Professor Bernardo Cuenca Grau
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Curriculum Vitae (Updated August-2024)

1 General Information

Research Interests

Artificial Intelligence, Knowledge Representation and Reasoning, Computational Logic, Automated Reasoning, Knowledge Graphs, Semantic Web, Data Management, Database Theory, Graph Representation Lerning, Machine Learning on Graphs.

Employment History

- *2015 – Present*: Full Professor in Computer Science, Dept. of Computer Science, Univ. of Oxford.
- *2014 – 2015*: Associate Professor, Dept. of Computer Science, University of Oxford.
- *2012 – 2018*: Research Lecturer, Dept. of Computer Science, University of Oxford.
- *2009 – 2017*: Royal Society University Research Fellow, Dept. of Computer Science, University of Oxford.
- *2007 – 2009*: Postdoctoral Researcher, Dept. of Computer Science, University of Oxford.
- *2005 – 2007*: Postdoctoral Researcher, School of Computer Science, University of Manchester (UK).
- *2003 – 2005*: Visiting Scholar, University of Maryland Institute for Advanced Computer Studies, (USA).
- *2002 – 2005*: Doctoral Fellow funded by the Spanish Ministry of Education. Univ. of Valencia (Spain).

Appointments in Oxford Colleges

- *2018 – Present*: Tutorial Fellow, Keble College.
- *2018 – Present*: Director of Studies (Computer Science), Keble College.
- *2013 – 2018*: Supernumerary Fellow, Oriel College.
- *2010 – 2018*: College Lecturer in Computer Science (Non-Stipendiary), Oriel College.

Education

- PhD in Computer Science, University of Valencia, Spain, graduated 'Cum Laude' in Nov. 2005.
- Licenciatura (combined BSc and MSc) in Physics, University of Valencia, Spain, graduated in 2001.

Other Appointments

- *Oct 2020 – Present*: Undergraduate Admissions Coordinator. Department of Computer Science, Oxford
- *Feb 2017 – Jan 2019* : Member of the Board of Directors. Covatic Limited.
- *Aprl 2017 – Present* : Member of the Board of Directors. Oxford Semantic Technologies Limited.

2 Research Activities

Awards

I have received the following awards (in reverse chronological order).

- **Teaching Commendation.** Awarded by the Department of Computer Science at Oxford for outstanding student feedback in 2022.
- **Teaching Award**. Awarded by the Department of Computer Science at Oxford for outstanding student feedback on the 2021 Artificial Intelligence course.
- **Semantic Web Science Association (SWSA) 10 Year Impact Award for 2021.** The SWSA Ten-Year Award recognizes the highest impact papers from the ISWC proceedings 10 years after their publication. The award was received for the paper "LogMap: Logic-based and Scalable Ontology Matching" published at ISWC 2011.
- **Mathematical and Physical and Life Sciences Division (MPLS) commercial impact award, honourable mention**, 2021.
- **IJCA-2017 Distinguished Paper Award**. Best paper award for the work entitled "Foundations of Declarative Data Analysis Using Limit Datalog Programs " at the International Joint Conference of Artificial Intelligence (IJCAI-2017). IJCAI is the most prestigious conference in the field of Artificial Intelligence worldwide and it is highly competitive; more than 2,500 papers were submitted to the conference in 2017, and only one paper was selected for the award.
- **Best Reviewer**, 2017. Best reviewer award at the International Semantic Web Conference (ISWC-2017).
- **Research and Recognition Award**, 2016. Departmental award for an outstanding achievement that goes beyond the natural expectations of the role.
- **Recognition of Distinction**, 2015. I was awarded the title of Full Professor in Computer Science in July 2015 (the 2015 Recognition of Distinction Exercise). The title was awarded upon fulfillment of the following three criteria:
  - *Research Excellence*. An ongoing research record which is characterised by a significant influence on the field of study, and is of a high order of excellence and of international standing, and the quality of which in terms of research distinction is at least equal to that expected of those appointed to full professorships at other leading international research universities.
  - *Teaching*. An ongoing record of effective teaching for the University and for colleges concomitant with the duties of the university post and the college fellowship (where one is held).
  - *Administration*. An ongoing record of involvement in University and/or college administration concomitant with the duties of the university post and the college fellowship (where one is held), and demonstrable competence in such administration.
- **AAAI-2010 Outstanding Paper Award.** at the Twenty-Fourth AAAI Conference on Artificial Intelligence (AAAI 2010). The AAAI conference is, together with IJCAI, the top annual conference in the field of Artificial Intelligence. The conference received 982 submissions on that year, where only two papers were selected for the award.
- **Royal Society University Research Fellowship**. Awarded in 2009 by the Royal Society. The aim of the fellowship is to provide outstanding scientists that have the potential to become leaders in their chosen field with the opportunity to build an independent research career. Covering all areas of the life and physical sciences, including engineering, but excluding clinical medicine, it has a success rate of approximately 5%.
- **Oxford University Computing Laboratory Merit Award**, October 2009. Departmental award for an outstanding achievement that goes beyond the natural expectations of the role.
- **ESWC-2006 Best Paper Award**. Third European Semantic Web Conference (ESWC-2006). The ESWC conference is the main venue for Semantic Technologies in Europe.
- **Beca de Ministerio para la Formación del Profesorado Universitario**. Fully-funded doctoral fellowship awarded by the Spanish government. Extremely competitive fellowship awarded after a national-level competition process.

Grants

I have been awarded research grants for a total value of over $£4.5$ million both in the capacity of a principal investigator and a co-investigator. These grants were awarded by the most prestigious funding bodies in UK and

Europe, including EPSRC, the Royal Society, and the European Union.

