

PERSONAL INFORMATION

Name Bailera, Manuel
 Birth 18/03/1990
 Language Spanish (Native), English (B2-C1), Japanese (N3)
 Website <https://mbailera.es/>

**PROFESSIONAL EXPERIENCE (05)**

- 05 [01/04/2021 – Present] **Marie Skłodowska-Curie Postdoctoral Fellow**
 Graduate School of Creative Science and Engineering, Waseda University, Japan
 K1-MET GmbH, Austria
 Mechanical engineering department, School of Engineering and Architecture, University of Zaragoza, Spain
- 04 [08/01/2018 – 31/03/2021] **Postdoc researcher**
 Mechanical engineering department, School of Engineering and Architecture, University of Zaragoza, Spain
- 03 [01/02/2017 – 31/12/2017] **Researcher**
 Mechanical engineering department, School of Engineering and Architecture, University of Zaragoza, Spain
- 02 [01/12/2015 – 31/01/2017] **Researcher**
 Mechanical engineering department, CIRCE University Research Institute, University of Zaragoza, Spain
- 01 [01/07/2014 – 30/11/2015] **Trainee researcher**
 Zero emissions area, Research Centre for Energy Resources and Consumption (CIRCE Foundation), Spain

VISITING (01)

- 01 [01/05/2016 – 31/07/2016] **MINES ParisTech – Ecole des mines de Paris (Visiting researcher)**
 Centre Efficacité énergétique des Systèmes, MINES ParisTech – Ecole des mines de Paris, France

EDUCATION (03)

- 03 [21/12/2017] **PhD in Renewable Energy and Energy Efficiency (Cum Laude)**
 'Renewable methane. Integrated configurations of power-to-gas and carbon capture by means of renewable energy surplus'
 ▪ Best PhD Thesis Award in CCSU (Spanish CO₂ Technology Platform)
 ▪ Best PhD Thesis Award in Environmental Engineering (Mariano López Navarro Chair)
 ▪ Special Doctorate Award (University of Zaragoza)
 University of Zaragoza, Spain
- 02 [07/10/2014] **Master in Renewable Energy and Energy Efficiency (9.00/10.00)**
 ▪ Best Master's Thesis Award in CCSU (Spanish CO₂ Technology Platform)
 University of Zaragoza, Spain
- 01 [12/07/2013] **Licentiate in Physics (7.42/10.00)**
 University of Zaragoza, Spain

OTHER SPECIALIZED EDUCATION (10)

Total time: 116 hours

- 10 [02/03/2016] **Biogas in Aragón: Challenges and Opportunities (6h)**
 Gas Natural Fenosa Foundation
- 09 [16/02/2016 – 18/02/2016] **Carbon Capture and Reuse of Solid Wastes for the Synthesis of Low-CO₂ Cements (8h)**
 Professor Fabio Montagnaro (University of Naples Federico II, Italy)
- 08 [15/09/2015 – 10/11/2015] **Writing in the Sciences (30 hours)**
 Passed with Distinction. Stanford Online Course
- 07 [08/10/2015] **How to respond to reviewers' comments (2h)**
 Elsevier Online Course
- 06 [08/10/2015] **How do Editors look at your paper? (2h)**
 Elsevier Online Course
- 05 [05/05/2015 – 26/05/2015] **Informational skills for doctoral students (15h)**
 Doctorate School, University of Zaragoza
- 04 [08/04/2015 – 19/05/2015] **Scientific commitment and professional responsibility (10h)**
 Doctorate School, University of Zaragoza
- 03 [04/02/2015 – 11/03/2015] **Human and socio-economic dimensions of the environment (15h)**
 Doctorate School, University of Zaragoza
- 02 [04/02/2015] **How to make an academic curriculum (8h)**

01 Doctorate School, University of Zaragoza
[23/10/2014 – 09/01/2015] **Academic English: Scientific (20h)**
Doctorate School, University of Zaragoza

RESEARCH

RESEARCH ARTICLES (22)

(Google Scholar: <https://scholar.google.es/citations?user=DYYtzpsAAAAJ>)

