PhD Position: Cross-Domain Knowledge Engineering for Crisis Management: A Neurosymbolic Approach

Aim

As part of a collaborative doctoral partnership between the **National Technical University of Athens (NTUA)** and the **European Commission's Joint Research Centre (JRC)**, this PhD position aims to develop a comprehensive approach to **knowledge engineering for crisis management**, enabling **semantic interoperability** and **AI-enhanced reasoning** across early warning and decision-support systems, within the European Crisis Management Laboratory (ECML) and in the scope of the JRC portfolio on "Anticipation, Risk, Resilience".

The project will support better integration of knowledge and foster mutual understanding among different communities of practice to address complex situations and anticipate emerging critical risks. It will integrate and extend methodologies and tools for **intelligence-gathering**, **situational awareness**, and **threat assessment**, leveraging a neuro-symbolic approach, i.e. combination of **semantic technologies** and **AI models** for **knowledge extraction, representation, reasoning, and exploration**.

The position

The PhD candidate will be enrolled in the PhD Program of the NTUA **School of Rural, Surveying, and Geoinformatics Engineering**. The following three members of the **Advisory Committee** will be responsible for shaping the research agenda and providing strategic guidance to the candidate:

- Dr Margarita Kokla, Associate Professor, School of Rural, Surveying and Geoinformatics Engineering, NTUA
- Dr Luigi Spagnolo, European Crisis Management Laboratory, JRC.E.1 Disaster Risk Management Unit
- Dr Katerina Pastra, Associate Researcher, Institute for Language and Speech Processing, Athena Research Center.

The PhD candidate will spend designated periods at the **NTUA campus in Athens** and the **JRC site in Ispra**, according to the following approximate timeline:

- **First 6 months – NTUA:** The candidate will attend any required courses, develop a detailed research plan, conduct a comprehensive literature review in the main research areas of the PhD (ontology engineering, knowledge extraction, reasoning, neuro-symbolic methods, and visual data exploration), and begin problem analysis, initial requirements elicitation, and ontology engineering.
- **Next 24 months – JRC Ispra:** The candidate will continue the research at the JRC, focusing on requirements elicitation, knowledge representation, extraction, reasoning, and exploration. This phase will also include the evaluation of the developed approach and the publication of scientific results.

- **Final phase – NTUA:** The candidate will return to NTUA to complete the PhD project and prepare the doctoral dissertation.

During their 24-month stay at the JRC, the PhD candidate will be employed as a **JRC Grantholder Category 20** in accordance with the *Grantholder Rules of 30.10.2012* or any future rules replacing them. The employment contract will be governed by Italian law, as the position is based at the JRC site in Ispra, Italy. The position includes the salary and benefits applicable to Grantholders Category 20; the **annual gross salary** is **approximately EUR 45.000** and is subject to national income tax.

Profile of the PhD Candidate

The candidate should hold a **master's degree** and demonstrate strong academic knowledge and hands-on experience (e.g., thesis work or other significant projects) in at least **two** of the following **areas**:

- **Semantic Web and related standards** (OWL, RDF, SPARQL, SHACL, etc.), including proposed extensions (e.g., RDF-star and SPARQL-star)
- **Knowledge representation and ontology modelling** (ontology/schema alignment)
- **Graph databases and related applications**
- **Computational reasoning** (e.g., logical, spatio-temporal) or **decision making** (e.g., under uncertainty)
- **Machine learning** for entity and event resolution (within or across modalities) or **knowledge extraction**
- **Information architectures, advanced user interfaces, and user experiences** for exploring large (graph-based) datasets

The candidate should also be proficient in at least one of the following programming languages: **Python, JavaScript/TypeScript, Java, or C#.**

Employment contract at JRC

Prior to the start of the employment contract with the JRC, candidates must:

- Hold the **nationality of a Member State of the EU** or a country associated to the EU Research Framework Programme in force, or have **resided in an EU Member State for at least five years**; and
- Be **enrolled in a PhD programme** with the School of Rural, Surveying, and Geoinformatics Engineering of the National Technical University of Athens.

The selected candidate will have no more than 6 months from the request for confirmation of interest in the position, to produce proof of enrolment in the doctoral study program.

How to apply

Applicants seeking admission as doctoral candidates must submit their application to the Secretariat of the School of Rural, Surveying and Geoinformatics Engineering (secret@survey.ntua.gr) using "Collaborative Doctoral Partnership between NTUA and JRC" in the subject line by **Friday, 23 January 2026**, accompanied by the following documents:

1. A detailed curriculum vitae (CV).
2. Copies of degree certificates.
3. Official transcripts.
4. Proof of proficiency in English.
5. Proof of IT skills.
6. Two letters of recommendation.
7. A short statement of the proposed doctoral project, as perceived by the candidate.
8. A copy of a national identity card, passport, or any other official document serving as proof of identity.

Selection process and criteria for evaluation

The selection process consists of **two phases**. In the **first phase**, the School's Selection Committee, together with the proposed supervisor, will review applications and may invite candidates for interviews to support the assessment and create a shortlist of two to five candidates. In the **second phase**, the shortlisted candidates will be interviewed by the JRC host unit, which will make the final decision for the PhD position.

In selecting candidates for Doctoral Studies, the following **criteria** are evaluated and considered:

- Overall degree grade.
- Relevance of the candidate's studies to the scientific field of the doctoral dissertation.
- Grades in undergraduate or postgraduate courses related to the scientific area of the dissertation.
- Performance in the diploma or master's thesis.
- Previous research, academic, or professional activity, particularly related to the dissertation topic, and any scientific publications or presentations.
- Any additional postgraduate qualifications beyond the minimum required.
- Letters of recommendation.
- Documented IT skills.
- Quality of the PhD statement.
- Interview with the Selection Committee.

For **additional information** regarding this position, please contact **Dr Margarita Kokla**, email: mkokla@survey.ntua.gr.