

Professional Experience

MIRARCO Mining Innovation. Energy, Renewables and Carbon Management Group, Laurentian University, Sudbury, Canada. July 2011 – present. Full time postdoctoral research fellow.

Department of Mechanical Engineering, Thermal Engineering Division, **University of Zaragoza, Spain.**

September 2006 – June 2011. Full Time Researcher.

- Research focused on developing procedures for the analysis, synthesis and design of trigeneration systems in the residential-commercial sector. Developed skills in using Lingo and SimaPro.

Umberto Competence Center, School of Applied Sciences, **Hochschule für Technik und Wirtschaft Berlin, Germany.**

September-December 2009. Full Time Researcher.

- Theme: Instruction, training and investigation in environmental modeling with Umberto – Analysis of the distribution of energy and environmental impacts in trigeneration systems. Developed skills in using Umberto software.

Department of Mechanical Engineering, Solar Energy Laboratory, **Federal University of Paraíba, Brazil.**

April 2003 - October 2005. Full Time Researcher

- Research focused on energy and exergy analysis in the red ceramics industry, including the consideration of environmental impacts.

Shopping Center Iguatemi Campina Grande and **Federal University of Campina Grande, Brazil.**

January 2003 - April 2003. Principal Investigator.

- Research focused on the efficient use of electricity.

ATECEL® and **Federal University of Campina Grande, Brazil.**

September 2000 – October 2002. Part time researcher.

- Research focused on the biological and behavioural effects of microwave radiation on *Rattus norvegicus*.
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Academic Background

PhD in Thermal Engineering. Department of Mechanical Engineering, University of Zaragoza, Spain. 2011. *Honorable mention from the jury.*

Advanced Studies Degree, Climatization technologies and energy efficiency in buildings. Department of Mechanical Engineering, University of Zaragoza, Spain. 2007.

MSc in Mechanical Engineering. Mechanical Engineering Program, Federal University of Paraíba, Brazil. 2005.

BEng in Electrical Engineering. Department of Electrical Engineering, Federal University of Campina Grande, Brazil. 2003.

Articles published

1. **Carvalho, M.;** Lozano, M.A. ; Serra, L.M; Wohlgemuth, V. Modeling simple trigeneration systems for the distribution of environmental loads. *Environmental Modelling & Software*, (ENVSOFT-S-11-00366) Accepted on Nov. 14, 2011.
2. **Carvalho, M.;** Lozano, M.A.; Serra, L.M. Multicriteria synthesis of trigeneration systems considering economic and environmental aspects. *Applied Energy*, 91, p. 245-254.
3. Lozano, M.A.; **Carvalho, M.;** Serra, L. Allocation of Economic Costs in Trigeneration Systems at Variable Load Conditions. *Energy and Buildings*, v. 43, p. 2869–2881.
4. **Carvalho, M.;** Serra, L.M.; Lozano, M.A. (2011) Geographic evaluation of trigeneration systems in the tertiary sector. *Energy (Oxford)*, v. 36, p. 1931-1939.
5. **Carvalho, M.;** Serra, L.M; Lozano, M.A. (2011) Optimal synthesis of trigeneration systems subject to environmental constraints. *Energy (Oxford)*, v. 36, p. 3779-3790.
6. Carvalho, J. B. Q. ; Feitosa, A. ; **Carvalho, M. ;** Neves, G. (2011) Use of powdered granite residue in the production of concrete blocks with no structural function. *Land contamination & reclamation*, DOI 10.2462/09670513.1007.
7. Rocha, J.; Ribeiro, P.; Lino, A.K.R.L. ; Alencar, M.S.; **Carvalho, M.;** Nain, S. (2009) The influence of microwave radiation on the behaviour of *Rattus norvegicus*. *International Journal of Risk Assessment and Management*, v. 13, p. 82-97.
8. Lozano, M.A.; Ramos, J. C.; **Carvalho, M.;** Serra, L. M. (2009) Structure optimization of energy supply systems in tertiary sector buildings. *Energy and Buildings*, v. 41, p. 1063-1075.
9. Lozano, M.A.; **Carvalho, M.;** Ramos, J. ; Serra, L. (2009) Thermo-economic analysis of simple trigeneration systems. *International Journal of Thermodynamics*, v. 12, p. 147-153.
10. Lozano, M.A.; **Carvalho, M.;** Serra, L.M. (2009) Operational strategy and marginal costs in simple trigeneration systems. *Energy (Oxford)*, v. 34, p. 2001-2008.
11. Abrahao, R. ; **Carvalho, M.** (2009) Water quality of a stream receiving industrial effluents, located in the Brazilian Northeast. *International Journal of Risk Assessment and Management*, v. 13, p. 137.
12. Abrahao, R. ; **Carvalho, M. ;** Silva Junior, W. R. ; Machado, T. T. V. ; Gadelha, C. L. M. ; Hernandez, M. I. M. (2007) Use of Index Analysis to Evaluate the Water Quality of a Stream Receiving Industrial Effluents. *Water S.A.*, ISSN 1816-7950 *Water SA (Online)*, v. 33, p. 459-466.
13. **Carvalho, M.;** Abrahao, R. ; Gondim, R. R. (2006) Medidas de Economia para um Forno Hoffmann de uma Indústria de Cerâmica Vermelha: Estudo de Caso. *Cerâmica Industrial*, São Paulo-SP, v. 11, n. 1, p. 33-36.

