

CURRICULUM VITAE OF STERGIOS VAKALIS

PERSONAL INFORMATION

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| Nationality | Greek (and United States Resident) |
| Email | stergios.vakalis@outlook.com |
| Personal webpage (1) | https://www.researchgate.net/profile/Stergios_Vakalis |
| Personal webpage (2) | https://www.linkedin.com/in/stergios-vakalis-b3944b113/ |
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SHORT INTRODUCTION

I currently work as an Assistant Professor (RTD Junior) at the Free University of Bozen-Bolzano. My main fields of research are biomass gasification/pyrolysis, thermodynamic modelling and waste-to-energy. My recent publications cover primarily the following topics: exergy analysis, thermodynamic modelling, energy efficiency of waste-to-energy plants, onsite monitoring of energy plants and materials characterization, synthesis of gaseous and liquid biofuels, production of bioproducts from biowaste. A notable point has been the development of frictional torrefaction, which is a novel pyrolysis process.

WORK EXPERIENCE

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| Jan 2017 – Dec 2020 | Assistant Professor (RTD Junior), Libera Università di Bolzano Faculty of Science and Technology, Technical Physics Group Bioenergy and Biofuels Laboratory |
| Nov 2017 – Jul 2018 | Academic Staff (external), Hellenic Open University School of Science and Technology, MSc Catalysis and Environmental Protection |
| May 2016 – Dec 2017 | Postdoctoral Researcher, National Technical University of Athens School of Chemical Engineering, Unit of Environmental Science and Technology |
| Aug 2011 – Nov 2011 | Technical Auditor (stagiaire) Confederation of European Waste-to Energy Plants, Brussels |

EDUCATION

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| Jan 2013 – Apr 2016 | PhD in Sustainable Energy and technologies. Libera Università di Bolzano, Faculty of Science and Technology |
| Oct 2010 – Nov 2012 | MSc in Sustainable Resource Management Technische Universität München, Faculty of Forestry and Resource Management |
| Sep 2001 – Oct 2010 | Diploma in Environmental Engineering (MEng) Technical University of Crete, Faculty of Environmental Engineering |

AWARDS AND ORGANIZATIONAL ROLES

- Postdoctoral scholarship: "IKY FELLOWSHIPS OF ACADEMIC EXCELLENCE FOR POSTDOCTORAL RESEARCH IN GREECE - SIEMENS PROGRAM 2015-2016"
- PhD Grant: 1st ranked PhD candidate (rating: 19.5/ 20)
- Reviewer in international journals: Applied Energy (IF: 7.18), Journal of Cleaner Production (IF: 5.71), Energy Conversion and Management (IF: 5.58), Bioresource Technology (IF: 5.65), Renewable Energy (IF: 4.35), Journal of Industrial and Engineering Chemistry (IF: 4.42), Journal of Environmental Management (IF: 4.01), Energy (IF: 4.52), Waste Management (IF: 4.03), Journal of Analytical and Applied Pyrolysis (IF: 3.47), Environmental Technology (IF: 1.76), Waste and Biomass Valorization (IF: 1.83), Waste Management & Research (IF 1.63), Desalination and Water Treatment (IF: 1.27), Journal of Thermal Science (IF: 0.54), Chemical Engineering Transactions (IF: 0.82)
- Organizing Committee: "NAXOS 2018: 6th International Conference on Sustainable Solid Waste Management"
- Organizing Committee: "ATHENS 2017: 5th International Conference on Sustainable Solid Waste Management"
- Organizing Committee: CEWEP/EAA seminar "From ashes to metals - Bottom ash from Waste-to-Energy plants as a material resource", 5 – 6 September 2011, Copenhagen
- Organizer of "Sustainability Career Fair 2012 @ T.U.M." and the "Sustainable Seminar", March 5th 2012 Munich website: <http://sustainabilityfair.wix.com/2012>

