

Promotion of Open Science in Requirements Engineering – Leveraging the Open Research Knowledge Graph for FAIR Scientific Information

Oliver Karras, Alessio Ferrari, Davide Fucci, and Davide Dell'Anna

oliver.karras@tib.eu, alessio.ferrari@isti.cnr.it, davide.fucci@bth.se, d.dellanna@uu.nl

32nd IEEE International Requirements Engineering 2024 Conference – Exploring New Horizons:
Expanding the Frontiers of Requirements Engineering

June 24th, 2024, Reykjavik, Iceland

Welcome!



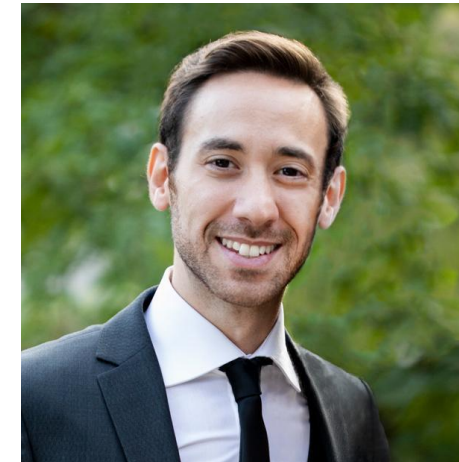
Oliver Karras



Alessio Ferrari



Davide Fucci



Davide Dell'Anna

Schedule and Table of Content

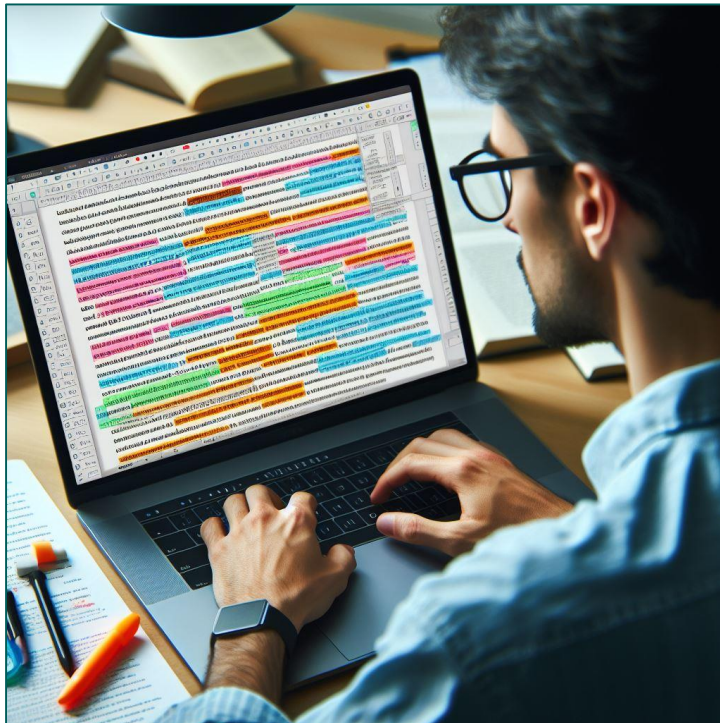
Session	Time	Table of Content	Style	Speaker
Theoretical	09:00 - 09:25	1. Welcome (5 min) 2. Introduction to open science in RE (10 min) 3. Introduction to the ORKG (10 min)	Presentation Presentation Presentation	All organizers Alessio Ferrari Oliver Karras
Practical	09:25 - 10:15	4. Create a FAIR-annotated publication for the ORKG (50 min) 4.1 Set up an Overleaf project for an exemplary publication 4.2 Use the LaTeX package SciKGT _E X to annotate the publication 4.3 Generate PDF with embedded FAIR scientific information 4.4 Optional: Upload the FAIR-annotated publication to the ORKG	Exercise Sub-exercise Sub-exercise Sub-exercise Sub-exercise	Oliver Karras All organizers All organizers All organizers All organizers
Break	10:15 - 10:45	Coffee break		
Practical	10:45 - 11:45	5. Use the ORKG based on a RE use case (60 min) 5.1 Add an exemplary publication to the ORKG 5.2 Describe the scientific information of the publication in the ORKG 5.3 Create an ORKG comparison of the publications added by participants 5.4 Publish the created ORKG comparison as a citable digital artifact 5.5 Optional: Create visualizations for the created ORKG comparison 5.6 Optional: Retrieve the information with the SPARQL endpoint	Exercise Sub-exercise Sub-exercise Sub-exercise Sub-exercise Sub-exercise Sub-exercise	Oliver Karras All organizers All organizers All organizers All organizers All organizers All organizers
Feedback	11:45 - 12:15	6. Reflection of the tutorial with the participants (25 min) 7. Farewell and closing (5 min)	Discussion Presentation	All organizers All organizers

Teaser: REFSQ'25 Open Science Competition

Challenge 1:

Annotate your REFSQ'25 paper with SciKGTeX.

