### PhD course n°1

**Advanced LCA Methodologies and Tools : Uncertainties & Impact Assessment**

| Organizers (names & email) | Prof. Dr. Isabelle Blanc (isabelle.blanc@mines-paristech.fr)  
Dr. Anne Ventura (anne.ventura@univ-nantes.fr) |
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<tbody>
<tr>
<td>Dates</td>
<td>January 20th – January 24th 2014 : week 4</td>
</tr>
<tr>
<td>Location</td>
<td>MINES ParisTech - Sophia Antipolis (06)</td>
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<tr>
<td>Keywords</td>
<td>LCA – Impact Assessment – Uncertainties - Variability</td>
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<tr>
<td>Nb of hours/ECTS</td>
<td>3 ECTS (8 x 3h courses + 6h case study + 8h personal homework)</td>
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<td>Pre-requisite</td>
<td>LCA methodology : basics and practice of an LCA software // Basics in Statistics // English</td>
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<tr>
<td>Description</td>
<td>This PhD class is orientated along 2 major innovative research axes for Life Cycle Assessment :</td>
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1. How to handle uncertainties in LCA and how to understand & handle impacts variability in pathways

   - Introduction to Uncertainties / Variability,
   - LCA and Sensitivity Analyses, a review of statistical tools,
   - Meta-Analysis / Meta models applied to LCA,
   - Parameterized models and reduced parameterized models applying Global Sensitivity Analysis (GSA) for energy pathways

2. New methodological developments related to spatial and temporal aspects

   - LCA & Impacts : Introduction,
   - New developments in LCA (1) : the spatial differentiation,
   - New developments in LCA (2) : the temporal differentiation.

Applications and illustrations mainly cover energy pathways.

8 sessions of 2h are scheduled for personal projects using R statistical tool.

This course is taught in English.
<table>
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<tr>
<th>Day</th>
<th>CDE n°1</th>
<th>8h30-10h00</th>
<th>10h30-12h00</th>
<th>13h30-15h00</th>
<th>15h30-17h</th>
<th>Personal Homework 17h-19h</th>
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| 1    | **Introduction to Uncertainties / Variability related to LCAs**  
Teacher(s): Isabelle BLANC - MINES Paristech | Sensitivity Analyses : a review of statistical tools  
Teacher(s): Robin GIRARD - MINES Paristech | Assessing uncertainties for LCAs  
Teacher(s): Robin GIRARD - Camille MARINI/ Mathilde Marchand ? MINES Paristech | Meta-Analysis / Meta-Models  
Teacher(s): Camille MARINI -MINES Paristech | Hands on R software  
Robin GIRARD – Camille MARINI | |
| 2    | Parameterized models & Reduced parameterized models with GSA (generation of simplified models)  
Teacher(s): Isabelle BLANC -MINES Paristech | Reduced parameterized model : a simplified model for wind electricity production  
Teacher (s): Camille MARINI | Case Study : generation of a simplified model for an energy pathway  
Teacher (s): Camille MARINI - Mathilde MARCHAND - Isabelle BLANC - MINES Paristech - | Case Study : generation of a simplified model for an energy pathway  
Teacher (s): Camille MARINI - Mathilde MARCHAND - Isabelle BLANC - MINES – Robin GIRARD Paristech - | Case study homework (1) | |
| 3    | **LCA & Impacts : Introduction**  
Teacher (s): Anne Ventura - Chaire Eco-construction / Université de Nantes | **LCA & Impacts**  
Teacher (s): Anne Ventura - Chaire Eco-construction / Université de Nantes | **LCA & Impacts**  
Teacher (s): Anne Ventura - Chaire Eco-construction / Université de Nantes | **New developments in LCA : the spatial differentiation**  
Teacher (s): Lynda AISSANI - IRSTEA | Case study homework (2) | |
| 4    | **New developments in LCA : the spatial differentiation**  
Teacher (s): Lynda AISSANI – IRSTEA | Impact characterization – application to odor impact for a waste management pathway  
Teacher (s): Mathilde MARCHAND – MINES ParisTech | New developments in LCA : The temporal differentiation  
Teacher (s): Didier BELOIN-SAINT-PIERRE - CSTB | New developments in LCA : The temporal differentiation  
Teacher (s): Didier BELOIN-SAINT-PIERRE - CSTB | Case study homework (3) | |
| 5    | **Case study finalization** | **Case study finalization** | **Presentation of the case study & Discussion** | | |