ADDITIONAL TRAINING AND EDUCATION

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| Jul 2003 - Jul 2004 | Laboratory Analyst, National School of Public Health (Greece) |
| Nov 2008 - Nov 2009 | Military Service at the Hellenic Navy, Office of Administration (Souda Naval Base) |
| Mar 24 th -27 th 2013 | PhD seminar, "Energy-Related Catalysis Today and Tomorrow: From Fundamentals to Application", Physikzentrum Bad Honnef |
| Feb 28 th - Mar 3 rd 2012 | Crash Course in "Business Economics", Technische Universität München |
| Nov 7 th – 11 th 2011 | PhD course, "Advanced Environmental Assessment of Waste-to-Energy technologies" Technical University of Denmark, School of Environmental Engineering |

LANGUAGES

Greek (native), English (fluent), German (fluent), Italian (basic)

PUBLICATIONS (IN PEER – REVIEWED JOURNALS)

1. S. Vakalis, M. Baratieri (2015). State-of-the-Art of Small Scale Biomass Gasifiers in the Region of South Tyrol. *Waste and Biomass Valorization* 6; 817 – 829.
2. S. Vakalis, F. Patuzzi, M. Baratieri (2016). Thermodynamic modelling of small-scale biomass gasifiers: Development and assessment of the "Multi-Box" approach. *Bioresource Technology* 206; 173-179.
3. S. Vakalis, A. Sotiropoulos, K. Moustakas, D. Malamis, M. Baratieri (2016). Utilization of biomass gasification by-products for onsite energy production. *Waste Management & Research* 34; 564 – 571.
4. S. Vakalis, R. Heimann, A. Talley, N. Heimann, M. Baratieri (2016). Introduction to frictional pyrolysis (FP) – An alternative method for converting biomass to solid carbonaceous products. *Fuel* 175; 49 – 56.
5. S. Vakalis, A. Sotiropoulos, K. Moustakas, D. Malamis, K. Vekkos, M. Baratieri (2016). Characterization of Hotel Bio-waste by Means of Simultaneous Thermal Analysis. *Waste and Biomass Valorization* 7; 649-657.
6. D. Prando, M. Boschiero, D. Campana, R. Gallo, S. Vakalis, M. Baratieri, F. Comiti, F. Mazzetto, S. Zerbe (2016). Assessment of different feedstocks in South Tyrol (Northern Italy): energy potential and suitability for domestic pellet boilers. *Biomass & Bioenergy* 90; 155 – 162.
7. A. Sotiropoulos, I. Vourka, A. Erotokritou, J. Novakovic, K. Valta, V Panaretou, S. Vakalis, T. Thanos, K. Moustakas, D. Malamis (2016). Combination of decentralized waste drying and SSF techniques for household biowaste minimization and ethanol production. *Waste Management* 52; 353 – 359.
8. F. Patuzzi, D. Prando, S. Vakalis, A.M. Rizzo, D. Chiamonti, W. Tirler, T. Mimmo, A. Gasparella, M. Baratieri (2016). Small-scale biomass gasification CHP systems: Comparative performance assessment and monitoring experiences in South Tyrol (Italy). *Energy* 112; 285-293.
9. A. Sotiropoulos, I. Vourka, A. Erotokritou, J. Novakovic, V Panaretou, S. Vakalis, D. Mamma, D. Alamanou, A.G. Thanos, K. Moustakas, D. Malamis (2016). Corrigendum to “Combination of decentralized waste drying and SSF techniques for household biowaste minimization and ethanol production” [*Waste Manage.* 52(June) (2016) 353–359]. *Waste Management* 56, 600.
10. A. Sotiropoulos, N. Bava, K. Valta, S. Vakalis, V. Panaretou, J. Novakovic and D. Malamis. Household food waste dehydration technique as a pre-treatment method for food waste minimisation. *Int. J. Environment and Waste Management* 17, Nos. 3/4, 2016.
11. S. Vakalis, A. Sotiropoulos, K. Moustakas, D. Malamis, K. Vekkos, M. Baratieri (2017). Thermochemical valorization and characterization of household bio-waste. *Journal of Environmental Management* 203; 648-654.
12. S. Vakalis, F. Patuzzi, M. Baratieri (2017). Introduction of an energy efficiency tool for small-scale biomass gasifiers- a thermodynamic approach. *Energy Conversion and Management* 131; 1-9.

