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# The Semantic Web – ISWC 2020

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Proceedings, Part II


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# Preface

Throughout the years, the International Semantic Web Conference (ISWC) has firmly established itself as the premier international forum to discuss and present the latest advances in fundamental research, innovative technology, and applications of the Semantic Web, Linked Data, Knowledge Graphs, and Knowledge Processing on the Web. Now in its 19th edition, ISWC 2020 aims to bring together researchers and practitioners to present new approaches and findings, share ideas, and discuss experiences. The conference involves researchers with diverse skills and interests, thanks to the increased adoption of semantic technologies. Furthermore, knowledge-driven technologies have become increasingly synergetic in many subfields of artificial intelligence, such as natural language processing and machine learning, and this year's call for papers for the main conference tracks was broadened to include such topics to acknowledge these cooperative research efforts.

This year, the submission process and the conference planning were heavily affected by the COVID-19 pandemic outbreak. Despite the myriad of challenges faced, ISWC has maintained its excellent reputation as a premier scientific conference. As a means of recognizing the difficulties experienced by the community, the submission deadline was postponed by five weeks, and the decision was made to run the conference as a virtual event. We received submissions from 51 different countries with Germany, the USA, China, Italy, and France featuring prominently in the submissions list.

Across the conference, we witnessed a real effort by the community – authors, Senior Program Committee (SPC) members, Program Committee (PC) members, and additional reviewers – all of whom were all incredibly supportive of the changes we had to make to the conference organization, demonstrating remarkable dedication and energy during the whole process. We also saw the pandemic become an opportunity to support the scientific community at large, with multiple papers related to COVID-19 research submitted to the conference.

The Research Track, chaired by Jeff Pan and Valentina Tamma, received 170 submissions and ultimately accepted 38 papers, resulting in an acceptance rate of 22.3%. Continuing with the approach taken last year, we adopted a double-blind review policy, i.e., the authors' identity was not revealed to the reviewers and vice versa. Furthermore, reviewers assigned to a paper were not aware of the identity of their fellow reviewers. We strengthened the composition of the PC, which comprised 34 SPC and 244 regular PC members. An additional 66 sub-reviewers were recruited to support the review process further.

ISWC has traditionally had a very rigorous reviewing process, which was again reflected this year. For every submission, several criteria were assessed by the PC members, including originality, novelty, relevance, and impact of the research contributions; soundness, rigor, and reproducibility; clarity and quality of presentation; and the positioning to the literature. This year, the vast majority of papers were reviewed by four reviewers and an SPC member. All of the reviewers engaged in lively and

thorough discussions once the initial reviews had been submitted, and later after the authors' responses were made available. Each paper was then discussed among the Research Track PC chairs and the SPC members to reach a consensus on the final list of accepted papers. As a further measure to recognize the COVID-19 pandemics' challenges, some papers were conditionally accepted, with the SPC members overseeing them and kindly agreeing to shepherd the papers to address the concerns raised by the reviewers. The PC chairs would like to express their gratitude to all SPC members, PC members, and external reviewers for the time, the dedication, and energy they put into the reviewing process, despite these very challenging circumstances.

The In-Use Track continues the tradition to showcase and learn from the growing adoption of Semantic Web technologies in concrete and practical settings, demonstrating the crucial roles that Semantic Web technologies often play in supporting more efficient, effective interoperable solutions in a range of real-world contexts. This year, the track chairs Bo Fu and Axel Polleres received 47 paper submissions, and they accepted 21 papers, leading to an acceptance rate of 44.7%, which reflects a continued increase in the number of submissions as well as acceptances compared to previous years, which indicates a growing maturity and adoption of Semantic Web technologies. The In-Use Track PC consisted of 50 members who engaged in extensive discussions to ensure a high-quality program, where the committee assessed each submission following review criteria including novelty and significance of the application, acceptance and uptake, scalability and technical soundness, as well as the generalizability of the lessons learned regarding the benefits, risks, and opportunities when adopting Semantic Web technologies. Each paper received at least three reviews. The final accepted papers describe successful applications of technologies, including ontologies, Knowledge Graphs, and Linked Data in a diverse range of domains (e.g., digital humanities, pharmaceuticals, manufacturing, taxation, and transportation) and highlight the suitability of Semantic Web methods to advance solutions in various challenging areas (e.g., adaptive systems, data integration, collaborative knowledge management, machine learning, and recommendations).