I have been awarded the following research grants as a **Principal Investigator**:

- OASIS: Ontology Reasoning over Frequently-changing and Streaming Data. : EP/S032347/1. From 01/10/2019 to 30/09/2022. Total value: $£961,132$.
- Query Formulation and Processing for Large-scale Semantic Repositories in the Energy Domain. EPSRC Impact Acceleration Award. From April 2016 to March 2017. Total value: $£58,647$.
- Score!: Scalable and Complete Reasoning with Incomplete Ontology Reasoners. EPSRC Standard Responsive Mode Grant EP/J020214/1. From Jan 2013 to Jan 2016. Total value: $£555,708$.
- LogMap: Logic-based Methods for Ontology Mapping. EPSRC First Grant EP/I005706/1. From Jan 2011 to Nov 2012. Total value: $£101,657$.
- Privacy in Ontology-based Information Systems. Royal Society University Research Fellowship. From Oct 2009 to Sep 2014. Total value: $£614,934$.
- Semantics-Aware Data Management: Scalable Querying under Privacy Constraints. Royal Society University Research Fellowship Renewal. From Oct 2014 to Sep 2017. Total value: $£275,000$.

I have been awarded the following research grants as a **Co-investigator**

- ConCur: Knowledge Base Construction and Curation; EPSRC EP/V050869/1; Standard responsive model EPSRC grant. From Dec. 2021 to Nov. 2024. Total value: $£1,131,073$.
- ED3: Enabling Analytics Over Diverse Distributed Datasources; EPSRC EP/N014359/1; From April 1st 2016 to 31st March 2019. Total value: £866,527. Standard responsive mode EPSRC grant.
- DBOnto: Bridging Databases and Ontologies; EPSRC EP/L012138/1; Total value: £1,263,746. Platform Grant. From Jan. 2014 to Jan. 2019.
- Optique: Scalable End-user Access to Big Data; EC 318338. Total amount (for Oxford, excluding other partners): Total value: €841,929. European FP7 IP project. From Nov. 2012 to Oct. 2016.
- Personalised Broadcasting Policy Management using Semantic Technologies. EPSRC Impact Acceleration Account. From April 2016 to March 2017. Total Value: $£53,786$.

Supervision and Mentoring of Early Career Academics and Postdoctoral Researchers

I have mentored and supervised the following postdoctoral researchers and early career academics.

- Dr. David Tena Cucala (EPSRC project OASIS): 2019-Present. Postdoc at Oxford University.
- Dr. Pan Hu (EPSRC project OASIS): 2019-2021. Associate professor at Shanghai Jiaotong.
- Dr. Michal Zawidzki (funded by EPSRC project OASIS): 2019-Present. Senior researcher at Oxford University.
- Dr. Przemyslaw Walega (funded by EPSRC project OASIS): 2018-Present. Senior researcher at Oxford University.
- Dr. Charalampos Nikolaou (funded by EPSRC project ED3): 2016-2019. Senior software engineer at Infor.
- Dr. Evgeny Kharlamov (Senior Research Fellow): 2016-2018. Senior scientist at Bosch.
- Dr. E. V. Kostylev (Departmental Lecturer, Dept. of Computer Science, Oxford): 2017-2021. Associate professor at University of Oslo.
- Dr. Ernesto Jimenez Ruiz (funded by EPSRC project LogMap): 2011-2012. Lecturer at City, Univ. of London.
- Dr. Mark Kaminski (funded by EPSRC project Score!): 2013-2016. German patent office.
- Dr. Cristina Feier (funded by EPSRC project Score!): 2013-2015.
- Dr. Sarunas Marciuska (funded by EPSRC project Score!): 2014-2016. Senior software engineer at Microsoft.

- Dr. Yavor Nenov (funded by EPSRC project Score!): 2014-2016. Chief scientific officer at Oxford Semantic Tech.
- Dr. Evgeny Sherkhonov (funded by IAA award): 2016-2017. Senior data scientist at Farfetch.

Invited Presentations and Tutorials

1. *Temporal and Stream Reasoning with DatalogMTL.* Invited talk at the 2022 Stream Reasoning Workshop.
2. *DatalogMTL: Theory and Practice of Temporal Reasoning*. Tutorial at the Int. Conference on the Principles of Knowledge Representation and Reasoning (KR-2022).
3. *Characterising Graph Neural Networks Using Logical Rules*. Dagstuhl Seminar on Structure and Learning. Sept. 2021.
4. *Logical Foundations of Declarative Data Analysis*. Invited departmental seminar at the Free University of Bozen-Bolzano (Italy). February 2018.
5. *Logical Foundations of Linked Data Anonymisation.* Invited departmental seminar at TU Dresden, Germany. August 2017.
6. *Ontologies, Semantic Technologies, and the Semantic Web: The Story so Far*. Invited talk at several top Chinese Universities, including Peking University (PKU), Beijing Institute of Technology (BIT), Nankai University, Sichuan University and Fudan University. China, 2016.
7. *Ontology Reasoning with Incomplete Reasoners*. Departmental Seminar, Univ. of Bozen-Bolzano (Italy). 2011.
8. *Completeness Guarantees for Incomplete Ontology Reasoners.* Departmental Seminar, Univ. of Liverpool. 2011.
9. *Ontology-based Information Systems: Past, Present and Future*. Keynote at the IEEE Workshop on Semantic Analytics. Belfast, UK. 2011.
10. *Representing Structured Objects Using Description Graphs*. Keynote at the Workshop on Reasoning on the Web: Scalability and Commonsense. 2008
11. *Modularizing OWL Ontologies*. Invited talk at IBM Watson Research Center. Hawthorne, USA, 2005.
12. *Evolution of OWL 2 QL and OWL 2 EL Ontologies*. Tutorial at the 9th OWL: Experiences and Directions Workshop (OWLEd). Crete. May 2012.
13. *OWL 2: Theory and Practice*. Tutorial at the International Semantic Web Conference (ISWC), 2010.
14. *Learning from the Masters: Understanding Ontologies Found on the Web*. Tutorial at the International Semantic Web Conference (ISWC), November 2006.