13. S. Vakalis, A. Sotiropoulos, K. Moustakas, D. Malamis, F. Patuzzi, M. Baratieri (2017). Tar analysis and naphthalene quantification in pyrolysis of food waste. *Journal of Environmental Management*.
14. S. Vakalis, M. Boschiero, K. Moustakas, A. Sotiropoulos, D. Malamis, S. Zerbe, M. Baratieri (2017). Assessing the suitability of biomass ashes from combustion in boilers as soil fertilizers - Statistical entropy analysis and introduction of the potassium utilization potential factor. *Waste and Biomass Valorization*.
15. S. Vakalis, F. Patuzzi, M. Baratieri (2017). Reply and closure to comments on “Introduction of an energy efficiency tool for small scale biomass gasifiers – A thermodynamic approach” by M.M. Awad. *Energy Conversion and Management* 138; 700- 702.
16. S. Vakalis, K. Moustakas, U. Sénéchal, R. Schneider, B. Salomo, M. Kurz, D. Malamis, Tobias Zschunke (2017). Assessment of Potassium Concentration in Biochar before and after the After-burner of a Biomass Gasifier. *Chemical Engineering Transactions* Vol. 56; ISBN 978 – 8-95608-47-1.
17. A. Talley, R. Heimann, S. Vakalis (2017). Development and Application of the Compression Frictional Treatment Method (CFT) for Sterilizing and Valorizing Organic Waste. *Environmental Technology*.
18. S. Vakalis, K. Moustakas, S. Malamis, A. Sotiropoulos, D. Malamis (2017). Assessing the removal of heavy metals in wastewater treatment plants by means of chemical exergy. *Desalination and Water Treatment*. doi: 10.5004/dwt.2017.20588
19. S. Vakalis, D. Malamis, K. Moustakas (2018). Thermodynamic modelling of an onsite methanation reactor for upgrading producer gas from small-scale biomass gasifiers. *Journal of Environmental Management* 216, 145 – 152.
20. S. Vakalis, A. Sotiropoulos, K. Moustakas, D. Malamis, M. Loizidou (2017). Assessing the potential of particleboard production from food waste: analysis of the input materials. *Sci Revs Chem Commun*. 7(1). ISSN: 2277-2669
21. S. Vakalis, K. Moustakas, U. Sénéchal, R. Schneider, B. Salomo, M. Kurz, D. Malamis, Tobias Zschunke (2018). Utilization of thermodynamic modelling for assessing the operation of the after-burner in a Biomass Gasifier. *Journal of Cleaner Production* 170; 70 – 75.
22. S. Vakalis, D. Semitekolos, J. Novakovic, K. Moustakas, L. Zoumpoulakis and M. Loizidou (2018). Introduction to the concept of particleboard production from mixtures of sawdust and dried food waste. *Waste and Biomass Valorization*. DOI: 10.1007/s12649-018-0214-0.
23. S. Vakalis, C. Caligiuri, K. Moustakas, D. Malamis, M. Renzi and M. Baratieri (2017). Modelling the emissions of a dual fuel engine coupled with a biomass gasifier – Supplementing the Wiebe model. *Environmental Science and Pollution Research*. DOI: 10.1007/s11356-018-1647-5
24. S. Vakalis, K. Moustakas and M. Loizidou (2018). Assessing the 3T method as a replacement to R1 formula for measuring the efficiency of waste-to-energy plants. *Waste Management & Research*. <https://doi.org/10.1177/0734242X18782727>

25. S. Vakalis, J. Ahmad, R. Heimann, F. Patuzzi, M. Baratieri (2018). The Case of Frictional Torrefaction and the Effect of Reflux Condensation on the Operation of the Rotary Compression Unit. *Bioresource Technology* 268, 91 - 96.

