

EXPERIENCE

DELFT UNIVERSITY OF TECHNOLOGY, THE NETHERLANDS

2021 – present Tenure-track Assistant Professor

KU LEUVEN, BELGIUM

2019 – 2021 Postdoctoral fellow

 > Personal research fellowship grant from Research Foundation - Flanders (FWO)

2014 – 2018 Research assistant

RESEARCH VISITS AND INTERSHIPS

Apr-May 2018 NEC Labs Europe, Germany

 > Host: Mathias Niepert

Jun-Aug 2013 Research Intern, Jozef Štefan Institute, Slovenia

 > Host: Nada Lavrač

2012 – 2013 Software Development Intern, Ericsson Ltd., Croatia

EDUCATION

KU LEUVEN, BELGIUM

2014 – 2018 PhD in Computer Science

 > **Thesis title:** Learning Symbolic Latent Representations for Relational Data

 > **Advisor:** Hendrik Blockeel

 > **Examination Committee:** Jesse Davis, Mathias Niepert, David Poole, Sebastian Riedel, Johan Suykens

UNIVERSITY OF ZAGREB, CROATIA

2012 – 2014 MSc in Computer Science

 > Spent a year at KU Leuven as an Erasmus exchange student, which included work on the master thesis under the supervision of Professor Hendrik Blockeel

2009 – 2012 BSc in Computer Science

SELECTED PUBLICATIONS

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| AAAI 2021 | KNOWLEDGE REFACTORING FOR INDUCTIVE PROGRAM SYNTHESIS
Sebastijan Dumančić, Tias Guns, Andrew Cropper |
| IJCAI 2020 | LEARNING LARGE LOGIC PROGRAMS BY GOING BEYOND ENTAILMENT
Andrew Cropper, Sebastijan Dumančić |
| IJCAI 2019 | LEARNING RELATIONAL REPRESENTATIONS WITH AUTO-ENCODING LOGIC PROGRAMS
Sebastijan Dumančić, Tias Guns, Wannes Meert, Hendrik Blockeel |
| NeurIPS 2018 | DEEPPROBLOG: NEURAL PROBABILISTIC LOGIC PROGRAMMING
Robin Manhaeve, Sebastijan Dumančić, Angelika Kimmig, Thomas Demeester, Luc De Raedt |

2021	IAAI Deployed Application Award at IAAI-21
2020	Citizen of Honour Award from the city of Požega for the contributions to science popularisation
2019	Honourable mention at the EurAI AI Dissertation Award Distinguished reviewer at IJCAI 2019 (113/2818 reviewers)
2018	Summa cum laude distinction for PhD thesis (top 5% of PhD awardees) Best paper award at Discovery Science 2018 Travel grant for the NAMPI workshop at ICML 2018
2017	Best student paper award at ILP 2017
2013	Erasmus student exchange scholarship, one year stay at KU Leuven, Belgium

TRAVEL GRANT FOR THE RESEARCH VISIT TO SEBASTIAN RIEDEL AT UCL	2021
Research Foundation - Flanders (FWO). Rejected due to Covid-19 restrictions.	4950,00 EUR
NEURAL PROBABILISTIC LOGIC PROGRAMMING	2020 - 2023
Research Foundation - Flanders (FWO). Project co-supervisor with Luc De Raedt and Angelika Kimmig.	338.800,00 EUR
FWO POSTDOCTORAL FELLOWSHIP	2019 - 2022
Research Foundation - Flanders (FWO). Success rate: 20 %	280.000,00 EUR
TRAVEL GRANT FOR THE RESEARCH VISIT TO MATHIAS NIEPERT AT NEC LABS	2018
Research Foundation - Flanders (FWO)	1650,00 EUR

FUNDING FOR SCIENCE POPULARISATION

STEP INTO SCIENCE: A FRAMEWORK FOR CONTINUOUS DEVELOPMENT OF SCIENTIFIC THINKING IN HIGH SCHOOLS	2021
European Social Fund	173.717,00 EUR
SUMMER SCHOOL OF SCIENCE 2019	2014–2019
Croatian Ministry of Science, continuously over years	11000,00 EUR
SUMMER SCHOOL OF SCIENCE 2015	2013–2015
City of Požega, Croatia, continuously over years	11000,00 EUR

FROM STATISTICAL RELATIONAL TO NEURO-SYMBOLIC ARTIFICIAL INTELLIGENCE	
> AAAI 2021 Tutorial	Feb 2021
WHAT CAN ABSTRACTION DO FOR PROGRAM INDUCTION	
> Samsung AI Research Center, Cambridge, UK	Jan 2021
> Automated Verification Group (Marta Kwiatkowska), Oxford, UK	Jan 2021
> Computational Cognitive Science Group (Josh Tenenbaum), MIT, USA	Dec 2020
NEURAL PROBABILISTIC LOGIC PROGRAMMING WITH DEEPPROBLOG	
> Data and Web Science Group (Heiner Stuckenschmidt), University of Mannheim, Germany	Oct 2020
CRASH COURSE ON MACHINE LEARNING	
> European Patent Office, The Hague, the Netherlands	Jun 2020
CONSTRAINT SOLVING WITH Z3	
> Decision Analytics Closing Symposium at KU Leuven, Belgium	2019