List of Publications

According to Google Scholar, my work has received over 17, 900 citations, my h-index is 48 and my i10-index 122.

Journal Publications

1. Practical Reasoning in DatalogMTL. Dingmin Wang, Pan Hu, Przemyslaw A. Walega, and Bernardo Cuenca Grau. Theory and Practice of Logic Programming (TPLP). To Appear.
2. The Stable Models Semantics of Datalog with Metric Temporal Operators. Przemyslaw Walega, David Tena Cucala, Egor V. Kostylev, and Bernardo Cuenca Grau. Theory and Practice of Logic Programming (TPLP), Volume 24 , Issue 1 , January 2024 , pp. 22 - 56.
3. Finite Materialisability of Datalog Programs with Metric Temporal Operators. Przemyslaw Walega, Michal Zawidzki, and Bernardo Cuenca Grau. Journal of Artificial Intelligence Research (JAIR). Volume 76. January 2023.
4. Stream Reasoning with DatalogMTL. Przemyslaw Walega, Mark Kaminski, Dingmin Wang, and Bernardo Cuenca Grau. Journal of Web Semantics (JWS) Vol. 76, Elsevier. 2023.
5. The Complexity and Expressive Power of Limit Datalog. Mark Kaminski, Egor V. Kostylev, Bernardo Cuenca Grau, Boris Motik and Ian Horrocks. Journal of the ACM (JACM), Volume 62, Issue 1. February 2022.
6. The Delay and Window Size Problems in Rule-based Stream Reasoning. Alessandro Ronca, Mark Kaminski, Bernardo Cuenca Grau, and Ian Horrocks. Artificial Intelligence (AIJ), Vol. 306, 2022.
7. Pay-as-you-go Consequence-Based Reasoning for the Description Logic $\mathcal{SROIQ}$. David Tena Cucala, Bernardo Cuenca Grau and Ian Horrocks. Artificial Intelligence (AIJ). Volume 298, 2021.
8. Logical Foundations of Linked Data Anonymisation. Bernardo Cuenca Grau and Egor V. Kostylev. Journal of Artificial Intelligence Research (JAIR). Volume 64, pages 253–314, 2019.
9. Foundations of Ontology-Based Data Access under Bag Semantics. Charalampos Nikolaou, Egor V. Kostylev, George Konstantinidis, Mark Kaminski, Bernardo Cuenca Grau, and Ian Horrocks. Artificial Intelligence (AIJ). Volume 274. Pages 91–132. 2019.
10. Limit Datalog: A Declarative Query Language for Data Analysis. Bernardo Cuenca Grau, Ian Horrocks, Mark Kaminski, Egor V. Kostylev, and Boris Motik. SIGMOD Rec. 48(4): 6-17, 2019.
11. Consequence-Based Reasoning for Description Logics with Disjunctions and Number Restrictions. Andrew Bate, Boris Motik, Bernardo Cuenca Grau, David Tena Cucala, Frantisek Simancik, Ian Horrocks. Journal of Artificial Intelligence Research (JAIR). Volume 63, Pages 625-690, 2018.
12. Logical Foundations of Information Disclosure in Ontology-Based Data Integration. Michael Benedikt, Bernardo Cuenca Grau, and Egor V. Kostylev. Artificial Intelligence Journal (AIJ). Elsevier. Volume 262, Issue C, pages 52-95, 2018.
13. Query Nesting, Assignment, and Aggregation in SPARQL 1.1. Mark Kaminski, Egor V. Kostylev, and Bernardo Cuenca Grau. ACM Transactions on Database Systems (TODS). Volume 42(3), pages 17:1-17:46. 2017.
14. Datalog Rewritability of Disjunctive Datalog Programs and Non-Horn Ontologies. Mark Kaminski, Yavor Nenov, Bernardo Cuenca Grau. Artificial Intelligence Journal (AIJ), pp. 90-118, 2016.
15. Module Extraction in Expressive Ontology Languages via Datalog Reasoning. Ana Armas Romero, Mark Kaminski, Bernardo Cuenca Grau, Ian Horrocks. Journal of Artificial Intelligence Research (JAIR). Vol. 55, pages 499-564. 2016.
16. Faceted Search over RDF-Based Knowledge Graphs. Marcelo Arenas, Bernardo Cuenca Grau, Evgeny Kharlamov, Sarunas Marciuska, Dimitry Zheleznyakov. Journal of Web Semantics (JWS). Volumes 37–38, March 2016, Pages 55–74.

17. PAGOdA: Pay-As-You-Go Ontology Query Answering Using a Datalog Reasoner. Yujiao Zhou, Bernardo Cuenca Grau, Yavor Nenov, Mark Kaminski, and Ian Horrocks Journal of Artificial Intelligence Research (JAIR). Volume 54, pages 309-367, November 2015.

18. Acyclicity Notions for Existential Rules and Their Application to Query Answering in Ontologies. B. Cuenca Grau, I. Horrocks, M. Krötsch, C. Kupke, D. Magka, Z. Wang. J. of Artificial Intelligence Research (JAIR), Vol. 47, pages 741-808, 2013.

19. Reasoning over Ontologies with Hidden Content: The Import-by-Query Approach. B. Cuenca Grau and B. Motik. J. of Artificial Intelligence Research (JAIR). Vol 45, pages 197-255, 2012.

20. Completeness Guarantees for Incomplete Ontology Reasoners: Theory and Practice. B. Cuenca Grau, B. Motik, G. Stoilos, and I. Horrocks. J. of Artificial Intelligence Research (JAIR). Vol. 43, pages 419-476. 2012.

21. Supporting concurrent ontology development: Framework, algorithms and tool. E. Jiménez Ruiz, B. Cuenca Grau, I. Horrocks, R. Berlanga. Data & Knowledge Engineering (DKE), 70:1, pages 146-164. 2011. Elsevier.