CONFERENCE PRESENTATIONS (ORAL & VISUAL)

1. S. Vakalis, D. Prando, F. Patuzzi and M. Baratieri. Measuring the performance of biomass small scale gasification plants by implementing mass and energy balances. 4th Central European Biomass Conference, 15th – 18th January, Graz, Austria.
2. S. Vakalis, D. Prando, F. Patuzzi, M. Baratieri. Implementing the ‘GAST’ project: opportunities and development of small-scale biomass gasification in South Tyrol. International Biomass Conference and Expo 2014, Orange County (FL), March 24th –26th.
3. S. Vakalis, M. Baratieri, Technological advancements in small-scale biomass gasification: case study of South Tyrol. 2nd International Conference on Sustainable Solid Waste Management, 12th –14th June 2014, Athens.
4. S. Vakalis, M. Baratieri, Calculating the overall efficiency of polygeneration plants – introducing an integrated thermodynamic decision tool for biomass gasification. SYMBIOSIS International Conference 2014. 19-21 June 2014, Athens, Greece.
5. S. Vakalis, A. Sotiropoulos, M. Baratieri. Thermochemical valorization and characterization of biomass waste streams. International Biomass Conference and Expo 2015, Minneapolis (MN), April 20th –22nd.
6. S. Vakalis, D. Prando, F. Patuzzi, M. Baratieri. Monitoring of representative small scale biomass gasifiers in South Tyrol. Biomass to Power and Heat 2015, 6-7 May 2015. Zittau (Germany)
7. S. Vakalis, D. Prando, F. Patuzzi, T. Mimmo, A. Gasparella, W. Tirlir, K. Mair, G. Voto, D. Chiaramonti, A.M. Rizzo, M. Pettorali, M. Prussi, S. Dal Savio, D. Andreasi, M. Baratieri. Measuring the Performance of Different Small Scale Biomass Gasifiers – Results from the GaST Project. 23rd European Biomass Conference and Exhibition. 1st- 4th June 2015, Vienna.
8. S. Vakalis, A. Sotiropoulos, K. Moustakas, D. Malamis and M. Baratieri. Utilization of char from biomass gasification for onsite energy production – Introduction and modelling of a secondary reactor. 3rd International Conference on Sustainable Solid Waste Management, 2nd –4th July 2015, Tinos, Greece.
9. S. Vakalis, R. Heimann, A. Talley, N. Heimann, M. Baratieri (2016). Valorization of organic waste by means of Compression Frictional Treatment. WasteEng - 6th International Conference on Engineering for Waste and Biomass Valorisation, May 23rd – 26th 2016, Albi (France).
10. S. Vakalis, A. Sotiropoulos, K. Moustakas, D. Malamis, F. Patuzzi, M. Baratieri (2016). Measurement and analysis of tar compounds from thermal valorization of food waste. 4th International Conference on Sustainable Solid Waste Management, 23–25th June 2016, Limassol.
11. S. Vakalis, U. Sénéchal, R. Schneider, B. Salomo, M. Kurz, K. Moustakas, A. Sotiropoulos, D. Malamis, M. Baratieri, T. Zschunke. Thermodynamic modelling of potassium in the after-burner of a biomass gasifier. 4th International Conference on Sustainable Solid Waste Management, 23–25th June 2016, Limassol.

