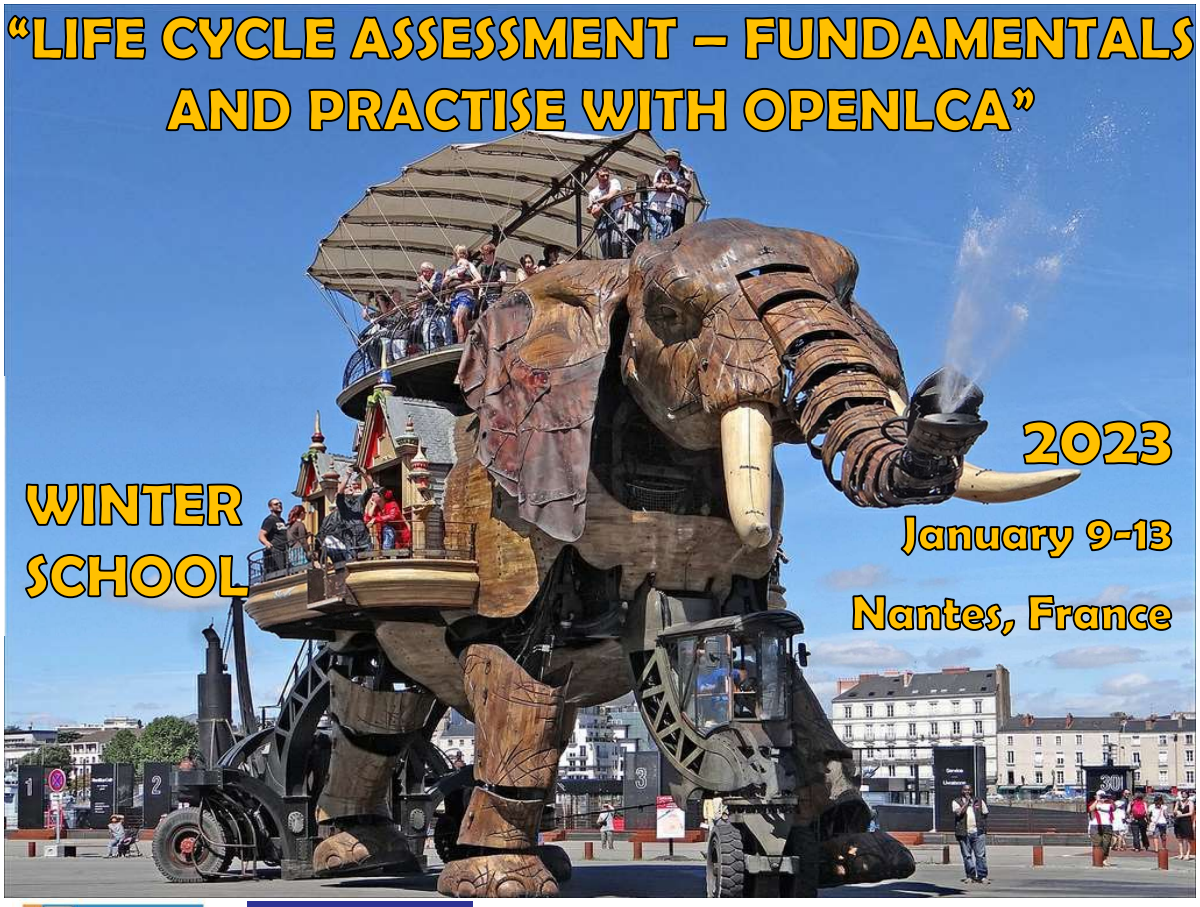

ORGANISERS

This winter school is organized by University Gustave Eiffel (formerly IFSTTAR) and INRAE (formerly IRSTEA), supported by the EcoSD network, and hosted by the IRSTV.

It is opened to 15 doctoral students from the EcoSD network, IRSTV federation as well as to international collaborators of IRSTV.