22. Logic-based Assessment of the Compatibility of UMLS Ontology Sources. E. Jiménez Ruiz, B. Cuenca Grau, I. Horrocks, R. Berlanga. Journal of Biomedical Semantics. BMC. Vol. 2, March 2011.

23. Incremental Classification of Description Logics Ontologies. B. Cuenca Grau, C. Halaschek-Wiener, Y. Kazakov, and B. Suntisrivaraporn. J. of Automated Reasoning (JAR), 44:4, pages 337-369. 2010. Springer.

24. Privacy in Ontology-based Information Systems: A Pending Matter. B. Cuenca Grau. Semantic Web Journal, Vol. 1, pages 137-141, 2010. IOS Press.

25. Representing Ontologies Using Description Logics, Description Graphs, and Rules. B. Motik, B. Cuenca Grau, I. Horrocks, U. Sattler. Artificial Intelligence (AIJ) 173(14):1275-1309, 2009. Elsevier.

26. OWL 2: The Next Step for OWL. B. Cuenca Grau, I. Horrocks, B. Motik, B. Parsia, P. Patel-Schneider, U. Sattler. Journal of Web Semantics (JWS), Vol. 6, Number 4, pp 309-322. 2008. Elsevier.

27. Modular Reuse of Ontologies: Theory and Practice. B. Cuenca Grau, I. Horrocks, Y. Kazakov, U. Sattler. Journal of Artificial Intelligence Research (JAIR), Vol 31, pp 273-318, 2008. AAAI Press.

28. Pellet: A Practical OWL DL Reasoner. E. Sirin, B. Parsia, B. Cuenca Grau, A. Kalyanpur, Y. Katz. Journal of Web Semantics (JWS), Volume 5, Issue 2, 2007. Elsevier.

29. Combining OWL Ontologies Using $\mathcal{E}$-connections. B. Cuenca Grau, B. Parsia, and E. Sirin. Journal Of Web Semantics (JWS), Volume 4, Issue 1, 2006. Pages 40-59. Elsevier.

30. Swoop: A Web Ontology Editing Browser. A. Kalyanpur, B. Parsia, E. Sirin, B. Cuenca Grau, and J. Hendler. Journal of Web Semantics (JWS). Volume 4, Issue 2, pages 144-153, 2006. Elsevier.

Conference Publications

1. MTLearn: Extracting Temporal Rules Using Datalog Rule Learners. Dingming Wang, Przemyslaw Walega and Bernardo Cuenca Grau. In Proceedings of the 21st International Conference on the Principles of Knowledge Representation and Reasoning (KR-2024). Hanoi, Vietnam, 2024.

2. Relational Graph Convolutional Networks Do Not Learn Sound Rules. Matthew Morris, David Tena Cucala, Bernardo Cuenca Grau and Ian Horrocks. In Proceedings of the 21st International Conference on the Principles of Knowledge Representation and Reasoning (KR-2024). Hanoi, Vietnam, 2024.

3. Bridging Max Graph Neural Networks and Datalog with Negation. David Tena Cucala and Bernardo Cuenca Grau. In Proceedings of the 21st International Conference on the Principles of Knowledge Representation and Reasoning (KR-2024). Hanoi, Vietnam, 2024.

4. Faithful Rule Extraction for Differential Rule Learning Models. Xiaxia Wang, David Tena Cucala, Bernardo Cuenca Grau, and Ian Horrocks. In Proceedings of the 12th International Conference on Learning Representations (ICLR-2024). Vienna, Austria. May 2024.

5. Orbit-equivariant Graph Neural Networks. Matthew Morris, Bernardo Cuenca Grau, and Ian Horrocks. In Proceedings of the 12th International Conference on Learning Representations (ICLR-2024). Vienna, Austria. May 2024.

6. Double-descent Curves in Neural Networks: a New Perspective Using Gaussian Processes. Ouns El Harzli, Bernardo Cuenca Grau, Guillermo Valle Perez, Ard A. Louis. In Proceedings of the 38th AAAI Conference on Artificial Intelligence (AAAI-2024). Vancouver, British Columbia.

7. On the Correspondence Between Monotonic Max-Sum GNNs and Datalog. David Tena Cucala, Bernardo Cuenca Grau, Boris Motik, and Egor V. Kostylev. In Proceedings of the 20th International Conference on the Principles of Knowledge Representation and Reasoning (KR-2023). Rhodes, Greece.

8. Revisiting Inferential Benchmarks for Knowledge Graph Completion. Shuwen Liu, Bernardo Cuenca Grau, Ian Horrocks, and Egor V. Kostylev. In Proceedings of the 20th International Conference on the Principles of Knowledge Representation and Reasoning (KR-2023). Rhodes, Greece.

9. An Empirical Study of Retrieval-enhanced Graph Neural Networks. Dingmin Wang, Shengchao Liu, Hanchen Wang, Bernardo Cuenca Grau, Linfeng Song, Jian Tang, Le Song, Qi Liu. In Proceedings of the 26th European Conference of Artificial Intelligence (ECAI-2023). Krakow, Poland, 2023.

10. Cardinality-Minimal Explanations for Monotonic Neural Networks. Ouns El-Harzli, Bernardo Cuenca Grau, and Ian Horrocks. In Proceedings of the 32nd International Joint Conference on Artificial Intelligence (IJCAI-2023). Macao, S.A.R.

11. Efficient Embeddings of Logical Variables for Query Answering over Incomplete Knowledge Graphs. Dingmin Wang, Yeyuan Chen, and Bernardo Cuenca Grau. In Proceedings of the 37th AAAI Conference on Artificial Intelligence (AAAI-2023). Washington DC, USA.

12. Materialisation-based Reasoning in DatalogMTL with Bounded Intervals. Przemyslaw Walega, Michal Zawidzki, Dingmin Wang, and Bernardo Cuenca Grau. In Proceedings of the 37th AAAI Conference on Artificial Intelligence (AAAI-2023). Washington DC, USA.