Articles submitted

1. **Carvalho, M.;** Lozano, M.A ; Ramos, J.C.; Serra, L.M. Synthesis of trigeneration systems: Resilience and sensitivity analyses. *International Journal of Energy Research*, (ER-11-2388).
2. Lozano, M.A.; **Carvalho, M.;** Serra, L.M. Tackling environmental impacts in simple trigeneration systems operating under variable conditions. *Energy*, (EGY-11-01342).

Other refereed publications – Selected publications

1. **Carvalho, M.** ; Serra, Luis. ; Lozano, M. A. . Environmental assessment rules of internal flows and final products of simple trigeneration systems under variable operation conditions. In: Dubrovnik Conference on Sustainable Development of Energy, Water and Environment Systems, 2011, Dubrovnik, Croatia.
2. Bravo, Y. ; **Carvalho, M.** ; Serra, Luis M. ; Monne, C. ; Alonso, S. ; Moreno, F. ; Munoz, M. . Dish-Stirling technology for power generation. Environmental evaluation. In: Dubrovnik Conference on Sustainable Development of Energy, Water and Environment Systems, 2011, Dubrovnik, Croatia.
3. Lozano, Miguel A. ; Serra, Luis. ; **Carvalho, M.** Allocation of economic costs in trigeneration systems at variable load conditions. In: 24th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems, 2011, Novi Sad, Serbia.
4. Lozano, Miguel A. ; **Carvalho, M.** ; Serra, Luis. . Analisis energético, económico y ambiental de la operación óptima de sistemas simples de cogeneración y trigeneración. In: VII Congreso Nacional de Ingeniería Termodinámica - CNIT7, 2011, Bilbao, Spain.
5. Lozano, M. A. ; **Carvalho, M.** ; Serra, Luis. Asignación de cargas ambientales en sistemas simples de trigeneración operando en condiciones variables. In: VII Congreso Nacional de Ingeniería Termodinámica - CNIT7, 2011, Bilbao, Spain.
6. **Carvalho, Monica** ; Lozano, Miguel A. ; Serra, Luis. . Síntesis de sistemas de trigeneración: análisis de sensibilidad y resiliencia. In: VII Congreso Nacional de Ingeniería Termodinámica - CNIT7, 2011, Bilbao, Spain.
7. **Carvalho, M.** ; Lozano, M. A. ; Serra, Luis. Multiobjective optimization of trigeneration systems considering economic and environmental aspects. In: 2nd European Conference on Polygeneration, 2011, Tarragona, Spain.
8. Serra, Luis. ; Lozano, M. A. ; **Carvalho, Monica** . Evaluation of environmental loads for the synthesis of a trigeneration system. In: ASME 2010 4th Conference on Energy Sustainability ES2010, 2010, Phoenix, U.S.
9. **Carvalho, Monica** ; Wohlgemuth, V. ; Lozano, M. A. ; Serra, Luis. Distribution of resources and allocation of environmental loads applied to trigeneration systems. In: ecos2010 23rd International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems, 2010, Lausanne, Switzerland.
10. **Carvalho, Monica** ; Lozano, M. A. ; Serra, Luis. ; Wohlgemuth, V. Modeling a simple trigeneration system: Environmental costs. In: International Congress on Environmental Modelling and Software, 2010, Ottawa, Canada.
11. **Carvalho, M.** ; Serra, Luis. ; Lozano, M. A. ; Wohlgemuth, V. Environmental impact analysis in trigeneration systems and implementation of cost assignment based on thermoeconomics. In: 15th Umberto User Workshop, 2010, Hamburg, Germany.
12. **Carvalho, M.** ; Lozano, M. A. ; Serra, Luis. . Diseño óptimo de sistemas de trigeneración para edificios: Evaluación económica. In: XIV Seminario académico APEC (Asociación de investigadores y estudiantes brasileños en Catalunya), 2009, Barcelona, Spain. v. 1. p. 441-450.
13. **Carvalho, M.** ; Lozano, M. A. ; Serra, Luis. . Análisis de sistemas de trigeneración: termoeconomía y evaluación ambiental. In: 3rd AlBan Conference, 2009, Oporto, Portugal.
14. **Carvalho, M.** ; Serra, Luis. ; Lozano, M. A. . Analisis ambiental de un sistema simple de trigeneración. In: VI Jornadas Nacionales de Ingeniería Termodinámica, 2009, Córdoba, Spain.
15. Lozano, M. A. ; Serra, Luis. ; **Carvalho, M.** . Análisis de costes energéticos en sistemas simples de cogeneración operando en condiciones variable. In: VI Jornadas Nacionales de Ingeniería Termodinámica, 2009, Córdoba, Spain.