The winter school is supervised by Pr. Anne Ventura, who is research director at University Gustave Eiffel.

ECOSD

EcoSD (Eco-design of Sustainable Systems) Network is a French association with the objective of encouraging collaboration between academic and industrial researchers in order to create and spread advanced knowledge in eco-design fields. This initiative aims at helping a global sustainable development process at national and international scales.

IRSTV

IRSTV (Scientific and Technical Research Institute on City) is a research center from the CNRS (French National Center of Research, FR2488) that conducts research on physical and social phenomena in cities, in order to develop knowledge to assess strategies for mitigating and adapting cities to the important transitions such as ecology, energy and climate change. It hosts a research axis on urban metabolism (CoDiUM) inside which the two teachers are active.

PREREQUISITES

Master 2 students as minimum level.
For beginners, no basic knowledge of Life Cycle Assessment is needed.

OBJECTIVES

Context: Many education programs propose Life Cycle Assessment (LCA) courses but they are currently restricted to few hours and correspond more to an initiation or an introduction to LCA than to an actual competence. However, with current and upcoming new regulations, the professional world requires not only more and more competences in LCA, but also those competences to be shared by collaborators from different educational backgrounds and professional activities. Indeed, collaborative and transdisciplinary working conditions are necessary for LCA studies in order to get relevant and in-depth results.

Learning objectives: this course aims at bringing fundamentals knowledge on LCA method to students from various educational backgrounds, as well as at ability to conduct an LCA study with OpenLCA open source software. The teaching conditions favors collaborative work.
Practical work relies upon the use of a numerical application allowing students to be autonomous, to self-test and progress at their individual rhythm.

TEACHING STAFF

- Anne Ventura (researcher at University Gustave Eiffel)
- Lynda Aissani (researcher at INRAE)

CONTENT

	Morning 9.30 – 12.00 Courses	Afternoon 13.30 – 16.30 Practical work	Evening
Day 1	Theoretical and conceptual basis of LCA and life cycle thinking **Teacher:** Anne Ventura	Fundamentals of OpenLCA software **Teacher**: Anne Ventura	Homework (individual or in groups)
Day 2	Building an LCA model **Teacher:** Anne Ventura	Conduct a simple LCA study **Teacher**: Anne Ventura	
Day 3	Analysis of LCA results, parts of a system, design of a simulation plan for sensitivity analysis **Teacher:** Anne Ventura	Conduct a parametrized LCA with sensitivity analysis **Teacher**: Anne Ventura	
Day 4	Actors, functionality, system modeling for multi-functionality **Teacher:** Anne Ventura	Monte Carlo simulation for calculating uncertainties **Teacher:** Anne Ventura	
Day 5	LCA indicators for impact categories **Teacher:** Lynda Aissani	According to students' individual choice: - Finish exercises if needed - Advanced functions of OpenLCA : spatialization - Individual support on student personal project **Teachers**: Anne Ventura, Lynda Aissani	

TEACHING MATERIAL

All participants will receive:

- An OpenLCA user's manual in PDF format;
- A numerical copy of all numerical applications for OpenLCA exercises
- A numerical copy of courses main content (presentations or compendiums)

ATTENTION: each student must come with its own personal computer with latest version of OpenLCA installed (download from http://www.openlca.org)

Language: courses are in English unless the entire audience is familiar with French language.

ORGANIZATION

Number of participants: 15

Location: IRSTV, Ecole Centrale de Nantes, 1 rue de la Noë 44300 Nantes, **room will be indicated to registered participants** (campus map provided page 5)
Access by public transports: Tramway line 2 – Stop « Ecole Centrale – Audencia »
In case of restrictions linked to covid-19 the course will be fully on-line.

REGISTRATION & CONTACT

The training is free of charge but registration is mandatory. To register complete the form:
https://surveys.ifsttar.fr/limesurvey/index.php/466668?lang=en
before December 9th 2022
ATTENTION: Meals and accommodation are at the charge of participants.

