

Training school Life Cycle Assessment applied to food packaging



RETHINKING

PACKAGING FOR CIRCULAR AND SUSTAINABLE FOOD SUPPLY CHAINS OF
THE FUTURE

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University of Aveiro,
Portugal

October 24-27, 2022



DAY 1

Monday, October 24

14:00 REGISTRATION

14:30 WELCOME

- **Paula Quinteiro & Cláudia Nunes** | Universidade de Aveiro, PT
- **Fátima Poças** | Universidade Católica do Porto, PT
- **Ana Isabel Miranda** | Director of Department of Environment and Planning - DAO, Universidade de Aveiro, PT
- **Amadeu Soares** | Scientific Coordinator of Centre for Environmental and Marine Studies - CESAM, Universidade de Aveiro, PT
- **João Coutinho** | Director of Associate Laboratory CICECO – Aveiro Institute of Materials, Universidade de Aveiro, PT
- **Milena Corredig** | Cost Action Chair & Aarhus Universitet, DK

14:45 PRACTICAL MATTERS & INTRODUCTION OF SPEAKERS

Paula Quinteiro & Cláudia Nunes | Universidade de Aveiro, PT

15:15 WHAT IS LCA FOR?

Paula Quinteiro | Universidade de Aveiro, PT

15:45 APPLICATION OF LCA TO PACKAGING SYSTEMS: AN OVERVIEW

Fátima Poças | Universidade Católica Portuguesa, PT

16:15 Refreshments & Snack

17:00 SOCIAL ACTIVITY – Tour on a traditional Moliceiro boat



9:00 INTRODUCTION ON LCA

- Key features of an LCA (what is LCA - why is LCA done - development of LCA)
- Phases of an LCA (goal and scope definition - inventory analysis - impact assessment – interpretation)
- General concepts of product systems (product system - system boundary – functional unit – allocation - environmental impacts etc.)

Ana Cláudia Dias | Universidade de Aveiro, PT

Paula Quinteiro | Universidade de Aveiro, PT

10:30 Refreshments & Snack

11:00 INTRODUCTION ON LCA (continuation)

- General concepts of product systems (product system - system boundary – functional unit – allocation - environmental impacts etc.)

Ana Cláudia Dias | Universidade de Aveiro, PT

Paula Quinteiro | Universidade de Aveiro, PT

12:30 Lunch break

14:00 CASE STUDY 1.

Representation of food packaging in LCA

Victoria Krauter | University of Vienna, AT

15:00 CASE STUDY 2.

A real-life case: LCA of food packaging in the canning industry

Rúben Aldaco | Cantabria University, ES

16:00 Refreshments & Snack

16:15 CASE STUDY 3.

Application of LCA to assess labelling options of a glass bottle

Fátima Poças | Universidade Católica Portuguesa, PT

17:15 PACKAGING DESIGN FOR FOOD

Teresa Franqueira | Universidade de Aveiro, PT

18:15 CLOSING



9:00 INTRODUCTION TO PRODUCT ENVIRONMENT FOOTPRINT

Marisa Vieira | PRé Sustainability, NL

9:45 APPLIED LCA

How to build up a SimaPro model

- Structure of a model and creating processes
- Impact assessment

Marisa Vieira | PRé Sustainability, NL

10:30 Refreshments & Snack

11:00 HOW TO BUILD UP A SIMAPRO MODEL (continuation)

Marisa Vieira | PRé Sustainability, NL

12:30 Lunch break

14:00 SIMAPRO PRACTICE

Case study of food packaging

- Life cycle inventory
- Life cycle impact assessment
- Hotspots analysis

Marisa Vieira | PRé Sustainability, NL

16:15 Refreshments & Snack

16:30 SIMAPRO PRACTICE (continuation)

Marisa Vieira | PRé Sustainability, NL

18:00 CLOSING



9:00 BIODEGRADABLE POLYMERS FOR FOOD PACKAGING

Cláudia Nunes | Universidade de Aveiro, PT

9:45 CASE STUDIES 4 & 5

- Ecodesign and Life cycle assessment of pharmaceutical packaging
- Ex-ante life cycle assessment framework and application to a biopolymer film market

Fausto Freire | Universidade de Coimbra, PT

10:45 Refreshments & Snack

11:00 THE CIRCULAR ECONOMY AND ITS APPLICATION TO PACKAGING

Paulo Ferrão | Instituto Superior Técnico, Universidade de Lisboa, PT

11:30 BRAINSTORMING/ROUNDTABLE

Learnings, limitation and challenges. Perspective of future work

12:30 CLOSING OF THE TRAINING SCHOOL

- **Paulo Ferrão** | Instituto Superior Técnico, Universidade de Lisboa, PT
- **Artur Silva** | Vice-Rector of Universidade Aveiro, PT
- **Ana Isabel Miranda** | Diretor of DAO, Universidade de Aveiro, PT
- **Paula Quinteiro & Cláudia Nunes** | Universidade de Aveiro, PT
- **Fátima Poças** | Universidade Católica Portuguesa, PT
- **Milena Corredig** | Cost Action Chair & Aarhus Universitet, DK