The Resources Track solicited contributions ranging from ontologies and benchmarks to workflows and datasets over software, services, and frameworks. Many of these contributions are research enablers. For instance, ontologies are used to lift data semantically, datasets become core hubs of the Linked Data cloud, and benchmarks enable others to evaluate their research more systematically. In this year's edition, track chairs Claudia d'Amato and Krzysztof Janowicz received 71 submissions, out of which they decided to accept 22. These submissions are well representative of the spirit of the track and the variety of Semantic Web research. They include knowledge graphs related to COVID-19, benchmarks for OWL2 ontologies, web crawlers, and ontologies. The track chairs are incredibly thankful for the timely and high-quality reviews they received and would like to express their gratitude towards the SPC members who provided excellent meta-reviews and engaged in discussions to ensure fair evaluation of all papers.

In light of the reproducibility crisis in natural sciences, we believe that sharing experimental code, data, and setup will benefit scientific progress, foster collaboration, and encourage the exchange of ideas. We want to build a culture where sharing results, code, and scripts are the norm rather than an exception. To highlight the importance in

this area, Valentina Ivanova and Pasquale Minervini chaired the second edition of the reproducibility initiative at ISWC. The track's focus was to evaluate submissions from the ISWC Research and Resources Tracks' accepted papers. This year, the ISWC Reproducibility Track extended the evaluation scope, which now includes two assessment lines: Reproducibility Line of Assessment for reproducing systems set ups and computational experiments and Replicability Line of Assessment for evaluating quantitative laboratory experiments with users. For the Reproducibility Line of Assessment, two independent members of the PC interacted with the authors to check the data's availability, source code, documentation, configuration requirements, and reproduce the paper's most important results. For the Replicability Line of Assessment, one member of the PC interacted with the authors to assess if the authors supplied enough materials about their work so an interested researcher could re-run the experiments in question. We received 10 submissions from the Resources Track in the Reproducibility Line of Assessment.

The Industry Track provides industry adopters an opportunity to highlight and share the key learnings and challenges of applying Semantic Web technologies in real-world and scalable implementations. This year, the track chairs Freddy Lecue and Jun Yan received 22 submissions from a wide range of companies of different sizes, and 15 submissions were accepted. The submissions were assessed in terms of quantitative and qualitative value proposition provided, innovative aspects, impact, and lessons learned, as well as business value in the application domain; and the degree to which semantic technologies are critical to their offering. Each paper got one review from an industry Semantic Web expert, which was checked and validated by the Industry Track chairs. The final decision was based on the evidence and impact of industrial applications using/based on Semantic Web technologies.

The Sister Conference Track has been designed as a forum for presentations of significant Semantic Web-related research results that have been recently presented at very well-established conferences other than the ISWC. The goal is to give visibility of these results to the ISWC audience and promote discussions concerning such results. For this first issue, chaired by Jérôme Euzenat and Juanzi Li, we decided to adopt a dual strategy, issuing an open call for papers and actively looking for relevant papers to invite. We invited 22 papers, out of which five applied. Four Additional papers replied to the call for papers. The authors of one other paper asked to submit, but were discouraged. Of these, we retained 8 papers. These were published in the past two year editions of the European Conference on Artificial Intelligence (ECAI), the Association for the Advancement of Artificial Intelligence (AAAI) conference, the International Joint Conferences on Artificial Intelligence (IJCAI), the International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS), and the World Wide Web (WWW) conference. These papers did not undergo a further peer review, nor are they republished in the ISWC proceedings. They complemented and added value to the ISWC 2020 program.

The workshop program, chaired by Sabrina Kirrane and Satya Sahoo, included a mix of established and relatively new topics. Workshops on established topics included ontology matching, ontology design and patterns, scalable knowledge base systems, semantic statistics, querying and benchmarking, evolution and preservation, profiling, visualization, and Semantic Web for health data management. Workshops on relatively

new topics included contextualized knowledge graphs, semantics for online misinformation detection, semantic explainability, natural language interfaces, research data management, artificial intelligence technologies for legal documents, the Semantic Web in practice, and Wikidata. Tutorials on a variety of topics such as knowledge graph construction, common sense knowledge graphs, pattern-based knowledge base construction, building large knowledge graphs efficiently, scalable RDF analytics, SPARQL endpoints, Web API, data science pipelines, semantic explainability, shape applications and tools, and building mobile Semantic Web applications complemented the workshop program.

