

**Fausto Miguel Cereja Seixas Freire**, Born 1970, Portugal  
 Assistant Professor at the Mechanical Engineering Department  
 Faculty of Science and Technology of the University of Coimbra, Portugal

### I– EDUCATION

- **1998- (expected 2004):** Doctoral Candidate, **IST**-Technical University of Lisbon. Provisional Dissertation Title: *“Life Cycle Activity Analysis – an Optimizing Approach To Industrial Ecology Integrating Environmental and Economic Analysis: Methodology and Applications”*  
 Supervisors: *Prof. Paulo Ferrão, IST, Lisbon and Prof. Sten Thore University of Texas, Austin, USA*
- **Sept-Nov, 2001:** Specialization Course in **Industrial Environmental Management**, PGG, Aveiro
- **1993-96:** **M.Sc. (Energy)**. **IST**-Technical University of Lisbon. Classification 5/5. Thesis Title: *“Experimental Analysis of the Drying Kinetics of an Agro-Alimentary Product”*
- **1994-95:** Specialization Course in **Energy Management**, Technical University of Lisbon
- **1988-93:** Diploma in **Mechanical Engineering**, specialization: **Thermodynamics and Fluids**. Classification 16/20. University of Coimbra, Portugal

### II– PROFESSIONAL POSITIONS/ACADEMIC EXPERIENCE

- **1997-Present:** Assistant Professor
- **Aug-Sept, 1996:** Visiting Professor, University Eduardo Mondlane. Maputo, Mozambique
- **1995-Present:** Research and Teaching Assistant at the Mech. Eng. Dept. of the University of Coimbra
- **1994-95:** **Research and Project Engineer** at the Energy and Environment Department of the Electricity Holding Company of Portugal (EDP), Lisbon

### III– TEACHING ACTIVITIES

Mechanical Engineering diploma (5-year course) disciplines, University of Coimbra

**Current Courses:** *Energy and Environmental Management (5<sup>th</sup> year), Seminar on Research Projects (5<sup>th</sup> year), Industrial Economics (3<sup>rd</sup> year) and Technical Drawing I (1<sup>st</sup> year)*

**Courses Taught: 1995-2003:** *Energy Management (5<sup>th</sup> year), Engineering Economics (3<sup>rd</sup> year) and Technical Drawing II (1<sup>st</sup> year)*

Other courses and short-courses:

**October 2002; April 2001:** *“Industrial Ecology”, “Life Cycle Assessment” and “Life Cycle Approaches”* courses in the post-graduate program “Principles of pollution abatement”. Department of Zoology, University of Coimbra

**Sept-Dec, 2001:** *“Life Cycle Assessment and Eco-Design”* course. Environmental Engineering Diploma at the Agrarian Polytechnical School of Coimbra

**Nov. 1998, May 1999, April 2000, Oct. 2000, Nov. 2001:** *“Economic Evaluation of Projects with Natural Gas”*, post-graduation of “Natural Gas Projects”, University of Coimbra and Inst. Pedro Nunes (IPN)

**Aug-Sept, 1996:** *“Engineering Thermodynamics”* and *“Heat Exchangers Design”* courses at the Mechanical Engineering Dept. of the University of Eduardo Mondlane, Mozambique

### IV– AWARDS

**“Best Paper Award”** recipient for the technical paper entitled *“Life Cycle Activity Analysis Applied to the Portuguese Used Tire Market”*. Total Life Cycle Conference 2000, April 26-28, USA, organized by the SAE

### V– PROFESSIONAL AFFILIATIONS

- *The International Society for Industrial Ecology*, c/o School of Forestry and Env. Studies at Yale University
- *Portuguese Engineering Society*
- *Operations Research Portuguese Association (APDIO)*