12. S. Vakalis, F. Patuzzi, D. Prando, K. Moustakas, M. Baratieri. Simulation and exergy analysis of a novel small-scale biomass gasifier: A "Multi-Box" application. 5th International Conference on Sustainable Solid Waste Management, 21st–24^h June 2017, Athens.
13. S. Vakalis, K. Moustakas, M. Loizidou. Assessing the 3T method as a replacement to R1 formula for measuring the efficiency of waste-to-energy plants. 5th International Conference on Sustainable Solid Waste Management, 21st–24^h June 2017, Athens.
14. S. Vakalis, K. Moustakas, D. Malamis, M. Loizidou. Gasification as a potential pathway for the decentralized production of heat and power 6th International Conference on Sustainable Solid Waste Management, 13–16 June 2018, Naxos
15. S. Vakalis, K. Moustakas, M. Loizidou. Applications of the 3T Method as an efficiency tool for Waste -to-Energy facilities and numerical comparisons with the R1 Formula 6th International Conference on Sustainable Solid Waste Management, 13–16 June 2018, Naxos
16. S. Vakalis, K. Moustakas, M. Loizidou. The 3T method as an assessment tool for comparing different waste management strategies. WasteEng - 6th International Conference on Engineering for Waste and Biomass Valorisation, 2–5 July 2018, Prague.
17. F. Patuzzi, D. Prando, S. Vakalis, T. Mimmo, A. Gasparella, K. Mair, D. Chiaramonti, A.M. Rizzo, S. Dal Savio, M. Baratieri. Experiences in biomass gasification in South Tyrol: Energy and environmental assessment. WasteEng - 6th International Conference on Engineering for Waste and Biomass Valorisation, May 23rd–26th 2016, Albi (France).
18. D. Prando, A.M. Rizzo, S. Vakalis, F. Patuzzi, A. Gasparella, D. Chiaramonti, M. Baratieri. Monitoring of two CHP systems based on biomass in northern Italy: boiler-ORC and gasifier-ICE. 4th International Conference on Engineering for Waste and Biomass Valorisation, August 25–28, 2014 Rio de Janeiro (Brazil).
19. D. Basso, S. Vakalis, F. Patuzzi, A. Gasparella, W. Tirlir, S. Dal Savio, A. Rizzo, D. Chiaramonti, M. Baratieri. The "NEXT GENERATION" project: valorization alternatives for char from small scale gasification systems in South-Tyrol. 5th International Conference on Sustainable Solid Waste Management, 21st–24^h June 2017, Athens.
20. F. Patuzzi, D. Prando, S. Vakalis, W. Tirlir, A. M. Rizzo, D. Chiaramonti, T. Mimmo, A. Gasparella and M. Baratieri. Measuring the performance of biomass small-scale gasification plants by implementing mass and energy balances
21. S. Vakalis, M. Boschiero, K. Moustakas, A. Sotiropoulos, D. Malamis, S. Zerbe and M. Baratieri. Statistical entropy analysis of heavy metals from combustion of agricultural waste in a commercial boiler. 4th International Conference on Sustainable Solid Waste Management, 23–25th June 2016, Limassol.
22. S. Vakalis, K. Moustakas, U. Sénéchal, R. Schneider, B. Salomo, M. Kurz, D. Malamis, Tobias Zschunke. Assessment of Potassium Concentration in Biochar before and after the After-burner of a Biomass Gasifier. International Conference of Low Carbon Asia (ICLCA) 2016. 23rd–25th November 2016. Malaysia.
23. S. Vakalis, F. Patuzzi and M. Baratieri. Development of the "Multi-Box": Thermodynamic modelling of downdraft gasifiers. International Biomass Conference and Expo 2014, Orange County (FL), March 24th–26th.