- 22 M. Bailera, B. Peña, P. Lisbona, J. Marín, LM. Romeo, 'Lab-scale experimental tests of Power to Gas-Oxycombustion hybridization: system design and preliminary results', *Energy* 226 (2021), 120375. Doi: 10.1016/j.energy.2021.120375
- 21 M. Bailera, S. Pascual, P. Lisbona, LM. Romeo, 'Modelling calcium looping at industrial scale for energy storage in concentrating solar power plants', *Energy* 225 (2021), 120306. Doi: 10.1016/j.energy.2021.120306
- 20 M. Bailera, P. Lisbona, B. Peña, LM. Romeo, 'A review on CO₂ mitigation in the Iron and Steel industry through Power to X processes', *Journal of CO₂ Utilization* 46 (2021), 101456. Doi: 10.1016/j.jcou.2021.101456
- 19 S. Pascual, P. Lisbona, M. Bailera, LM. Romeo, 'Design and operational performance maps of calcium looping thermochemical energy storage for concentrating solar power plants', *Energy* 220 (2021), 119715. Doi: 10.1016/j.energy.2020.119715
- 18 LM. Romeo, M. Bailera, 'Design configurations to achieve an effective CO₂ use and mitigation through power to gas', *Journal of CO₂ Utilization* 39 (2020), 101174. Doi: 10.1016/j.jcou.2020.101174
- 17 LM. Romeo, B. Peña, M. Bailera, P. Lisbona, 'Reducing cycling costs in coal fired power plants through power to hydrogen', *International Journal of Hydrogen Energy* 45 (2020), 25838-25850. Doi: 10.1016/j.ijhydene.2020.04.095
- 16 P. Lisbona, M. Bailera, T. Hills, M. Sceats, LI. Díez, LM. Romeo, 'Energy consumption minimization for a solar lime calciner operating in a concentrated solar power plant for thermal energy storage', *Renewable Energy* 156 (2020), 1019-1027. Doi: 10.1016/j.renene.2020.04.129
- 15 M. Bailera, P. Lisbona, LM. Romeo, LI. Díez, 'Calcium looping as chemical energy storage in concentrated solar power plants: Carbonator modelling and configuration assessment', *Applied Thermal Engineering* 172 (2020), 115186. Doi: 10.1016/j.applthermaleng.2020.115186
- 14 M. Bailera, B. Peña, P. Lisbona, LM. Romeo, 'Improved flexibility and economics of combined cycles by Power to Gas', *Frontiers in Energy Research* 8 (2020), 151. Doi: 10.3389/fenrg.2020.00151
- 13 M. Bailera, P. Lisbona, LM. Romeo, 'Avoidance of partial load operation at coal-fired power plants by storing nuclear power through Power to Gas', *International Journal of Hydrogen Energy* 44 (2019), 26063-26075. Doi: 10.1016/j.ijhydene.2019.08.033
- 12 M. Bailera, P. Lisbona, E. Llera, B. Peña, LM. Romeo, 'Renewable energy sources and power-to-gas aided cogeneration for non-residential buildings', *Energy* 181 (2019), 226-238. Doi: 10.1016/j.energy.2019.05.144
- 11 M. Bailera, DP. Hanak, P. Lisbona, LM. Romeo, 'Techno-economic feasibility of power to gas-oxyfuel boiler hybrid system under uncertainty', *International Journal of Hydrogen Energy* 44 (2019), 9505-16. Doi: 10.1016/j.ijhydene.2018.09.131
- 10 M. Bailera, B. Peña, P. Lisbona, LM. Romeo, 'Decision-making methodology for managing photovoltaic surplus electricity through Power to Gas: combined heat and power in urban buildings', *Applied Energy* 228 (2018), 1032-1045. Doi: 10.1016/j.apenergy.2018.06.128
- 09 P. Lisbona, GF. Frate, M. Bailera, U. Desideri, 'Power-to-Gas: Analysis of potential decarbonisation of Spanish electrical system in long-term prospective', *Energy* 159 (2018) 656-668. Doi: 10.1016/j.energy.2018.06.115
- 08 E. Llera, LM. Romeo, M. Bailera, JL. Osorio, 'Exploring the integration of the power to gas technologies and the sustainable transport', *International Journal of Energy Production and Management* 3 (2018), 1-9. Doi: 10.2495/EQ-V3-N1-1-9
- 07 M. Bailera, P. Lisbona, 'Energy storage in Spain: Forecasting electricity excess and assessment of power-to-gas potential up to 2050', *Energy* 143 (2018), 900-910. Doi: 10.1016/j.energy.2017.11.069
- 06 M. Bailera, S. Espatolero, P. Lisbona, LM. Romeo, 'Power to gas-electrochemical industry hybrid systems: A case study', *Applied Energy* 202 (2017), 435-446. Doi: 10.1016/j.apenergy.2017.05.177
- 05 M. Bailera, P. Lisbona, S. Espatolero, LM. Romeo, 'Power to Gas technology under Spanish future energy scenario', *Energy Procedia* 114 (2017), 6880-6885. Doi: 10.1016/j.egypro.2017.03.1828
- 04 M. Bailera, N. Kezibri, LM. Romeo, S. Espatolero, P. Lisbona, C. Bouallou, 'Future applications of hydrogen production and CO₂ utilization for energy storage: Hybrid Power to Gas-Oxycombustion power plants', *International Journal of Hydrogen Energy* Vol. 42,19 (2017), 13625-13632. Doi: 10.1016/j.ijhydene.2017.02.123
- 03 M. Bailera, P. Lisbona, LM. Romeo, S. Espatolero, 'Power to Gas projects review: Lab, pilot and demo plants for storing renewable energy and CO₂', *Renewable & Sustainable Energy Reviews* 69 (2017) 292-312. Doi: 10.1016/j.rser.2016.11.130
- 02 M. Bailera, P. Lisbona, LM. Romeo, S. Espatolero 'Power to Gas-Biomass oxycombustion hybrid system: Energy integration and potential applications', *Applied Energy* 167 (2016) 221-229, *SI Integrated Energy Systems*. Doi: 10.1016/j.apenergy.2015.10.014
- 01 M. Bailera, P. Lisbona, LM. Romeo, 'Power to gas-oxyfuel boiler hybrid systems', *International Journal of Hydrogen Energy* Vol. 40, 32 (2015) 10168-10175. Doi: 10.1016/j.ijhydene.2015.06.074

