

Projects and Collaborations

Projects shared by both teams

- **[PRIMA European project, 2008-2011.](#)** The project PRIMA aims to develop a method for scaling down the analysis of policy impacts on multifunctional land uses and on the economic activities. This method will rely on micro-simulation and multi-agents models, designed and validated at municipality level, using input from stakeholders. The models will address the structural evolution of the populations (appearance, disappearance and change of agents) depending on the local conditions for applying the structural policies on a set of municipality case studies.

International projects

- **[FICT 2.0. European project \(2017-2020\).](#)**

FuturICT 2.0 is an international European Project funded under the FLAG-ERA Joint Transnational Call (JTC) 2016. It started in February 2017 and will have a duration of three years. The project was inspired by the FuturICT Pilot, and its goal is to find a path for understanding and managing complex, global, socially interactive systems. From financial crisis to climate change, from crime and conflicts to resource management: the world is currently facing grand social challenges, that need to be addressed with new approaches and tools. FuturICT 2.0 aims at creating an incentive system to take on some of the main challenges of modern society. This will be achieved through what we call Finance 4.0 - a circular and sharing economy that would allow to create a high quality of life for more people with less resources. Under this "Finance 4.0" label, we will integrate experiments and computer simulations, to provide an operational, effective example of how the mixed ICT/Social Science approach could lead towards a more resilient and adaptive society.

- **[PATRES. European project \(completed in 2010\).](#)**

PATRES is a project supported by the New and Emerging Science and Technology programme of the sixth Framework Programme of the European Commission, coordinated by LISC. It studies the application of a definition of resilience developed in LISC to a series of case studies of complex dynamics (savanna, languages, bacterial biofilms, web). The book: "Viability and Resilience of Complex Systems: Concepts, Methods and Case studies from Ecology and Society". G. Deffuant and N. Gilbert editors. Springer 2011, synthetises the research carried out during this project. [more info on the book.](#)

- **[DREAM. European project, FP7, \(completed in 2013\)](#)**

This project allowed to produce method and tools for computing viability kernels applied to food industry systems. The framework Viabilitree (see [softwares](#)) is a significant output of this project.

- **[IMAGES. European project \(completed in 2001\)](#)**

French projects

- **Virgo. ANR young researcher project, 2016-2019.** A formal viability-based framework for the robust and adaptive management of Coupled Infrastructure Systems within an Institutional and Analysis Development framework

- **HERDECT. Projet CASDAR, 2017-2020.**

Herbage growth assessment with UAV and satellite images - PI: Alain Airiaud, Chambre d'agriculture Loire-Atlantique.

- **ASSOCIATIONE. Projet "Thématiques émergentes" Conseil Régional Auvergne Rhône-alpes, 2015-2019.**

Pourquoi les agriculteurs n'adoptent-ils pas une innovation qui leur profiterait et profiterait à la collectivité ? Il a souvent été constaté que la présence des éléments identifiés comme expliquant l'adoption ne l'entraînent pas systématiquement. De nombreux états de l'art ont par ailleurs montré l'importance d'allier d'une part agronomie et anthropologie, d'autre part psychologie sociale et modélisation dynamique pour dépasser les limites des travaux actuels. La réunion inédite des trois équipes Auvergnates que sont le LISC, le LAPSCO et Metafort permettra de bâtir les briques d'un modèle informatique générique du comportement de l'agriculteur face à l'innovation en prenant en compte son identité, son contexte social et environnemental et les caractéristiques majeures de son exploitation.

- **resus.irstea.fr. ANR project, 2015-2016.** Réseau sur la viabilité et la durabilité.

- **Patrames. Convention MEDDE - DEB (Direction de l'Eau et de la Biodiversité), 2017-2018.**

Comparing modelling approaches for the assessment of landscape functional connectivity - PI: Frédéric Archaux, Irstea Nogent-sur-Vernisson.

- **Velocite. Convention MEDDE - DEB (Direction de l'Eau et de la Biodiversité), 2016-2017.**

Climatic, edaphic and dispersal constraints on understorey plant metapopulation dynamics. - PI: Laurent Bergès, Irstea Grenoble.

- **RAZ 13. Projet Irstea, 2016-2018.**

Les dynamiques d'un système, comme le risque, peuvent être décrites sur la base des perceptions des acteurs opérationnels (gestionnaires, personnes concernées) et/ou être formalisées dans des cadres mathématiques. Le passage du langage opérationnel vers le langage formalisé - et vice versa -, encore peu exploré, est au cœur du présent projet. Processus aléatoires, théorie du contrôle optimal et viabilité, sont des formalismes mathématiques pouvant décrire l'évolution des variables d'un système dans un environnement qui peut perturber son état ou ses règles d'évolution et apporter ainsi des réponses à des questionnements différents liés au risque. Notre objectif est, en combinant ces formalismes, de produire des « cartes » de risque multi-entrées dont la richesse réside dans la diversité des indicateurs dont nous étudierons la complémentarité avec les acteurs opérationnels.

- **Démether. ANR project (terminé en 2015).** Manufacture of reliable insulation panels for the construction industry made from by-products of sunflower farming.

- **DISCO. ANR project (SYSCOMM call, terminé en 2013).** The objective is to develop and study computational and mathematical models of biofilm dynamics, taking into account the biodiversity (distribution of bacteria species) and spatial structure. The project gathers specialists of IBM study and reduction techniques, mathematical analysis of ecosystems modelling, multi-scale modelling of

complex structures and dynamics, wastewater engineering and biodiversity measurements through DNA fingerprints, and solid waste biodegradation and microscopic biofilm structure imaging. During the project, models will be matched with experimental data at both micro and macroscopic scales.

- **FORGEKO. ANR project (terminé en 2012)**, Aims at developing methods for integrated management of forests. Includes participatory processes and use of viability theory.
- **DEDUCTION. ANR project (« Agriculture et Développement Durable » call, terminé en 2010)**. LISC coordinates this project. The objective of the project is to study the potential of viability theory in clarifying the concept of sustainable development. The project gathers partners from mathematics who collaborate with specialists of the environment and development.

Other collaborations

- [Mexico](#) Network

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