013/10/Industrial\\_tech\\_2014\\_POSTERS1.pdf](http://www.industrialtechnologies2014.eu/wp-content/uploads/2013/10/Industrial_tech_2014_POSTERS1.pdf)).
33. Kosmadakis G, Manolakos D, Ntavou E, Papadakis G. Integrated system based on CPV/T collectors and a low temperature supercritical ORC engine. Poster presentation at the Industrial Technologies 2014 Int. Conference (IndTech2014), Athens, Greece, 9-11 April 2014 ([http://www.industrialtechnologies2014.eu/wp-content/uploads/2013/10/Industrial\\_tech\\_2014\\_POSTERS1.pdf](http://www.industrialtechnologies2014.eu/wp-content/uploads/2013/10/Industrial_tech_2014_POSTERS1.pdf)).
34. Kosmadakis G, Manolakos D, Ntavou E, Papadakis G. Multiple Reverse Osmosis sub-units supplied by unsteady power sources for seawater desalination. Proceedings of EDS2014 Int. Conference and Exhibition on Desalination for the Environment: Clean Water and Energy, Limassol, Cyprus, 11–15 May 2014.

## Curriculum Vitae

35. Ntavou E, Kosmadakis G, Manolakos D, Papadakis G. Experimental investigation of a multi-skid Reverse Osmosis (RO) unit, operating at a wide load range, powered by a small-scale Organic Rankine Cycle (ORC) engine. Proceedings of EDS2014 Int. Conference and Exhibition on Desalination for the Environment: Clean Water and Energy, Limassol, Cyprus, 11–15 May 2014.
36. Kosmadakis GM, Rakopoulos CD. Computational fluid dynamics investigation of alternative nitric oxide emission mechanisms in a hydrogen-fueled spark-ignition engine. Int J of Hydrogen Energy 2014;39(22):11774–91.
37. Kosmadakis GM, Rakopoulos CD. Computational fluid dynamics study of alternative nitric oxide emission mechanisms in a spark-ignition engine fueled with hydrogen and operating in a wide range of exhaust gas recirculation rates for load control. J Energy Eng 2015;141(2): C4014008.
38. Papazoglou EG, Kosmadakis G, Serelis KG, Ait Babahmad R, Ouhammou A, Outzourhit A, Rashad M, Sadi A, Bouhdjar A, Suardi A, Pari L. Jatropha Curcas cultivation in north African countries: the case study of the Jatromed project. Proceedings of the 22<sup>nd</sup> European Biomass Conference and Exhibition 2014 (EU BC&E 2014), Hamburg, Germany, 23-26 June 2014.
39. Kosmadakis G, Manolakos D, Olsson O, Ntavou E, Bystrom J, Papadakis G. Design and implementation of a hybrid low-concentration PV/thermal system, including a bottoming supercritical ORC engine. Accepted for presentation in the 29<sup>th</sup> European PV Solar Energy Conference and Exhibition (29<sup>th</sup> EU PVSEC), Amsterdam, The Netherlands, 22-26 September 2014.
40. Kosmadakis G, Robolakis N, Papazoglou EG, Ouhammou A, Outzourhit A, Rashad M. Economic analysis for the estimation of oil-seed production cost of jatropha curcas in Egypt and Morocco. Presented at the 26<sup>th</sup> Annual Meeting of the Association for the Advancement of Industrial Crops (AAIC), Athens, Greece, 13-19 September 2014.
41. Kosmadakis G, Manolakos D, Papadakis G. An investigation of design concepts and control strategies of a double-stage expansion solar organic Rankine cycle. Int J of Sustainable Energy, 2015, 34(7):446-467.
42. Kosmadakis G, Manolakos D, Ntavou E, Papadakis G. Multiple Reverse Osmosis sub-units supplied by unsteady power sources for seawater desalination. Desalination and Water Treatment 2015;55(11): 3111-3119.

## Curriculum Vitae

43. Kosmadakis GM, Moreno F, Arroyo J, Muñoz M, Rakopoulos CD. CFD code validation and combustion analysis of a spark-ignition engine fueled with methane-hydrogen blends. In: Global Conference on Global Warming (GCGW-15), 24-27 May 2015, Athens, Greece.
44. Kosmadakis GM, Moreno F, Arroyo J, Muñoz M, Rakopoulos CD. Combustion Analysis of a Spark-Ignition Engine Fueled on Methane-Hydrogen Blend with Variable Equivalence Ratio Using a Computational Fluid Dynamics Code. J Energy Eng 2015; E4015002, DOI: 10.1061/(ASCE)EY.1943-7897.0000300.
45. Ntavou E, Kosmadakis G, Manolakos D, Papadakis G, Papantonis D. Experimental investigation of a multi-skid RO unit, powered by a small-scale organic Rankine cycle engine. Presented at The International Desalination Association World Congress on Desalination and Water Reuse August 30-September 4 2015/San Diego, CA, USA.
46. Kosmadakis G, Manolakos D, Papadakis G. Experimental testing of a small-scale supercritical ORC at low-temperature and variable conditions. Presented at the 3<sup>rd</sup> Int. Seminar on ORC Power Systems (ASME-ORC2015), Brussels, Belgium, 12-14 October 2015, Paper ID: 126.
47. Erika Ntavou, George Kosmadakis, Dimitris Manolakos, George Papadakis. Experimental investigation of a small-scale two stage organic Rankine cycle engine operating at low temperature. Presented at the 3<sup>rd</sup> Int. Seminar on ORC Power Systems (ASME-ORC2015), Brussels, Belgium, 12-14 October 2015, Paper ID: 87.
48. Lazova M, Daenens D, Kaya A, Huisseune H, Kosmadakis G, Manolakos D, De Paepe M. Design of a supercritical heat exchanger for an integrated CPV/T-Rankine cycle. Presented at the 3<sup>rd</sup> Int. Seminar on ORC Power Systems (ASME-ORC2015), Brussels, Belgium, 12-14 October 2015, Paper ID: 198.
49. Kosmadakis GM, Rakopoulos DC, Rakopoulos CD. Investigation of nitric oxide emission mechanisms in a SI engine fueled with methane/hydrogen blends using a research CFD code. Int J of Hydrogen Energy 2015;40(43):15088–104.
50. Kosmadakis G, Manolakos D, Papadakis G. Experimental investigation of a low-temperature organic Rankine cycle (ORC) engine under variable heat input operating at both subcritical and supercritical conditions. Appl Therm Engin 2016;92(5):1-7.

## Curriculum Vitae

51. Rakopoulos DC, Rakopoulos CD, Papagiannakis R, Giakoumis EG, Karellas S, Kosmadakis GM. Investigation of Combustion and Emissions in HSDI Diesel Engine Running either on Diesel Fuel or Vegetable Oil as Base Fuel with either n-Butanol or Diethyl Ether as Fuel Extender. J Energy Eng 2015; E4015006-1. DOI: 10.1061/(ASCE)EY.1943-7897.0000308.