

16th International Conference on Semantic Web Applications and Tools for Health Care and Life Sciences (SWAT4HCLS 2025)

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We are pleased to introduce the proceedings of the 16th International Conference on Semantic Web Applications and Tools for Health Care and Life Sciences (SWAT4HCLS) which was held in Barcelona, Spain from 24th to 27th February, 2025. SWAT4HCLS is an established conference series that addresses data integration and semantic technologies within the biomedical domain. Originating in 2008 as a one-day workshop on semantic web technologies in bioinformatics, the event has progressively expanded into a four-day program consisting of tutorials, a scientific conference, and a hackathon. Its thematic scope has likewise broadened, now encompassing data-driven methodologies and best practices in data management relevant to the biomedical sciences. The call for papers invited contributions exploring the application of semantic and web technologies within Health Care and Life Sciences, spanning areas such as bioimaging, molecular biology, personalized medicine, drug development, and clinical intelligence. It also welcomed research on Semantic Web methods and tools, including explainable AI, neural-symbolic reasoning, knowledge-driven machine learning, large language models, and natural language processing. Broader topics of interest encompassed FAIR data principles, knowledge representation, interoperability, data stewardship, provenance, reproducibility, sustainability, and privacy-preserving infrastructures, reflecting the growing importance of robust and responsible data practices in the biomedical domain.

We received a total of 59 submissions from international contributors. The final conference program featured 22 accepted papers (11 long and 11 short), alongside 20 posters, 9 demonstrations, 2 position papers, 5 tutorials (1 tutorial was unfortunately cancelled due to U.S. politics), 4 keynote lectures and one panel discussion, as well as a Biohackathon on the last day.

The 4 keynote speakers have been: Prof. Toshiaki Katayama from the Database Center for Life Science (DBCLS), Japan, who presented the open source ecosystem for Knowledge Graphs that have been in development at DBCLS integrating over 60 life science and biomedical databases into an RDF portal. Prof. Anna Fensel, Wageningen University & Research, Wageningen, the Netherlands, about Knowledge graphs for FAIR principles and legal compliance in health care and life sciences data, Prof. Jiri Vondrasek, Principal Investigator of Vondrasek's group and Head of the ELIXIR CZ Infrastructure, who presented a keynote titled FAIR in Action: Transforming Cheminformatics Through Linked Data, Standards, and International Collaboration, and Miguel Pedrera Jimenez, PhD, Health Data Platform Specialist at Better, with a keynote titled: Towards Next Generation Health Data Spaces.

The organizers of SWAT4HCLS 2025 want to express our sincere gratitude to the program committee for their diligent work in reviewing the submitted papers. Their constructive feedback and insightful

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suggestions were invaluable in ensuring the high quality of the proceedings. We also extend our thanks to the authors for their excellent contributions, their responsiveness to reviewer comments, and their adherence to the publication schedule and to the keynote speakers for delivering engaging and thought-provoking presentations.

Finally, we would like to thank Dana Cernoskova for her assistance, coordination and support, our excellent sponsors and partners Metaphacts, AstraZeneca and Barcelona Supercomputer Center for making it possible, and our global participants for their enthusiastic questions, discussions and creative hacking.

Jose Emilio Labra Gayo, Alberto Labarga, Jerven Bolleman, Leyla Jael García Castro, M. Scott Marshall, Andrea Splendiani, Andra Waagmeester, Barcelona, 2025

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