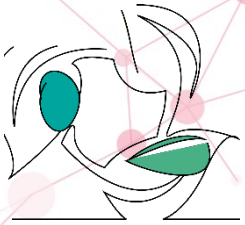
Eco-Epidemiology of Emerging Diseases (ECO-EPI)



Explore this IDIL Master's track in detail, including its academic objectives, curriculum, research opportunities, admission requirements and career prospects.

TRACK OVERVIEW & LEARNING OBJECTIVES

The emergences of diseases caused by pathogens are major contemporary challenges, as evidenced by recent outbreaks over the past few decades, the large number of scientific publications, and the mobilization of international organizations.

These phenomena are complex and multifactorial : degradation of natural ecosystems, biodiversity loss, environment overexploitation, agriculture intensification, pollution(s), urbanization, land artificialisation, climate change, globalization of human and trade exchanges, antimicrobial misuses, inappropriate healthcare, sectoral compartmentalization, disinvestment in the public sector, declining vaccination coverage, poverty... So, the **eco-epidemiological approach**, based on multidisciplinary expertise and cross-sectoral actions (Susser & Susser, 1996), has become essential to address these issues.

The Eco-EPIED master's program **trains experts** capable of **analyzing the relevant phenomena from an integrative perspective. By advancing knowledge on the complexe outbreak dynamics**, their researches will **support the increasing need of cross-sectoral interactions** to improve preventive and management strategies.

KNOWLEDGE, SKILLS & COMPETENCIES

See « RNCP » sheet of Mention « Eco-Epidemiologie » (in french).

More specifically for the Eco-EPIED specialisation :

- **Specific skills**

✓ Conduct an integrated diagnosis of complex phenomena involved in epidemics and outbreaks of pathogens affecting humans and/or animals, combining all the necessary disciplines (parasitology, ecology, evolution, infectious diseases, genetics, geography, sociology, anthropology, law, mathematics, and applied computer science, etc.).

✓ Identify and describe the environmental changes and socio-economic, cultural, or healthcare contexts or changes, whether local or global, involved in epidemics and emergences of human and/or animal pathogens, in the objective to anticipat and manage them.

✓ Conduct and interpret analytical and prospective studies, using the relevant methods, data, and tools (software, documentation, etc.) to develop a comprehensive scientific and societal approach.

✓ Create and manage a computer database of complex epidemics or outbreaks of human and/or animal pathogens.

✓ Understand, use, and design theoretical and empirical models (statistics, simulation, modeling) of complex epidemics or outbreaks of human and/or animal pathogens.

✓ Propose solutions ranging from local to global in order to address the issues and challenges related to the emergence and management of epidemics on a global scale.

✓ Provide integrative analysis and solution proposals (that are or could be implemented) in the national and/or international operational and institutional context of surveillance and management of infectious and parasitic diseases in humans and/or animals.

✓ Anticipate the technical, structural, and human resources, as well as environmental and health management strategies, needed to limit the impact of global changes on the emergence of human and/or animal pathogens

✓ Provide advice on environmental and health policy to public or private organizations concerning epidemiological surveillance and epidemic management, with a view to assisting decision-making

✓ Produce notes and studies in English to assist decision-making

- ✓ Coordinate a project in an international and multicultural context and/or within a multidisciplinary team with the aim of proposing sustainable solutions shared at the regional or international level.

- **Transversal skills (shared with all master graduates)**

- ✓ Identify digital uses and the impact of their evolution on the field(s) covered by the specialization

- ✓ Independently use advanced digital tools for one or more professions or research sectors in the field

- ✓ Mobilize highly specialized knowledges, some of which are at the forefront of knowledge in a field of work or study, as a basis for original thinking

- ✓ Develop a critical awareness of knowledge in a field and/or at the interface of several fields

- ✓ Solve problems to develop new knowledges and new procedures and integrate knowledges from different fields

- ✓ Make innovative contributions in high-level exchanges and in international contexts.

- ✓ Conduct a reflective and detached analysis taking into account the issues, problems, and complexity of a request or situation in order to propose appropriate and/or innovative solutions in line with regulatory developments

- ✓ Identify, select, and critically analyze various specialized resources to document a subject and synthesize this data for use

- ✓ Communicate for training or knowledge transfer purposes, both orally and in writing, in English

- ✓ Manage complex, unpredictable professional or academic contexts that require new strategic approaches

- ✓ Take responsibility for contributing to professional knowledge and practices and/or for reviewing a team's strategic performance

- ✓ Lead a project (design, management, team coordination, implementation and management, evaluation, dissemination) that may require multidisciplinary skills in a collaborative setting

- ✓ Analyze one's actions in professional situations, self-evaluate to improve one's practice as part of a quality approach

- ✓ Respect the principles of ethics, professional conduct, and environmental responsibility

Take into account the issues of disability and accessibility in all professional actions.