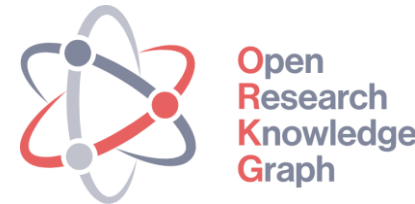
The accepted paper, best annotated with SciKGTeX, will be awarded the **Best ORKG Annotation Award** (prize: 100€).



Challenge 2:

Enrich your RESFQ'25 paper with an ORKG comparison.

The accepted paper, enriched with the best ORKG comparison, will be awarded the **Best ORKG Comparison Award** (prize: 200€).



Divide and Conquer the EmpiRE:
A Community-Maintainable Knowledge Graph of
Empirical Research in Requirements Engineering

Oliver Karras*, Felix Wernlein[†], Jil Klünder[†] and Sören Auer^{*†}
*TIB - Leibniz Information Centre for Science and Technology, Hannover, Germany
Email: {oliver.karras, soeren.auer}@tib.eu
[†]Leibniz University Hannover, Hannover, Germany
Email: felix.wernlein@stud.uni-hannover.de, jil.kluender@inf.uni-hannover.de, auer@t3s.de

Abstract—(Background.) Empirical research in requirements engineering (RE) is a constantly evolving topic, with a growing

(systematic) literature reviews, and even examine overlapping periods, venues, and themes (cf. Table 1) [16]. They have not collaborated to build on and update earlier works, which are known challenges of literature reviews [17]–[20]. Overcoming these challenges is critical to ensure the quality, reliability, and timeliness of research results from literature reviews [19], [21]. Recent research addresses these challenges by focusing on when and how to update (systematic) literature reviews in SE and its subfields [4], [21]–[23]. While these works mainly provide social and economic decision support and guidance for updating literature reviews [4], [20], the underlying problem is the unavailability of the extracted and analyzed data, corresponding to open science in SE [23], [24]. Unavailable data complicates collaboration among researchers and updating literature reviews, as the entire data collection, extraction, and analysis must be repeated and expanded for comprehensive results. Researchers need support in the form of technical infrastructures and services to conduct sustainable literature reviews so that all data is openly available in the long term [5], [17], [18], [29] according to the Findable, Accessible, Interoperable, and Reusable (FAIR) data principles [25], [26]. For this purpose, the data must be organized in a flexible, fine-grained, context-sensitive, and semantic representation to be understandable, processable, and usable by humans and machines [5], [13], [27]. Over the last decade, Knowledge Graphs (KGs) have become an emerging technology in industry and academia as they enable this versatile data representation [28]–[30]. Besides well-known KGs for encyclopedic and factual data, such as *Dispedia* [31] and *WikiData* [32], using so-called Research Knowledge Graphs (RKGs) for scientific data is a rather new approach [28], [29], [33]. RKGs include bibliographic metadata, e.g., titles, authors, and venues, as well as scientific data, e.g., research designs, methods, and results [34]–[39]. They are a promising technology to sustainably organize scientific data so that the data is openly available for long-term collaborations [27], [40]. We examine the use of RKGs as technical infrastructure by building, publishing, and evaluating an initial KG of Empirical research in RE (KG-EmpRE). Similar to Frattini et al. [41], our long-term goal is to continuously maintain,

A Comparison of Scientific Publications on the State of Empirical Research in Requirements Engineering and Software Engineering ★

November 2023 Oliver Karras Felix Wernlein Jil Ann-Christin Klünder Sören Auer

This comparison provides an overview of scientific publications that have investigated primary studies in requirements engineering and software engineering to give a snapshot of the “current” state of empirical research in requirements engineering and software engineering. In particular, the comparison shows for each publication (1) which research fields and topics were investigated, (2) whether and where the extracted and analyzed data is available, and (3) which method was used to determine the state, including further details about the respective method.

DOI: <https://doi.org/10.48366/RES0023>



Properties	Empirical research in requirements engineering: trends and opportunities <i>Empirical research - 2016</i>	Empirical research methodologies and studies in Requirements Engineering: How far did we come? <i>Empirical research - 2014</i>	A Survey on Empirical Requirements Engineering Research Practices <i>Empirical research - 2012</i>	Evidence-Based Structuring and Evaluation of Empirical Research in Requirements Engineering: Fundamentals, Framework, Research Map <i>Empirical research - 2010</i>	An Anal. Requires Data <i>Empirical research - 2010</i>
research problem	empirical research in requirements engineering	empirical research in requirements engineering	empirical research in requirements engineering	empirical research in requirements engineering	empirical research in requirements engineering
research field investigated	Requirements Engineering	Requirements Engineering	Requirements Engineering	Requirements Engineering	Requirements Engineering
topic investigated	bibliographic metadata context data collection	bibliographic metadata research topic theory	context data analysis data collection	context research method result	context research method result

your personal use. Not for redistribution. The definitive version of record was published in the proceedings of 2023 ACM/IEEE International Symposium on Empirical Software Engineering and Measurement (ESEM), <https://doi.org/10.1109/ESEM56168.2023.10304795>.