## VI– RECENT PUBLICATIONS

### Articles in refereed journals and books

- Freire, F.**, Malça, J and Rozakis, S (2004). “*Integrated economic and environmental life cycle optimization: an application to biofuel production in France*”. In Multiple Criteria Decision Aiding (MCDA), based on the papers presented at the 56th Meeting of the European Working Group Decision MCDA (2002), pp. 247-272
- Malça, J. and **Freire, F.** (2004). “*Life cycle energy analysis for bioethanol: allocation methods and implications for energy efficiency and renewability*”. In Energy-Efficient, Cost-effective, and Environmentally-Sustainable Systems and Processes. Rivero, R., Monroy, L., Pulido, R., and Tsatsaronis, G. (eds). Instituto Mexicano del Petróleo. México. Vol.3, pp. 997-1011. (based on papers presented at the 17th International Conference on Efficiency, Costs, Optimization, Simulation and Environmental Impact of Energy and Process Systems, ECOS 2004)
- Freire, F.**, Williams, E, Azapagic, A, Clift, R, Stevens G. and Mellor, W. (2002). “*Life Cycle Activity Analysis: A Case Study of Plastic panels*”. In: Technology Commercialization: DEA and related analytical methods for evaluating the use and implementation of technical innovation (Thore, ed.), pp. 323-352, Kluwer Academic Publishers
- Thore, S and **Freire, F.** (2002). “*Activity Analysis with Environmental Variables and Recycling: An Example from the Portuguese Bottled Water Industry*”. Technology Commercialization: DEA and related analytical methods for evaluating the use and implementation of technical innovation (Thore, ed.), pp. 301-321, Kluwer Academic Publishers
- Thore, S and **Freire, F.** (2002). “*Using DEA to Rank the Performance of Producers in the Presence of Environmental Goals*”. In Technology Commercialization: DEA and related analytical methods for evaluating the use and implementation of technical innovation (Thore, ed.), pp. 363-384, Kluwer Academic Publishers
- Freire, F.**, Thore, S and Ferrão, P (2001). “*Life Cycle Activity Analysis: Logistics and Environmental Policies for Bottled Water in Portugal*”. OR Spektrum, vol. 23 (1), pp. 159-182. Special issue: “Operations Research and Environmental Management”
- Freire, F.**, Ferrão, P., Reis, C and Thore, S. (2000). “Life Cycle Activity Analysis Applied to the Portuguese Used Tire Market”. Journal of Passenger Car – Mechanical Systems. SAE Transactions, vol. 109, nº 6, pp. 1980-1988 (“Best Paper Award” recipient from the Total Life Cycle Conference 2000)
- Freire, F.**, Figueiredo, A and Ferrão, P. (2001). “*Modeling High Temperature, Thin Layer, Drying Kinetics of Olive Bagasse*”. Journal of Agricultural Engineering Research, vol. 78 (4), pp. 397-406
- Freire, F.**, Figueiredo, A and Ferrão, P. (1999). “*Thermal Analysis and Drying Kinetics of Olive Bagasse*”. Drying Technology, vol. 17 (5), pp. 895-907
- Ferrão, P., Figueiredo A. and **Freire, F.**, (1998). “*Experimental Analysis of the Drying Kinetics of a Food Product*”. Drying Technology, vol. 16 (8), pp. 1687-1702

### Conference Proceedings (with referees)

- Freire, F.** and Thore, S. (2002). “*Life Cycle Activity Analysis: An integrated environmental and economic mathematical programming decision-support model*”. Proceedings of the Seminar “Comprehensive economic and spatial bio-energy modeling”. Serie A: Options Méditerranéennes, nº 48, CHIEAM