Dr. Anne Ventura
E-mail: anne.ventura@univ-eiffel.fr
Phone: +33 (0) 2 40 84 58 11

USEFUL LINKS

EcoSD: http://www.ecosd.fr/en/
IRSTV: https://irstv.ec-nantes.fr/
University Gustave Eiffel: https://www.univ-gustave-eiffel.fr/en/
INRAE: https://www.inrae.fr/
ISIE: https://is4ie.org/

MAP OF ECOLE CENTRALE DE NANTES

A Niveau 0 : ACCUEIL - AMPHI A - HALL A, direction de la formation / scolarité / direction des relations internationales
Niveau 1 : Direction, direction de la recherche, direction de la communication
direction générale des services, direction des ressources humaines, direction des affaires financières,
direction des affaires institutionnelles
salle des conseils

B Niveau 0 : Salle de cours - INFIRMERIE
Niveau 1 : Salle de cours - Salles informatiques - Bureau des PEI

C Niveau 0/1 : Salle de cours - Salles multimédias

D Niveau 0 : Direction des Systèmes d'Information - Direction de la prévention et des services généraux
Niveau 1 : Salles de TP Mécanique des Fluides et Énergétique (MFE) et TP Automatique / Robotique
Supercalculateur
Niveau 2 : LHEEA : Laboratoire de recherche en Hydrodynamique, Énergétique et
Environnement Atmosphérique
> Équipes b Hydrodynamique et Génie Océanique et Modélisation numérique
Service Facturier

E Niveau 0 : En Travaux

F Niveau 0 : Salle de cours informatique - TP Mécanique, Matériaux et Génie Civil
Niveau 1 : GeM - Institut de Génie Civil et Mécanique
Pôles Structures et Couplage et Matériaux poreux, interactions, ouvrages
GeM - équipes Matériaux-Ouvrages-Environnement et Structures et Simulations

G LHEEA > Moyens d'essais en hydrodynamique : bassin des carènes - bassin océanique

H LHEEA > Équipe Énergétique des Moteurs à Combustion Interne - Banc d'essais moteurs
GeM > RMP Rapid Manufacturing Plateform

I Atelier de Fabrication Mécanique / Plateforme RFI

J GeM - Institut de Génie Civil et Mécanique > dalle d'essais en génie civil
Atelier du service technique
Livraison de Marchandises - local colis

L Floor 0 : AMPHI L - HALL L, Gymnase - Médiathèque - Bureau des élèves - Salle de déjeuner
Floor 1 : Communication, Langues, Entreprises et Sport - Cafeteria

M LHEEA > Équipe Énergétique des Moteurs à Combustion Interne - Banc d'essais moteurs
Département Équipe Moteur - Local archives

N LHEEA > Équipe Dynamique de l'Atmosphère Habitée
et équipe Énergétique des Moteurs à Combustion Interne
Département Mécanique des Fluides et Énergétique

O GeM > Centre de ressources en essais dynamiques

P Ingénierie des Produits et Systèmes Industriels - TP Automatique / Robotique

R MDE (maison des élèves)

S AMPHI S - HALL S
LS2N - Laboratoire des Sciences du Numérique de Nantes

T GeM - Institut de Génie Civil et Mécanique > Pôle Matériaux et Procédés de Fabrication
Équipe de recherche du CERMA / IRSTV - Institut de Calcul Intensif (ICI)
Incubateur Centrale - Audencia - ensa Nantes
Direction du Développement et des Relations Industrielles - Centrale Nantes Alumni

Résidences Étudiantes

IM3 Département Informatique / Mathématiques
Direction Immobilière
Entreprises hébergées : CALLIGÉE / LEDIXIS / NEXTFLOW – SOFTWARE – INNOSEA

IM3b Bureau MAURIC / D-Ice ENGINEERING