Invited Speakers



PAULA QUINTEIRO

Universidade de Aveiro, PT

Paula Quinteiro holds a PhD in Environmental Sciences and Engineering, a master in Sustainable Energy Systems and a Degree in Chemical Engineering, from the University of Aveiro. P. Quinteiro works as an Assistant Researcher at the University of Aveiro, being an integrated researcher member of the associated laboratory Centre for Environmental and Marine Studies (CESAM), located at the University of Aveiro). P. Quinteiro main research expertise and interests focus on environmental assessment tools, such as water footprint, carbon footprint, life cycle assessment and life cycle sustainability assessment, following a life cycle thinking approach towards the vision for a sustainable value chain and the transition to a circular economy. P. Quinteiro has been working on the development and application of water footprint methodology and evaluation of environmental impacts of suspended solids in the water column. At the same time, P. Quinteiro has been applying the life cycle thinking based tools to assess the potential environmental and social impacts of products from various sectors, including seafood, packaging, ceramics, forest (eucalypt and pine), agriculture (vines), bioenergy, pulp and paper, construction materials, etc.



ANA CLÁUDIA DIAS

Universidade de Aveiro, PT

Ana Cláudia Dias is assistant researcher at the Department of Environment and Planning of University of Aveiro and member of the associated laboratory CESAM. She has a degree in Environmental Engineering and a PhD degree in Environmental Applied Sciences. Her main research interests are in the field of development and application of environmental management tools based on life cycle thinking, such as life cycle assessment, life cycle sustainability assessment, and carbon and water footprints. She published about 100 papers in peer reviewed journals and more than 90 conference papers, and she participated in more than 30 projects. She is member of the Technical Committee of the DAPHabitat - system for environmental product declarations for the habitat.





CLÁUDIA NUNES

Universidade de Aveiro, PT

Cláudia Nunes is a Researcher at CICECO - Aveiro Institute of Materials at the University of Aveiro. She holds a PhD in Biochemistry from the University of Aveiro since May 2008, having her PhD work focused on the extraction and structural analysis of polysaccharides. The main scientific interests include the development of biomaterials based on polysaccharides for application in the biomedical and food areas. Her experience is recognized by the publication of 1 patent, 8 book chapters and 93 articles in International Journals cited in the Science Citation Index, with 1500 citations (h = 26). She coordinated and participated in several research projects funded by national and European programs (28 in total).



FÁTIMA POÇAS

Universidade Católica Portuguesa, PT

BSC in Chemical engineering (Porto University) and MSc in Packaging (School of Packaging Michigan State University), PhD in Biotechnology – Food Science and Engineering (Escola Superior de Biotecnologia da Universidade Católica Portuguesa). She teaches packaging materials and systems for the last 30 years. She integrates the Research Centre CBQF since 2009 focusing on safety of packaging, recycling and cellulosic materials. She represents Portugal at European Network of Food Contact Materials Laboratories and has served as expert in several working groups of European Food Safety Authority.



VICTORIA KRAUTER

University of Vienna, AT

After studying food and biotechnology at the University of Natural Resources and Life Sciences (Vienna), FH-Prof. Dr Victoria Krauter specialized in the subject of (food) packaging and sustainability in her professional career. At FH Campus Wien she works in the department of packaging and resource management in research and teaching. She is also head of the Competence Center for Sustainable and Future Oriented Packaging Solutions and City of Vienna Endowed Professor for Sustainable and Future Oriented Packaging. In the COST project Circul-a-bility she leads working group 4, Cereals & Confectionary.





RÚBEN ALDACO

Cantabria University, ES

Dr. Rubén Aldaco is a Professor in Chemical Engineering at the Cantabria University, Spain. His research is currently mainly focused on environmental decision-making tools, including Life Cycle Assessment (LCA) and sustainability tools and metrics. Another issue of his interest addresses bioeconomy, circularity aspects of products, and the sustainable use of the natural resources. In this framework, he coordinates national and European research projects, transferring his knowledge through several research contracts for public administrations, institutions and private companies at regional, national and global scale. He has authored over 120 peer-reviewed journal and conference papers, and he also serves as a reviewer for several peer-reviewed journals, as well as scientific committee member of academic conferences. He has actively participated in different thematic networks, including the Spanish Thematic Network of Life Cycle Assessment, Spanish Thematic Network of Sustainability of Processes and Chemical Products and recently in the Network of Excellence in Life Cycle Assessment (esLCA). He is the Head of the Spanish LCA Network from 2018.