ANOMALY DETECTION IN ADVANCED TELECOMMUNICATION NETWORKS

- Artificial Intelligence Applied in Industry Symposium at KU Leuven, Belgium 2019

LEARNING RELATIONAL REPRESENTATIONS WITH AUTO-ENCODING LOGIC PROGRAMS

- Declarative Learning Based Programming workshop at IJCAI, China 2019
- Data Analytics Lab at VUB, Belgium 2019

LEARNING RELATIONAL FEATURE HIERARCHIES

- LICT Deep Learning Symposium at KU Leuven, Belgium 2019

TEACHING

LECTURER

Digital Humanities Master programme, KU Leuven

- Scripting languages (B-KUL-G0W95B), 6 ECTS credits 2019 – present

Master of Computer Science, KU Leuven

- Capita Selecta AI: Neural-Symbolic Artificial Intelligence (B-KUL-H05N0A), 4 ECTS credits 2020 – present

TEACHING ASSISTANT

Department of Computer Science, KU Leuven

- Machine Learning: Project (B-KUL-H0T25A) 2017–present
- Machine Learning and Inductive Inference (B-KUL-H02C1A) 2018–2019
- Knowledge and the Web (B-KUL-G0B34D) 2015–2018
- Introduction to Databases (B-KUL-H0109A) 2014–2015

THESIS SUPERVISION

Department of Computer Science, KU Leuven

- Elias Iblisdir, "Learning from big graphs via graph summarisation" 2020–2021
- Duygu Sezen Islakoglu, "Understanding events through time with temporal graph networks" 2020–2021
- Sjaan Vandebeek, "Machine learning as a learning problem" 2020–2021
- Quinten Bruynseraede, "An intelligent text editor" 2020–2021
- Matthias Vandersanden, "An intelligent text editor" 2020–2021
- Clara De Smet, "Improving the initialisation of COBRAS" 2019–2020
- Shanza Iftikhar, "Metric Learning and Spectral Transformation with COBRAS" 2019–2020
- Jonas Soenen, "Active semi-supervised clustering with noisy constraints" 2018–2019
- Antoon De Cleen, "A Machine Learning Approach for the Detection of Airplane Component Degradation" 2018–2019
- Bavo Luysterborg, "Preventive airplane maintenance" 2018–2019
- Jasper Sarrazin, "Neurally guided theorem proving in knowledge graphs" 2018–2019
- Victor Gutierrez, "Neurally guided Inductive Logic Programming" 2018–2019
- Bernd Schrooten, "An approach to unsupervised feature ranking for predictive airplane maintenance" 2016–2017
- Hannes Busneye, "Convolutional Neural Networks for fundamental frequency detection in music" 2016–2017
- Jeroen Tempels, "Automatically constructing deep hierarchies with arbitrary clustering algorithms" 2016–2017
- Servaas Vandecappelle, "Aerospace condition monitoring using Hidden Markov models" 2016–2017
- Tom Van Braband, "Interpreting Deep Neural Networks" 2016–2017
- Thomas Dierckx, "Model merging in relational learning" 2016–2017
- Alexandru Nicolae Onete, "Predicate invention using meta-interpretative learning" 2014–2015
- Philippe Moeyersoms, "Explicit optimal control of a hybrid-electric heavy-duty vehicle" 2014–2015

PROFESSIONAL ACTIVITIES

CONFERENCE CO-CHAIR

- International Joint Conference on Learning and Reasoning (IJCLR) 2021

WORKSHOP CO-CHAIR

- › Combining Learning and Reasoning: Programming Languages, Formalisms, and Representations (CLearR) @ AAAI 2022 2022
- › 1st Workshop on "Is Neuro-Symbolic SOTA still a myth for Natural Language Inference?" @ IJCAI 2021 2021
- › 10th International Workshop on Statistical Relational AI (StarAI) @ IJCLR 2021 2021
- › 9th International Workshop on Statistical Relational AI (StarAI) @ AAAI 2020 2020
- › Spring Meeting on Mining and Learning (SMiLe), KU Leuven 2015

SENIOR PROGRAM COMMITTEE MEMBER

- › European Conference on Artificial Intelligence (ECAI) 2020
- › AAAI Conference on Artificial Intelligence (AAAI) 2021 – present
- › International Joint Conference on Artificial Intelligence (IJCAI) 2021 – present