### Articles in conferences

- Malça, J. and **Freire, F.** (2004) Carbon and energy balances for biodiesel: Life-cycle emissions and energy savings. Proceedings of the 2nd International Ukrainian Conference on Biomass for Energy.
- Malça, J, Rozakis, S and **Freire, F.** (2003). “*Análise Energética do Ciclo de Vida de Biocombustíveis: Aplicação à fileira do bioetanol em França*”. 3as Jornadas Politécnicas de Engenharia. ISEC, Coimbra, November 19-20, 2003
- Freire, F.**, Malça, J and Rozakis, S (2002). “*Biofuel production systems in France: integrated economic and environmental life cycle optimization*”. II Int. Conf. on Mechanical Engineering, VI Conf. on Industrial Thermal Energy, Renewable Energy and the Environment Universidad Central de Las Villas, 13-15 Nov., 2002, Cuba
- Freire, F.** (2001). “*Economic and Environmental Optimization of the Life Cycle of Products: Methodology and Applications*”. Oikos Phd Summer Academy 2001: Environmental Management & Policy And Related Aspects Of Sustainability”, University Of St. Gallen, August 27-31, Switzerland
- Freire, F.**, Thore, S. and Ferrão, P. (1998). “*Life cycle assessment and activity analysis: an application to beverage containers in Portugal*”. In Loiselle, S and Rossi, C (eds), Environmental Change: Valuation Methods and Sustainable Indicators, pp. 301-309

### Conference Posters

Malça, J and **Freire, F** (2004). *"Biofuel Energy Systems: an Integrated Approach towards Sustainability "*. Gordon Research Conference on Industrial Ecology: Engineering Global Systems. August 1-6, 2004. Oxford, UK

Ferrão, P and **Freire, F** (2000). *"Advanced Tools for the promotion of industrial symbiosis"*. Gordon Research Conference on Industrial Ecology: Engineering Global Systems. Colby Sawyer College. June 11-16, 2000. New London, USA

**F. Freire**, S. Thore, P. Ferrão and R. Figueiredo (1999). *"Integrating Economics and Thermodynamics in the Optimization of the Life Cycle of Products"*. Gordon Research Conference on Modern Developments in Thermodynamics. Session: "Thermodynamics and Economics". Italy, April 18-23, 1999

#### Notes for Teaching

**Freire F** (2004). Instructor's notes for teaching *"Energy and Environmental Management"* (in Portuguese). Department of Mechanical Engineering, University of Coimbra

**Freire F** (1998). Instructor's notes for the course *"Economic Evaluation of Projects with Natural Gas"* (in Portuguese). Pedro Nunes Institute, Coimbra

**Freire F** (1996). Instructor's notes for teaching *"Engineering Economy"* (in Portuguese). Department of Mechanical Engineering, University of Coimbra

#### **VII– REFEREE FOR THE FOLLOWING JOURNALS**

- *Resources, Conservation and Recycling*, Elsevier
- *Byosystems Engineering*, Silsoe Research Institute
- *Revista Ibero-Americana de Engenharia Mecânica*
- *Journal of Agricultural Engineering Research*, Silsoe Research Institute
- VI Congresso Ibero-Americano de Engenharia Mecânica (2003), Coimbra, Portugal

#### **VIII– ORAL COMMUNICATIONS AND RESEARCH TALKS**

*"Integrated Economic and Environmental Life Cycle Optimization: Methodology & Application to Biofuels"* First International Seminar on Biofuels. August 4-6, 2004. National University of Colombia, Bogotá

*"Biofuels in the European Union. Political and Technical Issues"* (with Malca, J). First International Seminar on Biofuels. August 4-6, 2004. National University of Colombia, Bogotá

*"Renewability and Energy efficiency. The relevance of considering the entire life cycle in decision supporting – an application to bioethanol"*. (with Malca, J). First International Seminar on Biofuels. August 4-6, 2004. National University of Colombia, Bogotá

*"Industrial Ecology and Life Cycle Assessment" Methodology & Application to Biofuels"*. First International Seminar on Biofuels. August 10, 2004. Course on Renewable Energy. Mechanical Engineering Department. National University of Colombia, Bogotá

*"Life Cycle Activity Analysis: an Optimizing Approach to Industrial Ecology"*. International Society for Industrial Ecology Inaugural Conference: The Science & Culture of Industrial Ecology. Nov. 12-14, 2001. The Netherlands

*"Optimization Models Accounting for Environmental Effects over the Life cycle of Products"*. 2001 Symposium on Sustainability, Clarkson University Center for Environmental Management, Potsdam, NY, and N.S.F., USA

*"Life Cycle Activity Analysis: A mathematical programming decision-support model"*. International workshop "Comprehensive Modelling of Bio-Energy Systems" workshop. June 7-8, 2001. INRA-Unité Mixte de Recherche Economie Publique, Grignon, France