DETAILED CURRICULUM

- **Semester 1 (S7) compulsory teaching units**
  - Pathogens: from viruses to helminths (3 ECTS)
  - Ecology and Evolution of Microorganisms and Parasitism (4 ECTS)
  - Introduction to Emerging Diseases Eco-Epidemiology (2 ECTS)
  - Statistical Modeling (2 ECTS)
  - Bioinformatic and Data Base (3 ECTS)
  - In-Lab (s) (2 ECTS) – number and thematics depending on the year-
  - Personal project (10 ECTS)
  - Transversal training units IDIL (4 ECTS)
  - Non-Core Unit (2 ECTS)

- **Semester 2 (S8) compulsory teaching unit**
  - Research internship Eco-EPIED (30 ECTS)

- **Semester 3 (S9)**
  Compulsory teaching units
  - Transmission: cases studies (2 ECTS)
  - Risks; Risk Analysis and Monitoring (2 ECTS)
  - Vectors (2 ECTS)
  - Zoonoses (2 ECTS)
  - Eco-epidemiology of anti-microbial resistance (2 ECTS)
  - Multidisciplinary team project (10 ECTS)
  - Transversal units IDIL (4 ECTS)
  - Non-Core Unit (2 ECTS)

  Optional teaching unit (one among three)
  - Disturbance Ecology (2 ECTS)
  - Functional Genomics and Epigenomics in an environmental context (2 ECTS)
  - Mathematical Modeling for Climate and Environnement (2 ECTS)

- **Semester 4 (S10)**
  - Final Year Internship in Eco-Epidemiology of Emerging Diseases (30 ECTS)

ADMISSION REQUIREMENTS & STUDENT PROFILE

This interdisciplinary training is opened to

- ✓ students with a bachelor's degree in Life sciences or Health sciences, whatever the specialization field (from molecular to population biology and ecology),
- ✓ students with a bachelor's degree in Life and Earth sciences
- ✓ students with a bi-disciplinary bachelor's degree in Humanities and Heath sciences, Humanities and Biological sciences.
- ✓ Recently graduated students from Pharmacy or Human medicine or Veterinary medecine
- ✓ students with a bachelor's degree in Geography and Development, Social sciences, Health and Social sciences. *However, additional background details indicating their ability to quickly acquire skills of so-called "hard" sciences must be identified from their application*.

The choice of a master's program has a profound impact on the skills—and therefore the career and responsibilities—of the future graduate. So, whatever the previous academic background, **each candidat must demonstrate a strong interest** in pathogen agents, transmissible diseases and outbreak events. A basic understanding of (and a basic interest in) the program's thematics and objects of interest, as well as the social and human context(s) in which those events occur, is obviously an important prerequisite for any application. His/her academic and non-academic background must attest his/ her open mind to transdisciplinary approach. **This previous thinking is carefully evaluated**

Fluency in scientific English (B2 as minimum level, C1 recommended) is required. Autonomy and teamwork skills are also necessary.

No direct entry in M2.

CAREER OPPORTUNITIES

The Eco-EPIED master's program prepares all students to pursue their involvement in scientific research (PhD) by emphasizing the importance of interdisciplinary and international openness.

The PhD and following scientific carrier can be conducted in a fundamental and academic context on emergencies and epidemics, but also more applied to improving their management or prevention.

RESEARCH LABORATORIES & ACADEMIC PARTNERS

Notorious montpellieran research units devoted in emerging diseases analysis and control support the program. See : https://eco-epidemiologie.com/laboratoires-engages-dans-le-master-laboratories-involved-in-the-master/

International laboratories also ingaged : Healthdeep https://www.healthdeep.org/

And LMI PRESTO https://www.ird.fr/lancement-du-laboratoire-mixte-international-presto-lors-du-symposium-collaborative-strategy-one

It involves as well experts from international organizations (WHO, WOAH, FAO), public health agencies (ARS), pharmaceutic laboratories (as CEVA-Animal Health) and non-governmental organizations.