First International Workshop on Spatial Intelligence and Reasoning Enabled by Knowledge Graphs and Foundation Models (SPARK2026)

Amin Anjomshoaa[1], Manolis Koubarakis[2] and Hamid Rabiei[3]

[1]Vienna University of Economics and Business, Austria
[2]National and Kapodistrian University of Athens, Greece
[4]Dublin City University, Ireland

Abstract

This preface summarizes the International Workshop on Spatial Intelligence and Reasoning Enabled by Knowledge Graphs and Foundation Models (SPARK2026), a co-event with the 25th International Semantic Web Conference (ISWC 2026), held on October 26th, 2025, in Bari, Italy. The workshop aims to foster interdisciplinary research at the intersection of spatial intelligence, geospatial data, and geospatial foundation models, with a particular focus on their growing integration within the Semantic Web and knowledge graph communities and their application across a wide range of domains.

Keywords

Spatial AI, Spatial Intelligence, Spatial Reasoning, Foundation Models, Knowledge Graphs, Semantic Web

1. Introduction

Spatial intelligence plays a central role in understanding, modeling, and reasoning about complex real-world phenomena that are inherently geographic and spatiotemporal. With the growing availability of geo data and spatiotemporal data from sensors, Earth observation systems, digital twins, and location-aware services, there is an increasing need for methods that can effectively integrate spatial aspects into knowledge-based systems. This workshop aims to bring together researchers and practitioners working on spatial intelligence, geospatial data management, and spatiotemporal reasoning, with a particular focus on their integration within Semantic Web, Knowledge Graph and Foundation Model ecosystems.

SPARK 2026 seeks to foster knowledge exchange on innovative approaches to representing, integrating, and reasoning over spatial and spatiotemporal data, with a particular focus on bridging symbolic methods and sub-symbolic techniques, including machine learning, graph representation learning, and graph embeddings. The workshop will explore methods for modeling spatial and spatiotemporal information in knowledge graphs, advancing spatial reasoning capabilities, and adopting standards, vocabularies, and best practices to support interoperable geospatial and spatiotemporal data. It will also highlight practical applications of spatial intelligence across domains such as smart cities, environmental monitoring, mobility, crisis management, and digital twins. By bringing together these perspectives, SPARK 2026 aims to demonstrate how the integration of knowledge graphs and spatial intelligence can enable advanced analytics, support intelligent decision-making, and address real-world challenges.

This year's workshop invited novel and interdisciplinary research addressing the growing use of geospatial data, geospatial knowledge graphs, and geospatial foundation models across a broad range

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*Corresponding author.
†These authors contributed equally.
amin.anjomshoaa@wu.ac.at (A. Anjomshoaa); koubarak@di.uoa.gr (M. Koubarakis); hamid.rabiei555@gmail.com (H. Rabiei)
https://anjomshoaa.github.io/ (A. Anjomshoaa); https://cgi.di.uoa.gr/~koubarak/ (M. Koubarakis)
0000-0001-6277-742X (A. Anjomshoaa); 0000-0002-1954-8338 (M. Koubarakis); 0000-0003-2576-793X (H. Rabiei)
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of topics, including:

- Spatial and spatiotemporal reasoning in knowledge graphs
- Geospatial Knowledge Graphs and ontologies
- Spatial machine learning and AI for geospatial data
- Applications in smart cities, urban planning, and mobility
- Foundation models for spatial understanding
- Using foundation models for constructing spatial KGs
- KG Embedding & representation learning for Spatial Data
- Question Answering & Reasoning over Spatial KGs

2. Accepted Papers

The submitted papers cover a broad range of interdisciplinary topics and were evaluated through a single-anonymous peer-review process, with each paper reviewed by multiple Program Committee members. The list of accepted papers is provided below, organized alphabetically by title:

- BrepPMIOnt: Ontology for Semantic Validation of Computer-aided Design Models
  Julian Gebhard, Ratan Bahadur, Yuebo Wang and Steffen Staab
- CartoGraph: Generating Reference Answers for Map Visual Question Answering Benchmarks
  Rene Dorsch, Andreas Harth and Daniel Henselmann
- Does Cognitive Plausibility Matter for Agentic GeoAI? Testing Source–Target Asymmetry in Distance Estimation
  Krzysztof Janowicz and Alexandra Fortacz-Lazan
- On the capabilities of large reasoning models for cardinal direction reasoning
  Orestis-Minas Kapopoulos, Vasileios Kyriakopoulos, Maria Tsourma, Despina-Athanasia Pantazi and Manolis Koubarakis
- SOGO: A Scaling Ontology for Geospatial Observations in Knowledge Graphs
  Amin Anjomshoaa

3. Program Committee

The workshop organizers would like to express their sincere gratitude to the Program Committee members for their valuable contributions, expertise, and support: Andreas Both (Leipzig University of Applied Sciences, Germany), Zoe Falomir (Umea University, Sweden), Krzysztof Janowicz (University of Vienna, Austria), Iraklis Klampanos (University of Glasgow, Scotland), Mehrdad Koohikamali (California State Polytechnic University Pomona, USA), Gavin McArdle (University College Dublin, Ireland), Pierre Maret (Université Jean Monnet, St. Etienne, France), Cogan Shimizu (Wright State University, USA), Dimitris Skoutas(ATHENA RC, Greece), Shahrom Sohi (WU Vienna, Austria), Antonis Troumpoukis (NCSR Demokritos, Greece), Beyza Yaman (ADAPT Centre, Trinity College Dublin, Ireland) and Rui Zhu (University of Bristol, UK).