FRANCESCO PATUZZI

ACADEMIC POSITION

Assistant professor (RTDb) of Thermal Engineering and Industrial Energy Systems (ING-IND/10) at the Faculty of Science and Technology, Free University of Bolzano

EDUCATION

PhD in Management of Mountain Environment at the University of Bolzano, Italy
MSc in Environmental Engineering at the University of Trento, Italy
BSc in Environmental Engineering at the University of Trento, Italy

RESEARCH TOPICS

- thermochemical conversion processes applied to biomass, with particular attention to the aspects related to the use of these processes for combined heat and power (CHP) production.
- characterization of thermochemical conversion products and by-products; a research line deals with the valorization of the solid residues (char), assessing its applicability as catalytic filtering medium for improving the thermal cracking of the condensable fraction (tar).
- thermodynamic, kinetic and thermo-fluid-dynamics modelling, with the aim of providing useful tools to support the experimental activity and for the characterization of thermal conversion processes.

BIBLIOMETRIC INDEXES (Scopus, November 2021)

Documents: 86 / Citations: 903 / h-index: 15

SCIENTIFIC COMMITTEE PARTICIPATIONS

- Member of the Organizing Committee of Building Simulation Applications (BSA) Conference
- Member of the Students Tutoring Scientific Committee of Building Simulation Applications Conference
- Member of the Local Organizing Committee of the 16th IBPSA International Conference and Exhibition - BS 2019
- Member of the organizing committee of the "EU-Japan biomass seminar" hosted by the 27th European Biomass Conference & Exhibition on May 27th 2019 in Lisbon, Portugal
- Member of the organizing committee of the "Biomass Study Tour in South Tyrol", held on May 23rd and 24th in South Tyrol in the frame of the "EU-Japan biomass seminar" hosted by the 27th European Biomass Conference & Exhibition on May 27th 2019 in Lisbon, Portugal

EDITORSHIPS AND MEMBERSHIPS IN ACADEMIC ORGANIZATIONS

- Member of the editorial board of Building Simulation Applications (BSA) Proceedings, a periodic publication (ISSN: 2531-6702) by bu,press, the publisher of the Free University of Bozen-Bolzano
- Guest editor of the Special Issue "2018 EEC/WTERT Conference".
- Member of the International Building Performance Simulation Association, Chapter Italy.
- Member of the FTI, Associazione Nazionale della Fisica Tecnica Italiana

RESEARCH GRANTS

[as PI, Principal Investigator]

- "BIOLOGIK": Development of a composting technology for agricultural and forestry residues, funded by: Biologik s.r.l., period: 2021-22
- "SMUP: Small-scale producer gas upgrading for biofuels production", funded by: UNIBZ (RTD Call 2020)
- "CHAR-RCC: CHAR re-Circulation for improving the Conversion yields in fixed-bed biomass gasification systems", funded by: UNIBZ (RTD Call 2018)

[as Co-PI]

- "FRONTSH1P: A FRONTrunner approach for the Transition to a circular & resilient future: deployment of systemic solutions with the support of local clusters and the development of regional community-based innovation schemes, funded by: European Commission (call: H2020-LC-GD-2020)
- "AFTER: AgroAlimentary and agroForestry by-products: Thermochemical Evolution pRocess", funded by: Sauber srl
- "BioPolyComp: Biochar polymer composites with specific properties for innovative applications in material technology", funded by: Austrian Research Promotion Agency (BRIDGE Early Stage)
- "GASTOVE: GAsification for improved combustion in a biomass STOVE", funded by: Palazzetti spa

- "BIO-CHEAPER" BIOmasses Circular Holistic Economy APproach to EneRgy equipments, funded by: Italian Ministry of Education, University and Research (PRIN 2017)
- "PYROTYRE: Analysis of the pyrolysis process applied to tires and plastic residues Contract for research project", funded by: Synecom, period: 2017
- "GASSOLUTION: Analysis of European small scale GASification technologies and identification of new SOLUTIONs", funded by: Yanmar, period: 2017-2018
- "PRE-DES: Pre-design assessments of different reactor concepts", funded by: Yanmar, period: 2018
- "KING: KINetics analysis of char bed Gasification", funded by: Yanmar, period: 2018