BOOKS & CHAPTERS (3)

- 03 P. Lisbona, M. Bailera, B. Peña, LM. Romeo, 'Chapter 6.4 – Power to Fuel' in *Small Scale Power Generation Handbook*, Elsevier 2021. ISBN: 978-0-12-821672-9

- 02 P. Lisbona, M. Bailera, B. Peña, LM. Romeo, 'Chapter 22 – Integration of CO₂ capture and conversion' in Advances in Carbon Capture, Elsevier 2020 pp. 503-522. Doi: 10.1016/B978-0-12-819657-1.00022-0. ISBN: 978-0-12-819657-1
- 01 M. Bailera, P. Lisbona, B. Peña, LM. Romeo, Energy Storage: Hybridization of Power-to-Gas Technology and Carbon Capture, Springer Nature 2020. Doi: 10.1007/978-3-030-46527-8. ISBN: 978-3-030-46526-1

CONFERENCE CONTRIBUTIONS (22)

- 22 LM. Romeo, M. Bailera, P. Lisbona, B. Peña, 'Carbon utilization through Power to Gas and Oxyfuel combustion hybridization with recycled CO₂: design and preliminary results', 15th International Virtual Conference On Greenhouse Gas Control Technologies (GHGT15), 15th-18th March 2021, Hosted by Khalifa University.
- 21 LM. Romeo, J. Marín, M. Bailera, B. Peña, E. Llera, P. Lisbona, AI. Escudero, LI. Díez, 'CO₂ reutilization in residential sector through Power to Gas and Oxyfuel combustion', 15th International Virtual Conference On Greenhouse Gas Control Technologies (GHGT15), 15th-18th March 2021, Hosted by Khalifa University.
- 20 S. Pascual, M. Bailera, P. Lisbona, LI. Díez, LM. Romeo, 'Solar calcium looping energy storage: Preliminary comparison between pilot and large scale', 33rd International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS2020), 29th June - 3rd July 2020, Osaka, Japan.
- 19 M. Bailera, B. Peña, P. Lisbona, J. Marín, LM. Romeo, 'Lab-scale experimental tests of Power to Gas-Oxycombustion hybridization: system design and preliminary results', 33rd International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS2020), 29th June - 3rd July 2020, Osaka, Japan.
- 18 S. Pascual, M. Bailera, P. Lisbona, LI. Díez, LM. Romeo, 'Calcium Looping as Direct Use of CO₂ for Solar Energy Storage', 3rd Aportando valor al CO₂, 2nd-3rd October 2019, Madrid, Spain.
- 17 LM. Romeo, M. Bailera, B. Peña, P. Lisbona, 'Use of CO₂ in Power-to-Gas Systems for Renewable Generation of Synthetic Natural Gas (TRL 3-4)', 3rd Aportando valor al CO₂, 2nd-3rd October 2019, Madrid, Spain.
- 16 P. Lisbona, M. Bailera, T. Hills, M. Sceats, LI. Díez, LM. Romeo, 'Energy consumption minimization for a solar lime calciner operating in a concentrated solar power plant for thermal energy storage', 32nd International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS), 23rd-28th June 2019, Wroclaw, Poland.
- 15 M. Bailera, P. Lisbona, S. Pascual, LI. Díez, LM. Romeo, 'On the modelling of a lime carbonator operating in a concentrated solar power plant for energy storage', 32nd International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS), 23rd-28th June 2019, Wroclaw, Poland.
- 14 M. Bailera, A. García, P. Lisbona, LM. Romeo, 'Smart Island: Tecnología Power-to-Gas para una isla de Gran Canaria 100% renovable', Ibero-American Congress of Smart Cities (ICSC-CITIES 2018), 26th-27th September 2018, Soria, Spain.