PROGRAM COMMITTEE MEMBER

- › European Semantic Web Conference (ESWC) 2021
- › International Joint Conference on Artificial Intelligence (IJCAI) 2018-2021
- › AAAI Conference on Artificial Intelligence (AAAI) 2019-2020
- › ECML & PKDD 2019-2020
- › International Conference on Principles and Practice of Constraint Programming (CP) 2019
- › SIAM International Conference on Data Mining (SDM) 2020

JOURNAL REVIEWER

- › Journal of Machine Learning Research (JMLR) 2018-2020
- › Machine Learning Journal (MLJ) 2017-2020
- › Data Mining and Knowledge Discovery 2017

EXTERNAL EXAMINER

- › Polytechnic University of Valencia, PhD thesis of Lidia Contreras Ochando (supervised by Jose Hernandez Orallo and Cesar Ferri) 2020
- › University of Edinburgh, MSc Thesis of Amit Parag (supervised by Vaishak Belle) 2019

OUTREACH

- › Society for Out-of-frame Education: secretary since 2018; organised the Summer School of Science 2012-now
- › Young Mathematicians "Marin Getaldic": organised Young Mathematicians Summer Camp 2010-2012

PUBLICATIONS

DISSERTATION

LEARNING SYMBOLIC LATENT REPRESENTATIONS OF RELATIONAL DATA

Sebastijan Dumančić

KU Leuven, 2018

Summa cum laude (top 5% of PhD awardees)

PEER-REVIEWED JOURNAL PAPERS

- J.1 **NEURAL PROBABILISTIC LOGIC PROGRAMMING IN DEEPPROBLOG**
Robin Manhaeve, Sebastijan Dumančić, Angelika Kimmig, Thomas Demeester, Luc De Raedt
Artificial Intelligence, volume 298, 2021
- J.2 **AN EFFICIENT AND EXPRESSIVE SIMILARITY MEASURE FOR RELATIONAL CLUSTERING USING NEIGHBOURHOOD TREES**
Sebastijan Dumančić, Hendrik Blockeel
Machine Learning Journal, 106, pages 1523–1545, 2017

PEER-REVIEWED CONFERENCE PAPERS

- C.1 **AVATAR - AUTOMATED FEATURE WRANGLING FOR MACHINE LEARNING**
Gust Verbruggen, Elia Van Wolputte, Sebastijan Dumančić, Luc De Raedt
19th International Symposium on Intelligent Data Analysis, (IDA), 2021
- C.2 **KNOWLEDGE REFACTORING FOR INDUCTIVE PROGRAM SYNTHESIS**
Sebastijan Dumančić, Tias Guns, Andrew Cropper
AAAI Conference of Artificial Intelligence (AAAI), to appear
- C.3 **AUTOMATED REASONING AND LEARNING FOR AUTOMATED PAYROLL MANAGEMENT**
Sebastijan Dumančić, Wannes Meert, Stijn Goethals, Tim Stuyckens, Jelle Hutgen, Koen Denies
Annual Conference on Innovative Applications of Artificial Intelligence (IAAI), to appear
- C.4 **LEARNING LARGE LOGIC PROGRAMS BY GOING BEYOND ENTAILMENT**
Andrew Cropper, Sebastijan Dumančić
International Joint Conference on Artificial Intelligence (IJCAI), 2073-2079, 2020
- C.5 **TURNING 30: NEW IDEAS IN INDUCTIVE LOGIC PROGRAMMING**
Andrew Cropper, Sebastijan Dumančić
International Joint Conference on Artificial Intelligence (IJCAI), Survey Track, 4833-4839, 2020
- C.6 **FROM STATISTICAL RELATIONAL TO NEURO-SYMBOLIC ARTIFICIAL INTELLIGENCE**
Luc De Raedt, Sebastijan Dumančić, Robin Manhaeve, Giuseppe Marra
International Joint Conference on Artificial Intelligence (IJCAI), Survey Track, 4943-4950, 2020
- C.7 **TACKLING NOISE IN SEMI-SUPERVISED CLUSTERING**
Jonas Soenen, Sebastijan Dumančić, Hendrik Blockeel, Toon Van Craenendonck
European Conference on Machine Learning and Principles of Knowledge Discovery in Databases (ECML), 2020
- C.8 **LEARNING RELATIONAL REPRESENTATIONS WITH AUTO-ENCODING LOGIC PROGRAMS**
Sebastijan Dumančić, Tias Guns, Wannes Meert, Hendrik Blockeel
International Joint Conference on Artificial Intelligence (IJCAI), 6081-6087, 2019
- C.9 **A COMPARATIVE STUDY OF DISTRIBUTIONAL AND SYMBOLIC PARADIGMS FOR RELATIONAL LEARNING**
Sebastijan Dumančić, Alberto García-Durán, Mathias Niepert
International Joint Conference on Artificial Intelligence (IJCAI), 6088-6094, 2019
- C.10 **DEEPPROBLOG: NEURAL PROBABILISTIC LOGIC PROGRAMMING**
Robin Manhaeve, Sebastijan Dumančić, Angelika Kimmig, Thomas Demeester, Luc De Raedt
Advances in Neural Information Processing Systems (NeurIPS), 3749-3759, 2018
- C.11 **COBRAS: FAST, ITERATIVE, ACTIVE CLUSTERING WITH PAIRWISE CONSTRAINTS**
Toon Van Craenendonck, Sebastijan Dumančić, Elia Van Wolputte, Hendrik Blockeel
Symposium on Intelligent Data Analysis (IDA), 353-366, 2018
- C.12 **COBRAS-TS: A NEW APPROACH TO SEMI-SUPERVISED CLUSTERING OF TIME SERIES**
Toon Van Craenendonck, Wannes Meert, Sebastijan Dumančić, Hendrik Blockeel
Discovery Science, 179-193, 2018. Best paper award
- C.13 **LEARNING SEQUENCE ENCODERS FOR TEMPORAL KNOWLEDGE GRAPH COMPLETION**
Alberto García-Durán, Sebastijan Dumančić, Mathias Niepert
Empirical Methods in Natural Language Processing (EMNLP), 4816-4821, 2018
- C.14 **DEMYSTIFYING RELATIONAL LATENT REPRESENTATIONS**
Sebastijan Dumančić, Hendrik Blockeel
International Conference on Inductive Logic Programming (ILP), 63-77, 2017. Best student paper award
- C.15 **CLUSTERING-BASED RELATIONAL UNSUPERVISED REPRESENTATION LEARNING WITH AN EXPLICIT DISTRIBUTED REPRESENTATION**
Sebastijan Dumančić, Hendrik Blockeel
International Joint Conference on Artificial Intelligence (IJCAI), 1631-1637, 2017.
- C.16 **COBRA: A FAST AND SIMPLE METHOD FOR ACTIVE CLUSTERING WITH PAIRWISE CONSTRAINTS**
Toon Van Craenendonck, Sebastijan Dumančić, Hendrik Blockeel
International Joint Conference on Artificial Intelligence (IJCAI), 2871-2877, 2017.

