Bouquet de thèses 2025

The doctoral thesis described below is part of a series of theses designed to build a multidisciplinary scientific approach to the societal challenge of a "responsible digital society", and more specifically, the specific theme of "Data and AI in a sustainable and responsible approach", identified as a priority issue by the 4 institutions of the Lyon Saint-Etienne Engineering College (Centrale Lyon, ENTPE, INSA Lyon, Mines Saint-Étienne) and by the Université Jean Monnet Saint-Étienne, which are providing financial support for the theses making up this 2025 package.

The 2025 theses package includes 6 theses covering different facets of data science and artificial intelligence, addressing the following questions:

- Monitoring crystallization processes using AI-assisted acoustic emission
- AI-assisted design of biodegradable and/or biosourced biopolymers for the sustainable protection of agricultural crops
- Machine learning methods for urban microclimate prediction
- Data-driven non-linear structure identification
- Inference and explicability in confidential mode: towards self-diagnosis via images
- Towards certification of vibration monitoring with explanatory AI

These theses involve a total of 16 supervisors from 11 laboratories on the Lyon Saint-Etienne site (Centre d'Innovation en Télécommunications et Intégration, Centre SPIN - Génie des Procédés, Ingénierie des Matériaux Polymères, Biologie Fonctionnelle, Insectes et Interactions, Institut Camille Jordan, Laboratoire de Mécanique des Fluides et d'Acoustique, Laboratoire de Tribologie et Dynamique des Systèmes, Laboratoire d'InfoRmatique en Image et Systèmes d'information, Laboratoire Hubert Curien, Laboratoire Vibrations Acoustique, Matériaux : Ingénierie & Science) of which the 5 funding institutions are supervisors. The 6 PhD students recruited under this package will be enrolled in 3 Doctoral Schools on the site: MEGA, EDML, SIS.

The teams (doctoral students and their supervisors) involved in these 6 theses form a multi-disciplinary scientific community: regular exchanges between these teams will take place throughout the 3 years of the doctoral pathway, notably in the form of joint seminars to develop the multi-disciplinary systems approach specific to the bouquet and enrich the teams' disciplinary skills in a spirit of sharing and learning. Thesis papers produced at the end of the doctoral program will also reflect the original positioning of the thesis work within a bouquet, by including a chapter analyzing the impact of the work carried out on the "Data and AI in a sustainable and responsible approach" issue.