24. S. Vakalis, K. Moustakas, S. Malamis, A. Sotiropoulos, D. Malamis. Assessing the removal of heavy metals in wastewater treatment plants by means of chemical exergy. 13th IWA Specialized Conference on Small Water and Wastewater Systems & 5th IWA Specialized Conference on Resources-Oriented Sanitation. 14th – 16th September 2016, Athens, Greece.
25. S. Vakalis and M. Baratieri. Measuring biomass gasification plants by means of integrated balances – A comprehensive assessment tool. International Biomass Conference and Expo 2014, Orange County (FL), March 24th –26th.
26. S. Vakalis, D. Prando, F. Patuzzi and M. Baratieri. Thermodynamic modelling of biomass downdraft gasifiers: Introduction to the “Multi-Box” concept. 22nd European Biomass Conference and Exhibition. 23rd - 26th June 2014, Hamburg.
27. S. Vakalis, D. Prando, F. Patuzzi, T. Mimmo, A. Gasparella, W. Tirler, K. Mair, G. Voto, D. Chiaramonti, A. Rizzo, M. Pettorali, M. Prussi, S. Dal Savio, D. Andreasi, M. Baratieri. Assessment of a test methodology suitable for small scale biomass gasifiers. 22nd European Biomass Conference and Exhibition. 23rd - 26th June 2014, Hamburg.
28. S. Vakalis, D. Prando, F. Patuzzi, T. Mimmo, A. Gasparella, W. Tirler, S. Dal Savio, D. Chiaramonti, M. Prussi, Marco Baratieri. Experience in biomass gasification in South Tyrol: The “GAST” project. 21st European Biomass Conference and Exhibition. 3rd – 7th June 2013, Copenhagen.
29. S. Vakalis, K. Moustakas, D. Malamis, M. Loizidou. Assessment and extraction of starch from food waste – a review. 5th International Conference on Sustainable Solid Waste Management, 21st –24^h June 2017, Athens.
30. S. Vakalis, C. Caligiuri, K. Moustakas, D. Malamis, M. Renzi, M. Baratieri. Modelling the emissions of a dual fuel engine coupled with a biomass gasifier – Supplementing the Wiebe model. 5th International Conference on Sustainable Solid Waste Management, 21st –24^h June 2017, Athens.
31. S. Vakalis, K. Moustakas, D. Malamis, M. Loizidou. Introduction to the concept of particleboard production from mixtures of sawdust and dried food waste. 5th International Conference on Sustainable Solid Waste Management, 21st –24^h June 2017, Athens.
32. S. Vakalis, V. Benedetti, E. Cordioli, F. Patuzzi, K. Moustakas, M. Loizidou and M. Baratieri. (2018) Onsite sorting and pyrolysis of coffee residues for biochar production – a preliminary study of the COFFEE BIN project. WasteEng - 6th International Conference on Engineering for Waste and Biomass Valorisation, 2 -5 July 2018, Prague.
33. J. Ahmad, F. Patuzzi, D. Prando, S. Vakalis, L. Fiori, D. Chiaramonti, A. M. Rizzo, M. Baratieri. Characterization of biomass char from real scale gasifiers and assessment of possible utilization pathways. tcbiomass2015 - The International Conference on Thermochemical Conversion Science. November 2nd – 5th 2015, Chicago USA.
34. A. Sotiropoulos, N. Kalogiannis, K. Moustakas, S. Vakalis, D. Malamis. Qualitative and quantitative characteristics of the wastewater and ethanol produced from dehydrated household bio-waste using the drum-drying method and the SSF process respectively. 13th IWA Specialized Conference on Small Water and Wastewater Systems & 5th IWA Specialized Conference on Resources-Oriented Sanitation. 14th – 16th September, Athens, Greece.

35. V. Panaretou, S. Vakalis, A. Ntolka, A. Sotiropoulos, K. Moustakas, D. Malamis, M. Loizidou. Study of carbon balances from organic waste in a decentralised composting facility in Tinos Island. 5th International Conference on Sustainable Solid Waste Management, 21st–24^h June 2017, Athens.
36. S. Alatzas, S. Vakalis, K. Moustakas, D. Malamis. Biomass potential from agricultural waste for energetic utilization in Greece: a review. 5th International Conference on Sustainable Solid Waste Management, 21st–24^h June 2017, Athens.

OTHER PUBLICATIONS

1. Official Project Report: GaST Project
F. Patuzzi, D. Prando, S. Vakalis, A.M. Rizzo, D. Chiaramonti, D. Andreasi, S. Dal Savio, K. Mair, W. Tirlir, T. Mimmo, A. Gasparella, M. Baratieri. (2015). “Gasification Experiences in South Tyrol: energy and environmental assessment”. Project funded by the Autonomous Province of South Tyrol.
2. Official Project Report: ENCOAL Project
F. Patuzzi, S. Vakalis, D. Prando, M. Baratieri, A. Gasparella (2015). Comparative assessment of the environmental impact of different types of coal. Consulting Agreement between Libera Università di & D-BlueSphere Pte. Ltd.
3. S. Vakalis, D. Prando, F. Patuzzi, M. Baratieri (2015). Monitoring und Analyse von repräsentative kleintechnischen Biomassevergaser in Südtirol. Tagungsband "Biomass to Power and Heat", Hochschule Zittau / Görlitz, pp. 42-51. ISBN 978-3-941521-22-3.