13. Seminaïve Materialisation in DatalogMTL. Dingmin Wang, Przemyslaw Walega, and Bernardo Cuenca Grau. In Proceedings of DeclarativeAI-2022.

14. Faithful Approaches to Rule Learning. David Tena Cucala, Bernardo Cuenca Grau, Boris Motik. Proc. of the 19th International Conference on the Principles of Knowledge Representation and Reasoning (KR-2022).

15. Explainable GNN-Based Models over Knowledge Graphs. David Tena Cucala, Bernardo Cuenca Grau, Egor V. Kostylev, and Boris Motik. Proc. of the 10th International Conference on Learning Representations.

16. MeTeoR: Practical Reasoning in Datalog with Metric Temporal Operators. Dingmin Wang, Pan Hu, Przemyslaw A. Walega, and Bernardo Cuenca Grau. Proc. of the 26th AAAI Conference on Artificial Intelligence (AAAI-2022).

17. INDIGO: GNN-Based Inductive Knowledge Graph Completion Using Pair-Wise Encoding. Shuwen Liu, Egor V. Kostylev, Bernardo Cuenca Grau, and Ian Horrocks. In Proc. of the 35th Conference on Neural Information Processing Systems (NeurIPS 2021).

18. DatalogMTL with Negation Under Stable Models Semantics. Przemyslaw Walega, David Tena Cucala, Egor V. Kostylev, and Bernardo Cuenca Grau. Proceedings of the 18th International Conference on the Principles of Knowledge Representation and Reasoning (KR-2021). Held virtually, Nov. 2021.

19. Finitely Materialisable Datalog Programs with Metric Temporal Operators. Przemyslaw Walega, Michal Zawidzki, and Bernardo Cuenca Grau. Proceedings of the 18th International Conference on the Principles of Knowledge Representation and Reasoning (KR-2021). Held virtually, Nov. 2021.

20. Stratified Negation in Datalog with Metric Temporal Operators. David Tena Cucala, Przemyslaw Walega, Bernardo Cuenca Grau and Egor V. Kostylev. Proc. of the 25th AAAI Conference on Artificial Intelligence (AAAI 2021). Held virtually, Feb. 2021.

21. Tractable Fragments of Datalog with Metric Temporal Operators. Przemyslaw Walega, Bernardo Cuenca Grau, Mark Kaminski, Egor V. Kostylev. Proc. of the 29th International Joint Conference on Artificial Intelligence (IJCAI 2020). July 2020.

22. DatalogMTL over the Integer Timeline. Przemyslaw Walega, Bernardo Cuenca Grau, Mark Kaminski, Egor V. Kostylev. Proceedings of the 17th International Conference on the Principles of Knowledge Representation and Reasoning (KR-2020), pages 768-777. Sept. 2020.

23. Complexity and Expressive Power of Disjunction and Negation in Limit Datalog. Mark Kaminski, Egor V. Kostylev, Bernardo Cuenca Grau, Ian Horrocks. Proceedings of the 34th AAAI Conference on Artificial Intelligence (AAAI 2020). New York, USA, February 2020.

24. Query-based Entity Comparison in Knowledge Graphs Revisited. Alina Petrova, Egor V. Kostylev, Bernardo Cuenca Grau and Ian Horrocks. Proceedings of the 18th International Semantic Web Conference (ISWC 2019). Auckland, New Zealand, October 2019.

25. Bag Semantics of DL-Lite with Functionality Axioms. Gianluca Cima, Charalampos Nikolaou, Egor V. Kostylev, Mark Kaminski, Bernardo Cuenca Grau and Ian Horrocks. Proceedings of the 18th International Semantic Web Conference (ISWC 2019). Auckland, New Zealand, October 2019.

26. DatalogMTL: Computational Complexity and Expressive Power. Przemyslaw Walega, Bernardo Cuenca Grau, Mark Kaminski, and Egor V. Kostylev. Proc. of the 28th International Joint Conference on Artificial Intelligence (IJCAI 2019). Macao, China, August 2019.

27. Satisfaction and Implication of Integrity Constraints in Ontology-based Data Access. Charalampos Nikolaou, Bernardo Cuenca Grau, Egor V. Kostylev, Mark Kaminski, and Ian Horrocks. Proc. of the 28th International Joint Conference on Artificial Intelligence (IJCAI 2019). Macao, China, August 2019.

28. Reasoning over Streaming Data in Metric Temporal Datalog. Przemyslaw Walega, Mark Kaminski, and Bernardo Cuenca Grau. Proc. of the Thirty-third International AAAI Conference on Artificial Intelligence (AAAI 2019).

29. The Window Validity Problem in Rule-based Stream Reasoning. Alessandro Ronca, Mark Kaminski, Bernardo Cuenca Grau and Ian Horrocks. Proc. of the 16th International Conference on the Principles of Knowledge Representation and Reasoning (KR 2018), pages 571-581. Tempe, Arizona, October 2018.

30. Stratified Negation in Limit Datalog Programs. Mark Kaminski, Bernardo Cuenca Grau, Boris Motik, Egor V. Kostylev and Ian Horrocks. Proc. of the 27th International Joint Conference on Artificial Intelligence (IJCAI 2018), pages 1875–1881. Stockholm, Sweden, July 2018.

31. Consequence-based Reasoning for Description Logics with Disjunction, Inverse Roles, Number Restrictions, and Nominals. David Tena Cucala, Bernardo Cuenca Grau and Ian Horrocks. Proc. of the 27th International Joint Conference on Artificial Intelligence (IJCAI 2018), pages 1970–1976. Stockholm, Sweden, July 2018.

32. Stream Reasoning in Temporal Datalog. Alessandro Ronca, Mark Kaminski, Bernardo Cuenca Grau, Boris Motik, and Ian Horrocks. Proc. of the Thirty-Second International AAAI Conference on Artificial Intelligence (AAAI 2018), pages 1941–1948. New Orleans, USA, February 2018.