- 13 M. Bailera, LM. Romeo, LI. Díez, B. Oboirien, AI. Escudero, 'CO₂ recycling for Oxy-Power-to-Gas and Oxy-Power-to-Methanol. Clean alternatives for energy storage', 31st International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS), 17th-22nd June 2018, Guimarães, Portugal.
- 12 M. Bailera, B. Peña, E. Llera, P. Lisbona, LM. Romeo, 'Renewable energy and Power-to-gas aided cogeneration for residential uses', 31st International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS), 17th-22nd June 2018, Guimarães, Portugal.
- 11 LM. Romeo, B. Peña, M. Bailera, P. Lisbona, 'Analysis of the influence of Power-to-Gas systems in cyclic performance of fossil fuel power plants', 31st International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS), 17th-22nd June 2018, Guimarães, Portugal.
- 10 M. Bailera, LM. Romeo, P. Lisbona, B. Peña, 'Lab-scale research on Power to Gas-Oxycombustion hybridization: system design and economic evaluation', 12th Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES), 4th-8th October 2017, Dubrovnik, Croatia.
- 09 E. Llera, LM. Romeo, M. Bailera, J. Osorio, 'Exploring the integration of the power to gas technologies and the sustainable transport', 7th International Conference on Energy and Sustainability, 20th-22nd September 2017, Seville, Spain.
- 08 M. Bailera, LM. Romeo, P. Lisbona, S. Espatolero, B. Peña, 'CO₂ recycling based on Power to Gas-Carbon capture hybrid systems', 9th Trondheim Conference on CO₂ Capture, Transport and Storage, 12th-14th June 2017, Trondheim, Norway.
- 07 LM. Romeo, M. Bailera, P. Lisbona, B. Peña, 'Power-to-Gas and CO₂ capture. Smart storage (& management) of renewable energy', 2nd Aportando valor al CO₂, 9th-10th May 2017, Tarragona, Spain.
- 06 M. Bailera, P. Lisbona, S. Espatolero, LM. Romeo, 'Power to Gas technology in Spanish future energy market', 13th International Conference on Greenhouse Gas Control Technologies, 14th-18th November 2016, Lausanne, Switzerland.
- 05 M. Bailera, LM. Romeo, S. Espatolero, P. Lisbona, 'Future applications of hydrogen production and CO₂ capture for energy storage', 21st World Hydrogen Energy Conference (WHEC), 13th-16th June 2016, Zaragoza, Spain.
- 04 M. Bailera, LM. Romeo, S. Espatolero, P. Lisbona, AM. Ferriz, 'Power to Gas implementation in the Aragonese Pyrenees', 21st World Hydrogen Energy Conference (WHEC), 13th-16th June 2016, Zaragoza, Spain.
- 03 M. Bailera, LM. Romeo, S. Espatolero, P. Lisbona, 'Reducing energy penalty of oxycombustion through Power-to-Gas hybridization', 1st International Conference on Bioenergy & Climate Change, 6th-7th June 2016, Soria, Spain.

- 02 M. Bailera, S. Espatolero, LM. Romeo, P. Lisbona, F. Gracia, E. Simón, JM. Escudero, A. Usón, 'Power-to-Gas and carbon capture integration strategies in an electrochemical industry', 3rd International Conference on Renewable Energy Gas Technology (REGATEC), 10th-11th May 2016, Malmö, Sweden.
- 01 M. Bailera, P. Lisbona, LM. Romeo, 'Analysis of power-to-gas technology with oxyfuel combustion integration', 2nd International Conference on Renewable Energy Gas Technology (REGATEC), 7th-8th May 2015, Barcelona, Spain.

PARTICIPATION IN RESEARCH PROJECTS / INDUSTRIAL INNOVATION (8)