*"Optimização Económica e Ambiental do Ciclo de Vida de Produtos. Aplicação ao Mercado dos Pneus Usados em Portugal"*. IO'2000 — 9º Congresso da Associação Portuguesa de Investigação Operacional. Setúbal, Portugal. April 16-19, 2000

*"Life cycle activity analysis: logistics and environmental policies for bottled water in Portugal"*. International workshop: "Operations research and Environmental Management". Nov. 25-26, 1999. Technical University of Braunschweig, Germany

*"Life Cycle Activity Analysis: An innovative framework integrating Economics and Environment in the optimization of the life cycle of Products"*. European Summer School on Industrial Dynamics. Corsica, France, Sept. 5-12, 1999

*"Life cycle assessment and activity analysis: an application to beverage containers in Portugal"*. Environmental Change: Valuation Methods and Sustainable Indicators, EC Advance Study Institute. S. Miniato, Italy. Aug. 29- Sept. 6, 1998

### IX– RESEARCH VISITS

Center for Environmental Strategy (CES) at the University of Surrey: Collaborating on the project: “*Life Cycle and Process Optimization Approach to the Selection and Integrated Chain Management of Polymer Materials*” (CHAMP), several months during 2000 and 2001

### X– RELEVANT SHORT COURSES/MEETINGS ATTENDED

- February 11-16-, 2003. “*Frontiers 2: European applications in ecological economics*” University of La Laguna and European Society for Ecological Economics. Puerto de La Cruz, Tenerife, Espanha
- Novembet.13-15, 2002. “*II Int. Conf. on Mechanical Engineering, VI Conf. on Industrial Thermal Energy, Renewable Energy and the Environment*”. Universidad Central de Las Villas. Cuba
- June 7-8, 2001. “*Comprehensive Modeling of Bio-Energy Systems*”, INRA - Unité Mixte de Recherche “Economie Publique, Grignon, France
- June 16-19, 2001. *2001 Symposium on Sustainability*”, Clarkson University Center for Environmental Management. Potsdam, NY, and National Science Foundation
- June 11-16, 2000. “*Gordon Research Conference on Industrial Ecology: Engineering Global Systems*”. Colby Sawyer College. New London, USA
- May 22-26, 2000. “*GAMS Advanced Short Course*”. Prof Bruce McCarl, from the Texas A&M. Univ. of Wageningen, The Netherlands
- Sep.-Out. 1999. EC ASI on “*Decision Tools and Processes for Integrated Environmental Assessment*”. Universidade Autónoma de Barcelona. Spain
- September 1999. “*European Summer School on Industrial Dynamics*”. EC ASI. Córsega, France
- July 1999. “*General Equilibrium modelling*”. ISEG, Technical University of Lisbon
- July 1999. “*Summer Institute on Global Environmental Issues*”. Luso-American Foundation. Lisbon, Portugal
- May 1999. Euroconference: “*Quality of Life, Sustainability and Environmental changes*”. Austria
- November 1998. International NOW Conference “*Beyond Sustainability: Integrating behavioural, economical and environmental research*”. Amsterdam
- Aug-Sept 1998. “*Environmental Change: Valuation Methods and Sustainable Indicators*”. EC ASI, Italy
- July 1998. “*Thermodynamics and the Optimization of Complex Energy Systems*”. NATO ASI, Romania
- Jan. 1997. “*Improving Environmental Performance: LCA for Materials, Resources and Wastes*”. Centre for Environmental Strategies. University of Surrey, Guildford, UK
- Nov.-Dec. 1995. “*Young Managers for Environment Projects*”. University of Aveiro, Portugal

### XI– CONTACT DETAILS

Professional Address: Mechanical Engineering Department  
University of Coimbra – Pólo II Campus  
3030-201 Coimbra, PORTUGAL

Tel: ++351-239-790739 Fax: ++351-239-790701  
E-mail: [fausto.freire@dem.uc.pt](mailto:fausto.freire@dem.uc.pt)