16. Lozano, M. A. ; Serra, Luis. ; **Carvalho, M.** . Energy cost analysis of simple trigeneration systems under variable operation conditions. In: 22nd International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems, 2009, Foz do Iguaçu, Brazil. v. 1. p. 44.
17. **Carvalho, M.** ; Serra, Luis. ; Lozano, M. A. . Optimal synthesis of trigeneration systems subject to environmental constraints. In: 22nd International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems, 2009, Foz do Iguaçu, Brazil. v. 1. p. 59.
18. **Carvalho, M.** ; Serra, L.M. ; Lozano, M.A. . Geographic evaluation of trigeneration systems in the tertiary sector. Effect of climatic and electricity supply conditions.. In: 5th Dubrovnik Conference On Sustainable Development Of Energy Water And Environment Systems, 2009, Dubrovnik.
19. **Carvalho, M.** ; Lozano, M. A. ; Serra, Luis. ; Ramos, J. . Thermoeconomic Analysis of Simple Trigeneration systems. In: 21st International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems - ECOS 2008, 2008, Cracovia, Poland.
20. **Carvalho, M.** ; Lozano, M. A. ; Serra, Luis. . Estrategia operacional y asignación de costes en sistemas simples de trigeneración. In: XII Congreso Internacional De Ingeniería De Proyectos, 2008, Zaragoza, Spain.
21. Patino, J. M. ; Navarro, J. G. B. ; Martinez, M. A. G. ; **Carvalho, M.** . Aplicación del water pinch para minimización de agua y su relación con el consumo de energía eléctrica. Parte B. Motores de alta eficiencia.. In: Reunión de Verano de Potencia, Aplicaciones Industriales y Exposición Industrial, 2008, Acapulco, Mexico.
22. Diniz, L. S. ; Barros, G. D. T. ; **Carvalho, M.** ; Santos, C. A. C. . Theoric study of transient heat transfer for conduction-radiation coupling in a gray unidimensional participant medium. In: IV Congresso Nacional de Engenharia Mecânica, 2006, Recife, Brazil.
23. Diniz, L. S. ; Barros, G. D. T. ; **Carvalho, M.** ; Santos, C. A. C. Theoric study of thermal tensions in semitransparent ceramic materials with conduction-radiation coupling during heating. In: IV Congresso Nacional de Engenharia Mecânica, 2006, Recife, Brazil.
24. **Carvalho, M.** ; Gondim, R. R. ; Abrahao, R. . A desertificação como consequência do uso de lenha na indústria de cerâmica vermelha: estudo de caso. In: Seminário Luso-Brasileiro-Caboverdiano, 2006, João Pessoa, Brazil.
25. Abrahao, R. ; **Carvalho, M.** ; Silva Junior, W. R. ; Silva, L. P. E. ; Gadelha, C. L. M. . Poluição da água utilizada na agricultura familiar, na bacia do riacho Mussurê. In: Seminário Luso-Brasileiro-Caboverdiano, 2006, João Pessoa, Brazil.
26. Santos, P. H. D., **Carvalho, M.** Santos, C. A. C. Analise teorica da conveccao-difusao em reatores de leito fixo via transformada integral generalizada. In: III Seminário de Avaliação RECOGÁS / I Encontro de Estudantes da RECOGÁS, 2005, João Pessoa, Brazil.
27. **Carvalho, M.**, Abrahao, R., Carvalho, J. B. Q., Gondim, R. R. Environmental impacts of the red ceramics industry. In: International Conference on Energy, Environment and Disasters (INCEED), 2005, Charlotte, North Carolina, U.S.
28. Abrahao, R., **Carvalho, M.**, Gadelha, C. L. M. Impacts of the industrial effluents released in the Mussure stream, in the Brazilian Northeast. In: International Conference on Energy, Environment and Disasters (INCEED), 2005, Charlotte, U.S.
29. Abrahao, R., **Carvalho, M.**, Gadelha, C. L. M. Impacts of industrial occupation on a watercourse and its surroundings. In: International Conference on Energy, Environment and Disasters (INCEED), 2005, Charlotte, U.S.
30. Lopes, A. K. R., Alencar, M. S., Rocha, J., **Carvalho, M.**, Ribeiro, P., Nain, S. The influence of microwave radiation on the behavior of *Rattus norvegicus*. In: International Conference on Energy, Environment and Disasters (INCEED), 2005, Charlotte, U.S.