33. The Bag Semantics of Ontology-Based Data Access. Charalampos Nikolaou, Egor V. Kostylev, George Konstantinidis, Mark Kaminski, Bernardo Cuenca Grau and Ian Horrocks. Proc. of the 26th International Joint Conference on Artificial Intelligence (IJCAI 2017). Melbourne, Australia, August 2017.

34. Foundations of Declarative Data Analysis Using Limit Datalog Programs. Mark Kaminski, Bernardo Cuenca Grau, Boris Motik, Egor V. Kostylev and Ian Horrocks. Proc. of the 26th International Joint Conference on Artificial Intelligence (IJCAI 2017). Melbourne, Australia, August 2017. **[IJCAI Distinguished Paper Award].**

35. Semantic Faceted Search with Aggregation and Recursion. Evgeny Sherkhonov, Bernardo Cuenca Grau, Evgeny Kharlamov and Egor V. Kostylev. Proc. of the 16th International Semantic Web Conference (ISWC 2017). Vienna, Austria, October 2017.

36. Entity Comparison in RDF Graphs. Alina Petrova, Evgeny Sherkhonov, Bernardo Cuenca Grau, and Ian Horrocks. Proc. of the 16th International Semantic Web Conference (ISWC 2017). Vienna, Austria, October 2017.

37. SemFacet: Making Hard Faceted Search Easier. Evgeny Kharlamov, Luca Giacomelli, Evgeny Sherkhonov, Bernardo Cuenca Grau, Egor V. Kostylev and Ian Horrocks. Proc. of the 26th ACM International Conference on Information and Knowledge Management (CIKM 2017), Demo Track.

38. Source Information Disclosure in Ontology-Based Data Integration. Michael Benedikt, Bernardo Cuenca Grau, and Egor V. Kostylev. Proc. of the Thirty-First AAAI Conference on Artificial Intelligence (AAAI 2017). San Francisco, California, USA, February 2017.

39. Capturing Industrial Information Models with Ontologies and Constraints: The Siemens Use Case. Evgeny Kharlamov, Bernardo Cuenca Grau, Ernesto Jimenez-Ruiz, Steffen Lamparter, Gulnar Mehdi, Martin Ringsquandl, Yavor Nenov, Stephan Grimm, Mikhail Roshchin and Ian Horrocks. Proc. of the 15th International Semantic Web Conference (ISWC 2016). Kobe, Japan, 2016.

40. Extending Consequence-Based Reasoning to $\mathcal{SRIQ}$. Andrew Bate, Boris Motik, Bernardo Cuenca Grau, Frantisek Simancik and Ian Horrocks. Proc. of the 15th International Conference on the Principles of Knowledge Representation and Reasoning (KR 2016). Cape Town, South Africa, April 2016.

41. Reformulating Ontological Queries Using Materialised Rewritings. In Proceedigns of the 6th ACM Conference on Web Intelligence, Mining, and Semantics (WISM). Nimes, France, June 2016.

42. Semantics and Expressive Power of Subqueries and Aggregates in SPARQL 1.1. Mark Kaminski, Egor V. Kostylev and Bernardo Cuenca Grau. Proc. of the 25th International World Wide Web Conference (WWW-2016). Montreal, Canada, 2016.

43. Logical Foundations of Privacy-Preserving Publishing of Linked Data. Bernardo Cuenca Grau and Egor V. Kostylev. Proc. of the 30th AAAI Conference on Artificial Intelligence (AAAI). Phoenix, Arizona, Feb. 2016.

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Contributions to International Technology Standards

I have contributed to the following World Wide Web Consortium (W3C) recommendation documents.

1. OWL 2 Web Ontology Language: Direct Semantics. Editor. W3C Recommendation. 2012 (Second Edition).
2. OWL 2 Web Ontology Language: Profiles. Editor. W3C Recommendation. 2012 (Second Edition).
3. OWL 2 Web Ontology Language: XML Serialization. W3C Recommendation. 2012 (Second Edition).
4. OWL 2 Web ontology Language: Mapping to RDF Graphs. W3C Recommendation. 2012 (Second Edition).

3 University Teaching

I have lectured the following courses at Oxford, which are offered to both senior undergraduate students and graduate students.

- **Knowledge Representation and Reasoning** (2010–2014).
- **Computational Complexity** (2015–2018).
- **Artificial Intelligence** (2017–2022).
- **Imperative Programming** (2023–)

I have tutored the following courses at Oxford colleges: Discrete Mathematics, Models of Computation, Design and Analysis of Algorithms, Algorithms and Data Structures, Introduction to Formal Proof, Intelligent Systems, Databases, Knowledge Representation and Reasoning, and Computational Complexity.

4 Graduate Supervision and Graduate Teaching

Doctoral Students

I have (co-)supervised the following doctoral students (viva date is indicated in parentheses).

1. Shuwen Liu (2019–2024). University of Oxford. Thesis entitled *Deep Learning with Knowledge Graphs Using Graph Neural Networks*.
2. Dingmin Wang (2020–2024). University of Oxford. Thesis entitled *Practical Reasoning and Rule Mining with DatalogMTL.*
3. David Tena Cucala. University of Oxford (March 2020). Thesis title: *Consequence-based Reasoning for the Description Logic $\mathcal{SROIQ}$*. Currently a postdoc at Oxford University.
4. Alina Petrova. Thesis title: *Entity Comparison in Knowledge Graphs*. University of Oxford (January 2020). Currently a research scientist at Thomson Reuters Lab.
5. Alessandro Ronca. University of Oxford (December 2019). Thesis title: *Rule-based Stream Reasoning*. Currently, a postdoctoral researcher at the University of Oxford.
6. Andrew Bate. University of Oxford (January 2017). Thesis title: *Consequence-based Reasoning for $\mathcal{SRIQ}$ Ontologies.* Currently a senior software engineer at Infor.
7. David Carral. Wright State University, USA (December 2016). Thesis title: *Efficient Reasoning Algorithms for Fragments of Horn Description Logics.* Currently a researcher at Inria.
8. Yujiao Zhou. University of Oxford (September 2015). Thesis title: *PAGOdA: Pay-as-you-go ontology query answering using a datalog reasoner*. Currently a software engineer at Meta, USA.
9. Ana Armas Romero. University of Oxford (October 2015). Thesis title: *Ontology module extraction and applications to ontology classification*. Currently a software engineer at Github.

