

Université de technologie de Compiègne – Thesis proposal

Part 1: Scientific sheet	
Thesis proposal title	Environmental Comparison and Optimization of Territorial Organic Waste Management Strategies
PhD grant	Doctoral work contract based on a French Ministry of Research Grant and the CIRAIG's International Life-cycle Chair
Research laboratory	Research Laboratory 1: TIMR (Integrated Transformations of Renewable Matter), UTC Web site: https://www.timr.utc.fr/ Research Laboratory 2: CIRAIG (International Reference Center for Life Cycle of Products, Services and Systems), Polytechnique Montréal (EPM) Web site: https://ciraig.org/
Thesis supervisor(s)	- Olivier Schoefs, Full Professor, UTC - Guillaume Majeau-Bettez, Assistant Professor, EPM
Scientific domain(s)	Science and technology Environnement
Research work	In a context of ecological transition and green growth, the environmental optimization of the management and recovery of residual organic materials is fundamental to achieving the objectives set by governments. From an environmental point of view, life cycle analysis (LCA) is recognized as the reference method for systematically quantifying the various types of environmental impacts (multi-criteria) caused directly and indirectly by a technological choice, and this in order to avoid burden shifting. However, the use of LCA as a decision-making tool for the management of residual organic materials faces various obstacles including the difficulty of taking into account local specificities and constraints, variability in the composition and magnitude of residual flows, and the limited number of comparable scenarios due to inefficiencies in data collection and consolidation. The objective of the thesis is therefore to develop an environmental optimization tool for the management of residual organic materials in a territory taking into account the different technologies available, the local characteristics of the scenarios, and the environmental risks. The student will carry out his thesis project by combining conventional LCA and risk analysis tools and an environmental optimization tool under development (programming in Python or Scilab). The first part of the thesis will be carried out in the TIMR laboratory of UTC and the second part at the CIRAIG of Polytechnique Montréal.
Key words	Residual organic material, Life Cycle Analysis, treatment processes
Requirements	Master degree in engineering or equivalent Process engineering / chemical engineering skills Skills in treatment processes and / or LCA appreciated Good level of English, curiosity, proactivity, ability to work in a team
Starting time	October 1, 2021
Location	- Compiègne University of Technology (TIMR Laboratory) - Polytechnique Montréal (CIRAIG Laboratory)

Part 2: Job description	
Duration	36 months
Additional missions available	Teaching
Research laboratory	<p>The Integrated Transformations of Renewable Matter (TIMR) research unit aims to develop, validate and implement the knowledge and know-how intended for the processes and reactions of transformation of renewable material.</p> <p>This thesis project involves the skills of several TIMR teams including the MAB team (Microbial Activities and Bioprocesses) in the field of biological treatments and the EPICE team (Environment Protection in Chemical Engineering) in the field of heat treatments, environmental impacts and industrial risks. It also involves the skills of CIRAIG in the field of life cycle analysis, circular economy and environmental optimization.</p>
Material resources	The student will have the facilities of the TIMR laboratory and the CIRAIG, including in particular an office and the appropriate computer equipment including the software and databases necessary for his research.
Human resources	<p>The TIMR laboratory currently has 81 members, including 29 teacher-researchers and researchers from UTC, 12 teacher-researchers from ESCOM, 6 administrative and technical support staff, 31 doctoral students, 1 ATER and 2 associate members.</p> <p>CIRAIG is currently made up of 11 teacher-researchers and researchers, 3 administrative and technical support staff and 28 Ph.D or M.Sc.A students.</p>
Financial resources	The operating costs will be provided by the internal resources of the MAB and EPICE teams of TIMR and of CIRAIG
Working conditions	The doctoral student will be required to organize and regularly participate in progress meetings with the supervisory team made up of members of TIMR and CIRAIG, to write progress reports and to participate in the promotion of his work (writing of scientific papers, communications in national and international conferences, etc.). The first half of the thesis will be carried out within the TIMR laboratory, the second part within the CIRAIG. The doctoral student must demonstrate autonomy, curiosity and a proactive attitude.
Research project	
National collaborations	
International collaborations	Research collaboration between TIMR and CIRAIG
International cosupervision (cotutelle)	Co-supervised thesis between the Compiègne University of Technology and Polytechnique Montréal
Contact	<p>Olivier SCHOEFS, +33 (0) 3 44 23 46 40, olivier.schoefs@utc.fr, TIMR, Rue Roger Coultolenc, CS 60319, 60203 Compiègne cedex, France</p> <p>Guillaume MAJEAU-BETTEZ, +1 514 340 4711, guillaume.majeau-bettez@polymtl.ca, CIRAIG, Queen Mary 3333 Suite 310, Montreal, Quebec, H3V1A2, Canada</p>

Please contact first the thesis supervisor before applying online on <https://webapplis.utc.fr/admissions/doctorants/accueil.jsf>