- 08 **Decarbonisation of carbon-intensive industries (Iron and Steel Industries) through Power to gas and Oxy-fuel combustion (DISIPO)**
 Programme: Marie Skłodowska-Curie Actions – Individual Fellowship 2019 (Global Fellowship)
 Funding body: European Commission (GA: 887077)
 Project duration: 01/04/2021 – 30/06/2023 Participation: 01/04/2021 – 30/06/2023
 Role: Principal Investigator
- 07 **Development, evaluation and optimization of sustainable power-to-gas schemes for energy-intensive industrial metal manufacturing processes**
 Programme: Competitive Internal Research Award (2020), Khalifa University of Science & Technology
 Funding body: Khalifa University of Science & Technology
 Project duration: 01/07/2020 – 30/06/2023 Participation: 01/07/2020 – 30/06/2023
 Role: Researcher
- 06 **Renewable energy storage through recycled CO₂, PtG and Oxy-fuel combustion (ALEN OXY-PTG)**
 Programme: R&D oriented to RIS3 Aragon
 Funding body: Aragonese Government and European Regional Development Fund (Ref: LMP134_18)
 Project duration: 16/09/2018 – 15/09/2020 Participation: 16/09/2018 – 15/09/2020
 Role: Researcher
- 05 **Solar Calcium-looping integration for thermo-chemical energy storage (SOCRATCES)**
 Programme: H2020 Programme – LCE-07-2016-2017
 Funding body: European Commission (Ref: 727348)
 Project duration: 01/01/2018 – 31/12/2020 Participation: 08/05/2018 – 30/09/2021
 Role: Researcher
- 04 **Methane from Renewable Energies and CO₂ Capture & Use in the Residential, Industrial and Automotive Sector (MERCURIA)**
 Programme: R&D National plan (Spain)
 Funding body: Spanish Government (Ref: ENE2016-76850-R)
 Project duration: 01/01/2017 – 31/12/2020 Participation: 01/01/2017 - 31/12/2020
 Role: Researcher
- 03 **Energy storage (PtG) and carbon capture integration in chemical industry with hydrogen production**
 Programme: Private project
 Funding body: ERCROS S.A. (Ref: INNOVA-A1-038-15)
 Project duration: 10/11/2015 – 30/10/2016 Participation: 10/11/2015 – 30/10/2016
 Role: Researcher
- 02 **Energy storage through methane. Preliminary analysis of scenarios with high share of renewable energy in the Spanish electricity market**
 Programme: Research Grants for Energy and Environment 2014-2015
 Funding body: Iberdrola Foundation (Spain)
 Project duration: 01/09/2014 – 31/08/2015 Participation: 01/09/2014 – 31/08/2015
 Role: Researcher
- 01 **Innovative processes: Implementation of Power-to-Gas Technology in the Aragonese Pyrenees**
 Programme: R&D programme on Innovative business clusters
 Funding body: Ministry of Industry, Energy and Tourism, Spanish Government (Ref: AEI-020500-2014-79)
 Project duration: 06/11/2014 – 31/03/2015 Participation: 06/11/2014 – 31/03/2015
 Role: Researcher

PhD SUPERVISION (1)

- 01 [26/04/2021 – Present] **Supervisor in PhD Thesis (ongoing)**
 Title: Innovative proposals for the integration of Power to Gas systems in the iron and steel industry.
 Author: Jorge Perpiñán PhD Programme: Mechanical Engineering, University of Zaragoza

FUNDING GRANTED (5)*Total allocation: 231,864 €*

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- 05 [01/04/2021] **Marie Skłodowska-Curie Actions – Individual Fellowship 2019 (GA: 887077)**
Allocation: 188,442 € Funding body: European Commission H2020
- 04 [26/01/2016] **IBERCAJA-CAI Programme for Research internships 2016**
Allocation: 2,200 € Funding body: Ibercaja-CAI Foundation
- 03 [21/10/2015] **Scholarship for PhD studies**
Allocation: 35,100 € Funding body: Aragonese Government (Spain) and European Social Fund
- 02 [01/07/2014] **Scholarship for Trainee researchers (Ref: IN14-06/EM1)**
Allocation: 2,400 € Funding body: CIRCE Research Centre for Energy Resources and Consumption
- 01 [13/08/2013] **Scholarship for Master studies (Ref: 2505203)**
Allocation: 3,722 € Funding body: Ministry of Education, Culture and Sport, Spanish Government

MEMBERSHIP OF RECOGNISED RESEARCH GROUPS (2)

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- 02 [01/01/2017 – 31/12/2022] **Energy and CO₂**
Reference research group recognised by the Aragonese Government, Spain. Reference: T46_17R and T46_20R
- 01 [01/01/2015 – 31/12/2016] **Efficiency of resources and clean energy**
Consolidated research group recognised by the Aragonese Government, Spain. Reference: T24

TEACHING

COURSES (2)

Total time: 105 hours

- 02 **Technical Thermodynamics and Heat Transmission Fundamentals** (9h Flipped classroom + 78h Practical session)
- [2020 – 2021] Bachelor of Industrial Technologies Engineering, University of Zaragoza (3h+36h)
 - [2019 – 2020] Bachelor of Electronics and Automation Engineering, University of Zaragoza (0h+30h)
 - [2017 – 2018] Bachelor of Industrial Technologies Engineering, University of Zaragoza (6h+12h)
- 01 **Thermal Engineering** (18h Practical session)
- [2019 – 2020] Bachelor of Industrial Technologies Engineering, University of Zaragoza (0h+18h)

SEMINARS (3)