INVITED TALKS

- "Analisi degli impianti di gassificazione di piccola taglia in Alto Adige" Open-day sulla gassificazione, University of Modena and Reggio Emilia (September 2015)
- "Thermogravimetric analysis coupled with FT-IR spectroscopy: advanced thermal analysis applied to the characterization of common reed pyrolysis", SKT 2018 conference, 7th Coupling Days on Thermal Analysis Coupled to Evolved Gas Analysis (October 2018)
- "Valorization of co-products of small-scale gasification plants (biochar and bio-oil) and importance for overall profitability of the plant", "EU-Japan small-scale biomass gasification seminar" hosted by the 14th Conference on Biomass Science in Higashihiroshima (January 2019)
- "Case study of South Tyrol (Italy) – results of environmental and performance monitoring of gasification plants", "EU-Japan small-scale biomass gasification seminar" hosted by the 14th Conference on Biomass Science in Higashihiroshima (January 2019)

SELECTED PUBLICATIONS

1. Benedetti, V., Patuzzi, F., Baratieri, M.: Characterization of char from biomass gasification and its similarities with activated carbon in adsorption applications. Applied Energy. 227, 92–99 (2018). https://doi.org/10.1016/j.apenergy.2017.08.076
2. Ahmad, J., Rashid, U., Patuzzi, F., Baratieri, M., Taufiq-Yap, Y.H.: Synthesis of char-based acidic catalyst for methanolysis of waste cooking oil: An insight into a possible valorization pathway for the solid by-product of gasification. Energy Conversion and Management. 158, 186–192 (2018). https://doi.org/10.1016/j.enconman.2017.12.059
3. Marchelli, F., Cordioli, E., Patuzzi, F., Sisani, E., Barelli, L., Baratieri, M., Arato, E., Bosio, B.: Experimental study on H2S adsorption on gasification char under different operative conditions. Biomass and Bioenergy. 126, 106–116 (2019). https://doi.org/10.1016/j.biombioe.2019.05.003
4. Cordioli, Patuzzi, Baratieri: Thermal and Catalytic Cracking of Toluene Using Char from Commercial Gasification Systems. Energies. 12, 3764 (2019). https://doi.org/10.3390/en12193764
5. Benedetti, V., Cordioli, E., Patuzzi, F., Baratieri, M.: CO2 Adsorption study on pure and chemically activated chars derived from commercial biomass gasifiers. Journal of CO2 Utilization. 33, 46–54 (2019). https://doi.org/10.1016/j.jcou.2019.05.008
6. Benedetti, V., Ail, S.S., Patuzzi, F., Baratieri, M.: Valorization of Char From Biomass Gasification as Catalyst Support in Dry Reforming of Methane. Frontiers in Chemistry. 7, 1–12 (2019). https://doi.org/10.3389/fchem.2019.00119
7. Benedetti, V., Ail, S.S., Patuzzi, F., Cristofori, D., Rauch, R., Baratieri, M.: Investigating the feasibility of valorizing residual char from biomass gasification as catalyst support in Fischer-Tropsch synthesis. Renewable Energy. 147, 884–894 (2020). https://doi.org/10.1016/j.renene.2019.09.050
8. Ahmad, J., Rashid, U., Patuzzi, F., Alamoodi, N., Choong, T.S.Y., Soltani, S., Ngamcharussrivichai, C., Nehdi, I.A., Baratieri, M.: Mesoporous Acidic Catalysts Synthesis from Dual-Stage and Rising Co-Current Gasification Char: Application for FAME Production from Waste Cooking Oil. Materials. 13, 871 (2020). https://doi.org/10.3390/ma13040871
9. Menin, L., Vakalis, S., Benedetti, V., Patuzzi, F., Baratieri, M.: Techno-economic assessment of an integrated biomass gasification, electrolysis, and syngas biomethanation process. Biomass Conversion and Biorefinery. (2020). https://doi.org/10.1007/s13399-020-00654-9
10. Patuzzi, F., Basso, D., Vakalis, S., Antolini, D., Piazzi, S., Benedetti, V., Cordioli, E., Baratieri, M.: State-of-the-art of small-scale biomass gasification systems: An extensive and unique monitoring review. Energy. 223, 120039 (2021). https://doi.org/10.1016/j.energy.2021.120039