As of ISWC 2020, the Semantic Web Challenges mark their 17th appearance at the conference. Since last year, all proposed challenges need to provide a benchmarking platform, on which participants can have their solution validated using objective measures against fixed datasets. Three exciting challenges were open for submissions: the SeMantic Answer Type prediction task (SMART), the Semantic Web Challenge on Tabular Data to Knowledge Graph Matching (SemTab), and the Mining the Web of HTML-embedded Product Data. For SMART, participants focus on predicting the type of answers to English questions, which is essential to the topic of question answering within the natural language processing and information retrieval domain. For SemTab, participants aimed to convert tables into knowledge graphs to better exploit the information contained in them. For the Product Data challenge, participants had to address tasks in the domain of e-commerce data integration, specifically product matching, and product classification. Challenge entries and lessons learned were discussed at ISWC 2020.

The Posters and Demos Track is one of the most vibrant parts of every ISWC. This year, the track was chaired by Kerry Taylor and Rafael Gonçalves, who received a total of 97 submissions: 58 posters and 39 demos. The PC consisting of 97 members and the track chairs, accepted 43 posters and 35 demos. The decisions were primarily based on relevance, originality, and clarity of the submissions.

The conference also included a Doctoral Consortium (DC) Track, chaired by Elena Simperl and Harith Alani. The DC Track was designed to enable PhD students to share their work and initial results with fellow students and senior researchers from the Semantic Web community, gain experience in presenting scientific research, and receive feedback in a constructive and informal environment. This year, the PC accepted 6 papers for oral presentations out of 11 submissions. The DC program focused on allowing the students to work together during multiple activity sessions on joint tasks, such as articulating research questions or forming an evaluation plan. The aim was to increase their interactions and receive hands-on guidance from the ISWC community's senior members. DC Tracks also included a fantastic invited talk, delivered by Prof. Payam Barnaghi.

This year, ISWC offered Student Grant Awards to support the full conference's registration cost. We acknowledge the Semantic Web Science Association (SWSA) and the *Artificial Intelligence Journal* (AIJ) for generously funding this year's student grants. The applications were solicited from students attending a higher education institution, having either an ISWC 2020 paper accepted or just intending to participate in the conference. Preference was given to the students having a first-authored paper in either the main conference, the doctoral consortium, a workshop, the poster/demo



session, or the Semantic Web challenge. This year, given the conference's virtual nature and the challenge of increasing student engagement, we planned a unique program for the Student Engagement and Mentoring Session that was open to all the student attendees of the conference. The session included three main parts. First, we hosted career-advising panels, consisting of senior researchers (mentors) with an open Q&A session on research and career advice. Second, a brainstorming group activity was planned to engage students in participatory design to creatively combine and articulate their research ideas for the Semantic Web's future vision. Lastly, a fun-filled social virtual party took place to help students socially engage with their peers.

Our thanks go to Elmar Kiesling and Haridimos Kondylakis, our publicity chairs, and Ioannis Chrysakis and Ioannis Karatzanis, our Web chairs. Together they did an amazing job of ensuring that all conference activities and updates were made available on the website and communicated across mailing lists and on social media. Gianluca Demartini and Evan Patton were the metadata chairs this year, and they made sure that all relevant information about the conference was available in a format that could be used across all applications, continuing a tradition established at ISWC many years ago. We are especially thankful to our proceedings chair, Oshani Seneviratne, who oversaw the publication of this volume alongside a number of CEUR proceedings for other tracks.

Sponsorships are essential to realizing a conference and were even more important this year as additional funds were necessary to put together the virtual conference. Despite numerous hurdles caused by the unusual situation, our highly committed trio of sponsorship chairs, Evgeny Kharlamov, Giorgios Stamou, and Veronika Thost, went above and beyond to find new ways to engage with sponsors and promote the conference to them.

Finally, our special thanks go to the members of the Semantic Web Science Association (SWSA), especially Ian Horrocks, the SWSA President, for their continuing support and guidance and to the organizers of previous ISWC conferences who were a constant source of knowledge, advice, and experience.

September 2020

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Claudia d'Amato  
Krzysztof Janowicz  
Bo Fu  
Axel Polleres  
Oshani Seneviratne  
Lalana Kagal

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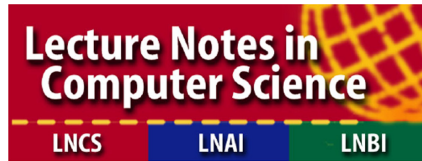
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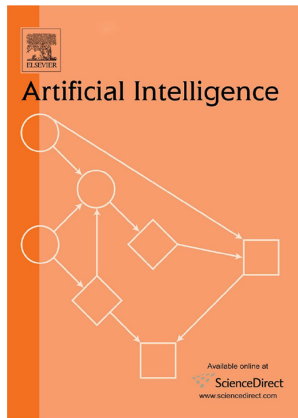


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