- 03 [17/05/2018] **Power-to-Gas: Large-scale energy storage as an alternative use for CO₂**
School of Engineering of the Forestry, Agronomy and Bioenergy Industry, University of Valladolid (Spain)
- 02 [20/04/2016] **Power-to-Gas: Massive energy storage. State of the art**
University School of Agricultural Engineering, University of Valladolid (Spain)
- 01 [20/04/2016] **Future energy storage scenarios**
University School of Agricultural Engineering, University of Valladolid (Spain)

SUPERVISION AND MENTORING ACTIVITIES (6)

- 06 [15/12/2020] **Supervisor in Master's Thesis**
Title: Decarbonization of the steel industry. New proposals based on the power to gas technology
Author: Jorge Perpiñán Grade: 9.0 Bachelor: Master in Renewable Energy and Energy Efficiency, University of Zaragoza
- 05 [09/07/2020] **Supervisor in Master's Thesis**
Title: Using the Power to Gas technology in the iron and steel industry
Author: Ignacio Nieto Grade: 8.3 Bachelor: Master in Industrial Engineering, University of Zaragoza
- 04 [06/06/2018] **Supervisor in Bachelor's Thesis**
Title: Project for the commissioning of a 1 MWe cogeneration plant in a recycling plant for farming wastes in Almazán
Author: Carlos Salvador Grade: 9.0 Bachelor: Agricultural and Energy Engineering, University of Valladolid
- 03 [08/05/2018] **Supervisor in Master's Thesis**
Title: Combining an energy storage system with a wind farm: a feasibility study
Author: Paula Peña Grade: 9.5 Master: Energy Sustainability and Bioenergy Engineering, University of Valladolid
- 02 [15/02/2018] **Supervisor in Bachelor's Thesis**
Title: Sustainable island systems: Study of the application of Power-to-Gas technology on the island of Gran Canaria
Author: Alejandro García Grade: 8.5 Bachelor: Industrial Technologies Engineering, University of Zaragoza
· Secondary Award in 'Juan Aroca Awards' (Official College of Industrial Engineers of Aragon and La Rioja)
- 01 [17/02/2017] **Supervisor in Bachelor's Thesis**
Title: Design of a biological methanation plant in Aragon
Author: Alejandro Quintana Grade: 8.1 Bachelor: Chemical Engineering, University of Zaragoza

EDUCATIONAL PUBLICATIONS AND LEARNING RESOURCES (7)

- 07 [04/03/2021] **Practical problem solution: Calculation at the average temperature of the process**
Learning video (in Spanish) at Youtube channel of the 'Thermal Engines and Machines Area', University of Zaragoza (Spain)
Available at: https://youtu.be/nE_rPkHLTQ
- 06 [04/03/2021] **Practical problem solution: Entropy change between two states (Perfect gas)**
Learning video (in Spanish) at Youtube channel of the 'Thermal Engines and Machines Area', University of Zaragoza (Spain)
Available at: <https://youtu.be/TX8eQ9E0YFs>
- 05 [04/03/2021] **Practical problem solution: Evolution to the equilibrium (Ideal gas and real substance)**
Learning video (in Spanish) at Youtube channel of the 'Thermal Engines and Machines Area', University of Zaragoza (Spain)
Available at: https://youtu.be/_kxvNQeAmDQ
- 04 [04/03/2021] **Practical problem solution: Isentropic efficiency of nozzles (Perfect gas)**
Learning video (in Spanish) at Youtube channel of the 'Thermal Engines and Machines Area', University of Zaragoza (Spain)
Available at: <https://youtu.be/j4PSFggMoao>
- 03 [04/03/2021] **Practical problem solution: Isentropic efficiency of turbines (Real substance)**
Learning video (in Spanish) at Youtube channel of the 'Thermal Engines and Machines Area', University of Zaragoza (Spain)
Available at: <https://youtu.be/aFlysxviAM0>
- 02 [04/03/2021] **Practical problem solution: Mixing process (Ideal gas)**
Learning video (in Spanish) at Youtube channel of the 'Thermal Engines and Machines Area', University of Zaragoza (Spain)
Available at: <https://youtu.be/p7mV8e3KM2g>

- 01 [04/03/2021] **Practical problem solution: Spontaneous processes**
 Learning video (in Spanish) at Youtube channel of the 'Thermal Engines and Machines Area', University of Zaragoza (Spain)
 Available at: <https://youtu.be/OdubWg7Ways>

INNOVATIVE TEACHING PROJECTS (3)