10. Ernesto Jiménez Ruiz. Universidad Jaume I, Spain (June 2010). Currently a Lecturer at City, Univ. of London.

I am currently supervising the following doctoral students:

- Mr Maximilian Pfügel (2019–). University of Oxford.
- Mr. Jingchuan Shi (2020–). University of Oxford.
- Mr. Ouns el-Harzi (2021–). University of Oxford.
- Mr. Matthew Morris (2022–). University of Oxford.
- Miss Xiaxia Wang (2022–). University of Oxford.
- Miss Eva Feng (2023–). University of Oxford.

MSc and 4th Year Thesis Supervision

I have supervised the following 4th year and MSc students: Alexander Furmston (MSc) in 2024, Stephan-Alexandru Tiplea (MSc) in 2024, Tania Sendroiu (4th Year) in 2023, Jiaqi Wang (MSc) in 2022, Kieran Gal (4th Year), 2022; Junhui Yang (4th Year), in 2022; Thomas Dowley (4th Year), in 2019; David Tena Cucala (MSc), in 2016 (distinction and Hoare's prize to the top MSc student); Daanish Rijhwani (MSc), in 2016; Alessandro Ronca (MSc), in 2015; Antón Morant (MSc), in 2011 (distinction); Martha Imprialou (MSc), in 2011 (distinction); Andrew Bate (4th Year), in 2012 (distinction); Yuan Gong (4th Year), in 2014; Shuo Zhang (MSc), in 2014.

Additionally, I have also acted as an academic supervisor and college advisor of numerous MSc students in the department.

5 University Examining and Departmental Duties

- Undergraduate Admissions Coordinator for CS and Joint Schools (2020–Present)
- Examiner for Parts A and B in Computer Science, Maths and Computer Science, and Computer Science and Philosophy. (2018–Present).
- DPhil scholarship committee, 2021.
- Undergraduate project assessor (2012—Present).
- IT Committee (2019–2023).
- DPhil. transfer and confirmation examiner in 2010, 2016, 2019, 2021.
- Recruitment panel for Associate Professor post in Computational Medicine (2020).

6 Doctoral Examining

I have been an **external examiner** for the following doctoral dissertations.

- Quentin Maniere. University of Bordeaux/CNRS (France). 2022
- Haoruo Zhao. University of Manchester (UK). 2022
- Davide Lanti. Free University of Bozen-Bolzano (Italy). February, 2018.
- Ana Ozaki Castillo. University of Liverpool (UK). April 2016.
- Julien Corman. University of Toulouse (France). Decemeber 2015.
- Nicolas Matentzoglu. University of Manchester (UK). November 2015.
- Valerio Santarelli. University of Rome "La Sapienza" (Italy). 2015.
- Melanie König. University of Montpellier 2 (France). October 2014.

I have been the **internal examiner** for the following dissertations.

- Ralph Abboud, University of Oxford, 2022.
- Eleonora Giunchiglia. University of Oxford. 2022.
- Fredah Banda. University of Oxford. 2021.
- Rodrigo Carvalho. University of Oxford. March 2019.

7 Engagement Outside the University

Conference Organisation

- General chair for the 2020 International Workshop on Description Logics (DL-2020).
- Program Committee Chair for the 22nd International Workshop on Description Logics (DL-09).
- Organisational committee of the 4th Int. Workshop on Modular Ontologies (WOMO 2010)
- Organisational committee of the Workshop on Ontologies: Reasoning and Modularity (WORM 2008).
- Organisational committee of the 2nd International Workshop on Modular Ontologies (WoMo 2007).
- Organisational committee of the 2nd International Workshop OWL:Experiences and Directions (OWLEd 2006).
- Organisational committee of the First International Workshop OWL:Experiences and Directions (OWLEd 2005).

Member of International Steering Committees and Working Groups

- Member of the Description Logics Steering Committee (2009-2012) and (2015-2018).
- Member of the W3C OWL Working Group (2007-2009).
- Member of the OWL: Experiences and Directions Workshop Steering Committee.

Program Committee Membership in International Conferences

- International Conference on Machine Learning (ICML): 2024.
- International Conference on Learning Representations (ICLR): 2024.
- Advances in Neural Information Processing (NeurIPS): 2023.
- ACM International Conference on Information and Knowledge Management (CIKM): 2015, 2014.
- International Joint Conference on Artificial Intelligence (IJCAI): 2024 (Senior PC) 2023 (Senior PC), 2022 (Senior PC), 2020 (Senior PC), 2019, 2018, 2016, 2015 (Senior PC), 2013, 2011, 2009, 2007.
- AAAI Conference on Artificial Intelligence (AAAI): 2025, 2024, 2022, 2020 (senior PC), 2019 (Senior PC), 2018, 2017, 2016, 2015 (Senior PC), 2013, 2012, 2010, and 2006.
- European Conference on Artificial Intelligence (ECAI): 2023, 2014, 2012, 2010, and 2008.
- Int. Conference on the Principles of Knowledge Representation and Reasoning (KR): 2024 (Area Chair), 2023, 2021, 2020, 2018, 2016, 2014 and 2012.
- International World Wide Web Conference (WWW): 2018, 2016 and 2010.
- Declarative AI (RuleML+RR): 2024, 2023, 2022.
- International Conference on Conceptual Modeling (ER): 2008.
- International Semantic Web Conference (ISWC): 2020, 2018, 2017, 2015, 2014, 2012, 2011, 2009, 2008, and 2007.
- Extended Semantic Web Conference (ESWC): 2013, 2012, 2011, 2010, 2009, 2008, and 2007.