TERESA FRANQUEIRA

Universidade de Aveiro, PT

Teresa Franqueira is Associate Professor at the University of Aveiro, is a designer and the Director and Scientific Coordinator of the Design Factory Aveiro at the Creative Science Park Aveiro Region. Teresa is the International coordinator of the DESIS Network - Design for Social Innovation and Sustainability (a network with 65 labs) and was the founder and coordinator of the research group ID+ DESIS Lab (from 2011 till 2018). Teresa is also senior researcher at the ID+ Research Unit (University of Aveiro and University of Porto). She has an habilitation in industrial design, a PhD in Design at Politecnico di Milano; a MSc degree in Industrial Design; a Post-Graduation degree at the Glasgow School of Art and Portuguese Design Centre and a BsC degree in Product Design. She is member of the Rectory Team for Pedagogical and Curricular Innovation. Her research interests focus on themes related to product-service design, design thinking, social innovation, circular economy and alternative scenarios towards more sustainable economic and social models. In the last years, she was the local coordinator of four international Erasmus + projects and was involved in other European research and Erasmus projects in the thematics such as education for creative thinking, for social innovation, for circular economy and sustainability. She is now coordinating an Erasmus+ Strategic Partnership at the University of Aveiro and is a National Delegate and Member of the Management Committee for the COST Action 18236 - SHIINE.





MARISA VIEIRA

PRé Sustainability, NL

Marisa Vieira works as a Principal consultant at PRé Sustainability. She holds a PhD in Fossil and Mineral Resource Scarcity in LCA from the Radboud University of Nijmegen, and a Master's degree in Environmental Sciences and Technology from the University of Porto. Marisa combines a hands-on, scientifically robust environmental metrics expertise with an eye on business applications. Marisa's experience is focused on life-cycle-related solutions, with a special focus on Environmental Footprinting. At PRé, she manages complex consultancy projects with a wide variety of organisations. Marisa is the Content Lead of Consultancy team at PRé and the coordinator of the SimaPro database in the Database team. Marisa is also part of the PEF training team.



FAUSTO FREIRE

Universidade de Coimbra, PT

Fausto Freire is associate professor at UC, with research and teaching on life-cycle based approaches, and Circular Economy systems to enhance the sustainability of products and systems. Member and co-founder of the coordination committee of the Energy for Sustainability initiative at UC. Faculty at the MIT-Portugal program and MIT visiting Scholar (2010-2012, several months). Fulbright Scholar at the University of Michigan in 2008. Member of the International Society for Industrial Ecology (treasurer and council member in 2012-2013). Prof. Freire has studied and coordinated several large projects on products, industrial and energy systems, and supervised 15 PhD thesis. Evaluator for H2020 projects, Fulbright Foundation, European Science Foundation, A3ES. Senior member and expert in Energy of the Portuguese Engineers Association. Co-Editor-in-Chief of the journal Cleaner Environmental Systems (2020-), Elsevier. He has +3000 citations in Scopus, with an h-index= 28.





PAULO FERRÃO

Instituto Superior Técnico, Universidade de Lisboa, PT

Paulo Ferrão is a Distinguished Professor of Instituto Superior Técnico - University of Lisbon, President of IN+, Center for Innovation, Technology and Policy Research. He is a board member of the EUREKA Association. He has been President of the COST association from 2019 to 2021 and the President of Fundação para a Ciência e a Tecnologia (Portuguese

National Science and Technology Foundation) from 2016 to 2019, and Director of the MIT-Portugal Program from 1996 to 2016. He is a member of the Environmental Advisory Committee of Rolls-Royce.

He is a member of the European Commission Mission Board on “Climate-Neutral and Smart Cities”, and he has been engaged with the U.S. National Academies as a member of the Sustainability Roundtable, the Committee on “Sustainability Linkages in the Federal Government” and the committee of “Pathways to Urban Sustainability: Challenges and Opportunities for the United States”. He has been leading the urban project component in two ADB projects, for which the publication “Urban metabolism of six Asian Cities” emerged. His scientific career has evolved within the areas of “Laser diagnostics for turbulent combustion”, “Energy Systems” and “Industrial Ecology”. He is very active in the area of Waste management, and he was the coordinator of the National Waste Management Strategy for Portugal and of the Portuguese Municipal Waste Management Strategic Plan (PERSU 2020).

He is author and co-author of nine books and more than hundred peer-reviewed papers published in scientific journals and a variety of book chapters and over hundred papers presented in conferences and invited talks in different domains.