- 03 **Strategies, resources and methodologies for the effective implementation of the flipped classroom model in academic engineering**
 Funding body: School of Engineering and Architecture, University of Zaragoza (Spain) (Ref. PIIDUZ_19_265)
 Project duration: 24/09/2019 – 30/06/2021
 Role: Research team member
- 02 **Compilation and elaboration of new typologies of teaching videos to broaden the open ADD course assisting with the study of thermodynamics and thermal engineering**
 Funding body: School of Engineering and Architecture, University of Zaragoza (Spain) (Ref. PRAUZ_19_104)
 Project duration: 24/09/2019 – 30/06/2021
 Role: Research team member
- 01 **Combining the flipped-classroom model with the use of ICT and active methodologies**
 Funding body: School of Engineering and Architecture, University of Zaragoza (Spain) (Ref. PIIDUZ_18_102)
 Project duration: 25/09/2018 – 27/06/2019
 Role: Research team member

CONFERENCE CONTRIBUTIONS ON TEACHING (10)

- 10 I. Zabalza, M. Bailera, B. Zalba, JM. Marín, B. Peña, J. Uche, EM. Llera, S. Usón, '*Retroalimentación de los estudiantes sobre el uso de videos docentes como apoyo al estudio de la Termodinámica*', VII Congreso de innovación educativa y docencia en red (IN-RED), 13th-15th July 2021, Virtual Conference, Spain.
- 09 B. Peña, I. Zabalza, M. Bailera, B. Zalba, '*Enfoques y herramientas para la enseñanza de la Termodinámica Técnica durante la pandemia de COVID-19: retos y oportunidades*', VII Congreso de innovación educativa y docencia en red (IN-RED), 13th-15th July 2021, Virtual Conference, Spain.
- 08 B. Peña, M. Bailera, I. Zabalza, B. Zalba, '*Experiences in thermal engineering on shifting to on-line learning under the covid-19 pandemic scenario*', 13th International Conference on Education and New Learning Technologies (EDULEARN), 5th-6th July 2021, Virtual Conference, Spain.
- 07 B. Peña, M. Bailera, I. Zabalza, B. Zalba, '*The flipped classroom model in engineering thermodynamics: Comparison of experiences in different bachelor degrees*', 12th International Conference on Education and New Learning Technologies (EDULEARN), 6th-7th July 2020, Virtual Conference, Spain.
- 06 M. Bailera, I. Zabalza, B. Peña, '*Enabling a better flexibility during self-study through youtube*', 12th International Conference of Education, Research and Innovation (ICERI2019), 11th-13th November 2019, Seville, Spain.
- 05 M. Bailera, B. Peña, I. Zabalza, E. Teruel, R. Aragüés, E. Llera, S. Usón, D. Ranz, P. Lisbona, '*Enhancing the acquisition of competences through the flipped classroom model*', 12th International Conference of Education, Research and Innovation (ICERI2019), 11th-13th November 2019, Seville, Spain.
- 04 M. Bailera, B. Peña, I. Zabalza, E. Teruel, R. Aragüés, E. Llera, S. Usón, D. Ranz, P. Lisbona, '*Flipped classroom model to enhance the acquisition of competences*', XIII Workshop on Teaching Innovation and Educational Research, 5th-6th September 2019, Zaragoza, Spain.
- 03 B. Peña, M. Bailera, '*Assessment of quantitative and automated rubrics as learning tool in engineering thermodynamics*', 11th annual International Conference on Education and New Learning Technologies (EDULEARN), 1st-3rd July 2019, Palma de Mallorca, Spain.
- 02 M. Bailera, B. Peña, I. Zabalza, '*Learning analytics through the digital footprint: Results for engineering thermodynamics subject*', 11th annual International Conference on Education and New Learning Technologies (EDULEARN), 1st-3rd July 2019, Palma de Mallorca, Spain.
- 01 B. Peña, I. Zabalza, S. Usón, E. Llera, M. Bailera, '*The flipped classroom model in the thermal engines and machines area: Analysis and comparison of experiences*', 11th annual International Conference on Education and New Learning Technologies (EDULEARN), 1st-3rd July 2019, Palma de Mallorca, Spain.

ATTENDED COURSES FOR TEACHER TRAINING (10)

Total time: 68 hours

- 10 [21/02/2019 – 07/03/2019] **Scientific publication (6h)**
 Institute of Educational Sciences, University of Zaragoza, Spain
- 09 [08/02/2019] **Criteria for the evaluation of research in ACPUA (3h)**
 Institute of Educational Sciences, University of Zaragoza, Spain
- 08 [01/02/2019] **Planning for the assessment of multidisciplinary competences (4h)**