- International Conference on Web Reasoning and Rule Systems (RR): 2022, 2014, 2013, and 2009.
- International Conference on Formal Ontology in Information Systems (FOIS): 2014.
- International Joint Conference on Semantic Technologies (JIST): 2012 and 2011.
- Asian Semantic Web Conference (ASWC): 2009 and 2008.
- Int. Conference on Ontologies, Databases, and Applications (ODBASE 2011).

Program Committee Membership in International Workshops and Symposia

- International Workshop on Description Logics (DL): 2021, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011, 2010, and 2007.
- International Workshop on OWL: Experiences and Directions (OWLEd): 2013, 2012, 2011, 2010, 2009.
- International Workshop on Debugging Ontologies and Ontology Mappings (WoDOOM): 2014, 2012.
- International Workshop on Scalable Semantic Web Knowledge Base Systems (ISSW): 2018, 2017.
- International Workshop on Modular Ontologies (WoMo): 2012, 2011, 2006.
- International Workshop on Nature Inspired Reasoning (NatuReS): NatuReS-2009, NatuReS-2008.
- International Workshop on Semantics Applied Technologies on Biomedical Informatics (SATBI 2011)
- Doctoral Consortium: 8th Extended Semantic Web Conference (ESWC 2011)
- 1st International Workshop on Business Rules and Ontologies (BuRO 2010)
- International Workshop of Self-Organization and Approximation Techniques for the Web of Data (SOAT2010)
- International Workshop on Evaluation of Semantic Technologies (IWEST 2010)
- ESWC 2008 Workshop: Knowledge Reuse and Re-engineering (KRRSW 2008)
- ESWC 2008 Workshop: Ontologies, Reasoning and Modularity (WORM 2008)
- 21st ACM Symposium on Applied Computing (SAC 2006).
- 11th International Workshop on Scalable Semantic Web Knowledge Base Systems (SSWS 2015).

Editorial Board in International Journals

I am on the editorial board of the following international journals.

- Transactions on Data and Knowledge (2023-Present)
- Journal of Web Semantics. (2017-2023).
- ACM Transactions on the Web. (2017-Present).
- Semantic Web Journal (2017-Present)

Reviewing for Journals

Artificial Intelligence (AIJ); J. of Artificial Intelligence Research (JAIR); J. of Automated Reasoning (JAR); J. of Web Semantics (JWS); J. of Information and Software Technology; AI Communications; Information Sciences; IEEE Transactions on Education; J. of Logic, Language and Information; Int. J. of Semantic Web and Information Systems; Applied Ontology; Data and Knowledge Engineering (DKE); Information and Computation; Journal of Logic and Computation (JLC); ACM Transactions on the Web; Knowledge-based Systems; Knowledge and Information Systems (KAIS); ACM Transactions on Intelligent Systems and Technology.

International Standards

I have made numerous key technical contributions to the Web Ontology Language (OWL) 2 published by the World Wide Web Consortium,[1] and I contributed to many of the technical documents (see Publications section).

Contributions to Research Councils

- Royal Society International Exchanges Evaluation Panel. From April 2015-December 2021.
- I am a member of the EPSRC Peer Reviewing College and regularly review proposals and participate in prioritisation panels for EPSRC. I also regularly review proposals for other national funding bodies in countries such as Luxembourg and Sweden.
- Foreign Expert for the Italian research evaluation agency (CINECA) in 2012-2013, and 2016.
- Member of the Committee of Experts for INRIA's evaluation (2019).

Research Prototypes

- MeTeoR (a temporal rule reasoner).
- Indigo (a link prediction system based on Graph Neural Networks).
- SemFacet (a semantic faceted search system): `http://www.cs.ox.ac.uk/isg/tools/SemFacet/`.
- PAGOdA (an ontology-based query answering system): `http://www.cs.ox.ac.uk/isg/tools/PAGOdA/`.
- SOMM (an ontotology development tool).
- PRISM (a module extraction system for ontologies): `https://www.cs.ox.ac.uk/isg/tools/PrisM/`
- MORe (an ontology reasoner): `http://www.cs.ox.ac.uk/isg/tools/MORe/`.
- LogMap (an ontology matching system): `http://www.cs.ox.ac.uk/isg/tools/LogMap/`.
- ContentCVS (a versioning system for ontologies): `http://www.cs.ox.ac.uk/isg/tools/ContentCVS/`

Technology Transfer

I am a University co-founder of *Oxford Semantic Technologies (OST).* Formed in April 2017 with the goal of developing and commercialising knowledge graph and rule-based reasoning solutions (See https://www.oxfordsemantic.tech/). The company was acquired by Samsung Electronics in July 2024.

Industry Collaborations

Oracle. In 2012 I worked with research scientists at Oracle on novel techniques to enhance the reasoning capabilities of Oracle's RDF triple store. A paper describing the result of this collaboration was published in the research track of the World Wide Web Conference (WWW) in 2013.

Optique. The aim of the Optique EU project (see Grants section) is to provide scalable end-user access to Big Data. The ontology matching system LogMap, which we developed as part of a previous EPSRC grant, has become an integral part of the Optique platform, which is being exploited by the Norwegian Oil Company Statoil and Siemens.

Siemens. From 2015 I have worked with Siemens research scientists and engineers on the application of ontologies to industrial manufacturing applications. As a result of this project, we have developed a tool (SOMM) for ontology modeling and reasoning in the industrial manufacturing domain.

EDF. As of April 2016, I am collaborating with EDF France in a joint project funded by an IAA account. The goal of the project is to explore the applicability of our research prototypes SemFacet and PAGOdA to the EDF use cases.

[1] `http://www.w3.org/TR/owl-overview/`