# Internship - Literature Review Tool: from scientific papers to MATER database

## Abstract

Following a successful internship in 2025, we have a functional prototype of a local RAG (Retrieval-Augmented Generation) tool for automated querying of scientific corpora. This internship aims to further develop the prototype by implementing our thematic workflows with outputs that are both workflow-specific and standardized across the MATER ecosystem; and integrate it directly into the MATER ecosystem.

## Context

Regional energy transitions are occurring worldwide amid growing tensions—climatic, geopolitical, and economic. Current numerical models representing transition dynamics have limitations: they struggle to test scenario feasibility from a biophysical standpoint and to provide recommendations at appropriate decision-making scales. New tools are needed to support prospective thinking for these stakeholders.

The team develops MATER (Multi-regional Assessments of Technologies Energies and Resources): a Mass-Flow-Analysis/Input-Output model generator that represents the biophysical structure of human societies, i.e.the flows and stocks of resources between human and terrestrial systems, and among human systems themselves.

With the exponential growth of scientific publications, efficiently retrieving domain-specific information and data has become increasingly complex. Quick and easy access to this data is essential for generating models useful to multiple stakeholders (public authorities, industries, think tanks, associations, academics) seeking to create individual prospective scenarios and shared pathways when interacting on the same system.

Automating this retrieval, processing it against specific scientific questions, and integrating it into the MATER database will provide significant time savings, allowing the team to focus on data analysis and publication.

## Main Responsibilities

The successful candidate will be responsible for:

**Technical development:**

- Develop and implement customized thematic workflows on the existing prototype
- Standardize outputs according to MATER ecosystem specifications
- Ensure traceability and reproducibility of processing (pre-RAG and post-RAG)
- If time allows, create an automated pipeline for direct feeding of the MATER database

**Documentation and dissemination:**

- Rigorously document workflows and code (open source standard)
- Ensure source citation and processing transparency
- Participate in tool presentations to the team

**Collaboration:**

- Work closely with both the internship supervisor (technical infrastructure integration) and the "users" team (functional specifications)
- Participate in research team activities

# Required Profile

## Degrees and Training

- Master's student (M2), engineering school, or equivalent training (RNCP level 6 or higher)
- Knowledge of scientific publications information systems appreciated

## Languages

- Fluency in **English** is required (technical documentation and communication)
- French is a plus

## Scientific skills

- Proficiency in Python and its data ecosystem (pandas, numpy)
- Experience with LLMs and RAG techniques
- Database skills (SQL, vector databases like Qdrant)
- Knowledge of git and development best practices
- Familiarity with containerization (Docker/Podman) appreciated

## Transferable skills

- Autonomy and rigor in code documentation
- Ability to work in a team
- Interest in energy transition and sustainability issues

## Additional assets

- Experience with user interface frameworks (Gradio, Streamlit)
- Knowledge of scientific article retrieval APIs
- Sensitivity to open source and reproducible best practices

# Conditions

- **Location:** SIMAP EPM, 1340 rue de la piscine, 38610 Gières

- **Contract Type:** Internship
- **Duration:** 2 to 6 months
- **Start Date**: Flexible
- **Application Deadline:** Continuous hiring
- **Remuneration:** Legal internship allowance / approximately €600-650 gross monthly

*Please feel free to apply for the position even if you do not have all the required skills and knowledge. Missing skills can be learned, and we value diverse perspectives and experiences.*

*You will join a dynamic, collaborative, and supportive working environment consisting of a small and highly motivated team.*

*We welcome candidates from all backgrounds, career paths, and identities. Our team is committed to creating an inclusive research environment where everyone can contribute and thrive.*

# Contacts and Information

Please send your CV and cover letter to the following contacts with "Internship: Literature Review Tool" in the email subject line. Applications will be reviewed and processed on a rolling basis until the position is filled.

**Scientific Information**:


– Olivier Vidal, Researcher, ISTerre, CNRS : olivier.vidal@univ-grenoble-alpes.fr
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