- Institute of Educational Sciences, University of Zaragoza, Spain
- 07 [15/01/2019 – 17/01/2019] **Ethics in research (4h)**
Institute of Educational Sciences, University of Zaragoza, Spain
- 06 [16/01/2019] **Labor risk prevention – Data visualisation screen users (2h)**
Institute of Educational Sciences, University of Zaragoza, Spain
- 05 [17/09/2018 – 22/10/2018] **ADD / Moodle basics (25h)**
Institute of Educational Sciences, University of Zaragoza, Spain
- 04 [24/09/2018] **Diversity in the classroom: Challenges and resources (4h)**
Institute of Educational Sciences, University of Zaragoza, Spain
- 03 [17/09/2018] **Using the UZ Events tool (4h)**
Institute of Educational Sciences, University of Zaragoza, Spain
- 02 [11/09/2018 – 13/09/2018] **Advanced use of email and UZ related utilities (6h)**
Institute of Educational Sciences, University of Zaragoza, Spain
- 01 [10/09/2018 – 12/09/2018] **Intellectual Property in Academics (10h)**
Institute of Educational Sciences, University of Zaragoza, Spain

ACCREDITATIONS (1)

- 01 [05/02/2019] **Assistant Professor Certification**
Accredited by the National Agency for Quality Assessment and Accreditation of Spain, ANECA.

OTHER MERITS

HONORS AND AWARDS (9)

- 09 [15/08/2020] **Member of the Marie Curie Alumni Association**
Global network restricted to past, or present, Marie Curie researchers.
- 08 [07/06/2019] **Best PhD Thesis Award in Environmental Engineering**
Awarded by the Mariano López Navarro Chair
- 07 [19/03/2019] **Seal of Excellence within the Horizon 2020's Marie Skłodowska-Curie actions**
Awarded by the European Commission to the project 842328 'Decarbonisation of carbon-intensive industries through Power to Gas and oxy-fuel combustion' submitted to the call H2020-MSCA-IF-2018.
- 06 [04/03/2019] **Special Doctorate Award**
Awarded by the University of Zaragoza
- 05 [28/11/2018] **Best PhD Thesis Award in Carbon Capture, Transport, Storage and Utilization**
Awarded by the Spanish CO₂ Technology Platform
- 04 [01/10/2018] **Outstanding Reviewer Recognition by Elsevier (Applied Energy)**
Recognition for being within the top 10th percentile of reviewers for the Journal 'Applied Energy' in terms of the number of manuscript reviews completed in the last two years.
- 03 [01/07/2018] **Outstanding Reviewer Recognition by Elsevier (Energy)**
Recognition for being within the top 10th percentile of reviewers for the Journal 'Energy' in terms of the number of manuscript reviews completed in the last two years.
- 02 [01/10/2017] **Highly Cited in Field by Essential Science Indicators**
The article 'Power to Gas projects review: Lab, pilot and demo plants for storing renewable energy and CO₂', published in Renewable & Sustainable Energy Reviews, received enough citations to place it in the top 1% of the academic field of Engineering.
- 01 [15/12/2015] **Best Master's Thesis Award in Carbon Capture, Transport, Storage and Utilization**
Awarded by the Spanish CO₂ Technology Platform

INVITED PRESENTATIONS & SESSIONS CHAIR AT CONFERENCES (2)

- 02 [15/06/2018] **Invited presentation**
M. Bailera, 'Carbon capture: technologies for large-scale operation. Successful projects based on Power to Gas', Technical Meeting on Carbon Capture, Transport, Storage and Utilization Technologies: an opportunity in climate change mitigation (Spanish CO₂ Technology Platform), 15th June 2018, Spain.
- 01 [04/10/2017] **Session Chair**
Chair in the 'Alternative Fuels' session at the 12th Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES), Croatia.

EDITOR & EXTERNAL REVIEWER (3)

- 03 [01/02/2021] **Guest Editor of Special Issue – Sustainability MDPI**
https://www.mdpi.com/journal/sustainability/special_issues/Decarbonization_Industry
'Decarbonization of Industry through Green Hydrogen and Power to X Processes', a special issue of Sustainability by MDPI (ISSN 2071-1050).
- 02 [01/01/2021] **Guest Editor of Special Issue – Energies MDPI**
https://www.mdpi.com/journal/energies/special_issues/Integration_PtG_CC
'Integration of Power to Gas and Carbon Capture', a special issue of Energies by MDPI (ISSN 1996-1073). This special issue belongs to the section "Sustainable Energy".
- 01 **External Reviewer in Scientific Journals**
<https://publons.com/researcher/1428630/manuel-bailera/peer-review>
- Applied Energy (Elsevier), Q1
 - Energy (Elsevier), Q1
 - Journal of Cleaner Production (Elsevier), Q1
 - Science of Total Environment (Elsevier), Q1
 - Electric Power System Research (Elsevier), Q2
 - International Journal of Hydrogen Energy (Elsevier), Q2
 - Energy Efficiency (Springer), Q3
 - Frontiers in Energy Research (Frontiers), Q3