- C.17 **AN EFFICIENT AND EXPRESSIVE SIMILARITY MEASURE FOR RELATIONAL CLUSTERING USING NEIGHBOURHOOD TREES**
Sebastijan Dumančić, Hendrik Blockeel
European Conference on Artificial Intelligence (ECAI), Short paper track, 1674-1675, 2016.

WORKSHOPS PAPERS

- W.1 **INVENTING ABSTRACTIONS BY REFACTORING KNOWLEDGE**
Sebastijan Dumančić, Andrew Cropper
Conceptual Abstraction and Analogy in Natural and Artificial Intelligence workshop at AAAI Fall Symposium, 2020
- W.2 **FEATURE INTERACTIONS IN XGBOOST**
Kshitij Goyal, Sebastijan Dumančić, Hendrik Blockeel
AIMLAI workshop at ECML&PKDD, 2019
- W.3 **DEEPPROBLOG: NEURAL PROBABILISTIC LOGIC PROGRAMMING**
Robin Manhaeve, Sebastijan Dumančić, Angelika Kimmig, Thomas Demeester, Luc De Raedt
BNAIC/BENELEARN, 2019
- W.4 **ON EMBEDDINGS AS AN ALTERNATIVE PARADIGM FOR RELATIONAL LEARNING**
Sebastijan Dumančić, Alberto García-Durán, Mathias Niepert
8th workshop on Statistical Relational Artificial Intelligence StarAI at IJCAI/ICML, 2018
- W.5 **AUTO-ENCODING LOGIC PROGRAMS**
Sebastijan Dumančić, Tias Guns, Wannes Meert, Hendrik Blockeel
2nd workshop on Neural Abstract Machines and Program Induction NAMPI at ICML, 2018
- W.6 **UNSUPERVISED RELATIONAL REPRESENTATION LEARNING VIA CLUSTERING: PRELIMINARY RESULTS**
Sebastijan Dumančić, Hendrik Blockeel
6th workshop on Statistical Relational Artificial Intelligence StarAI at IJCAI, 2016
- W.7 **THEORY RECONSTRUCTION: A REPRESENTATION LEARNING VIEW ON PREDICATE INVENTION**
Sebastijan Dumančić, Wannes Meert, Hendrik Blockeel
6th workshop on Statistical Relational Artificial Intelligence StarAI at IJCAI, 2016