31. Carvalho, J. B. Q.; Feitosa, A.; **Carvalho, M.**; Neves, G. Use of powdered granite residue in the production of concrete blocks with no structural function. In: International Conference on Energy, Environment and Disasters (INCEED), 2005, Charlotte, U.S.
32. Diniz, L. S., **Carvalho, M.**, Santos, C. A. C. Study of thermal tensions in ceramic materials during cooling. In: 18th International Congress of Mechanical Engineering - COBEM 2005, 2005, Ouro Preto, Brazil.
33. Diniz, L. S., Santos, P. H. D., **Carvalho, M.**, Santos, C. A. C. Theoric analysis of the channel flow with radiation in participating media through the use of the generalized integral transform technique. In: 18th International Congress of Mechanical Engineering - COBEM 2005, 2005, Ouro Preto, Brazil.
34. Lopes, A. K. R. ; Alencar, M. S. ; Rocha, J. ; Ribeiro, P. ; **Carvalho, M.** . Evaluation of the Learning Capability of Rats Submitted to Microwave radiation (850 MHz). In: Mediterranean Conference on Medical and Biological Engineering, 2004, Nápoles, Italia. Proceedings of the Mediterranean Conference on Medical and Biological Engineering. Nápoles, Italia: Italian Association of Medical and Biological Engineering, 2004, 2004.
35. Lopes, A. K. R. ; Dantas, D. ; **Carvalho, M.** ; Alencar, M. S. ; Nain, S. . Behavioral Effects of Microwave Radiation on Rattus Novergicus. In: IEEE International Microwave and Optoelectronics Conference - IMOC'2003, 2003, Foz do Iguaçu. Proceedings of the IEEE International Microwave and Optoelectronics Conference.. São Paulo : Sociedade Brasileira de Microondas e Optoeletrônica - SBMO, 2003. v. 1. p. 333-337.
36. Lopes, A. K. R. ; Dantas, D. ; Silva, A.R.; **Carvalho, M.** ; Alencar, M. S. ; Nain, S.. Evaluation of the Level of Stress in Rats of the Species Rattus Norvegicus Submitted to Microwave Radiation. In: IEEE International Microwave and Optoelectronics Conference, 2003, Foz do Iguaçu. Proceedings of the IEEE International Microwave and Optoelectronics Conference - IMOC'2003. São Paulo : Sociedade Brasileira de Microondas e Optoeletrônica - SBMO, 2003. v. 1. p. 329-332.
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Honors and awards

- European doctorate mention. University of Zaragoza, 2011.
- Umberto Student Award, ifu Hamburg GmbH. Hamburg, Germany. 2010.
- Excellent Student Paper and Presentation Award at the iEMSs Biennial Congress, International Environmental Modelling and Software Society. Ottawa, Canada. 2010.
- Significant Professional Contribution Award at the International Conference on Energy, Environment and Disasters (INCEED 2005), UNESCO. Charlotte, USA. 2005.
- (Investigation group) - II Award “Dra. Conceição”, in the category “Remarkable investigation Project”, Coordination of the medicine program at the Federal University of Campina Grande, Brazil. 2004.