Sara Magliacane

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Work experience

Nov. 2020 - **current** **Assistant Professor (tenured since Nov. '23) at University of Amsterdam**.

- Causal representation learning, causal discovery, causality-inspired ML/RL, applications of causality to transfer learning and domain adaptation, safe reinforcement learning.
- Groups: Amsterdam ML Lab (from Nov. '22), Intelligent Data Engineering Lab.
- Teaching: Causal Data Science (MSc Data Science '22, '23, '24), Causality (MSc AI '23, '24), guest lectures in Intro to AI (BSc AI '21, '22, '23), Causality & DL module for Deep Learning 2 (MSc AI '22, '23).
- Grant acquisition:
  - PI on internal AI4Fintech project "Robust fraud detection through causality-inspired ML" (funding acquired: €320k, 1 PhD student),
  - PI on UvA-Adyen collaboration project (funding acquired: in total 2 PhD student, €1M), responsible for causality work package (1 PhD student),
  - PI on AFRL proposal "CausalFusion: Causal Knowledge Extraction and Fusion from Multiple Modalities" (funding acquired: €305k, 1 PhD student)

Apr. 2022 - June 2022 **Visiting Professor at Simons Institute, UC Berkeley**.

Participating in the Causality semester at the Simons Institute.

Apr. 2019 - Nov. 2020 **Research Scientist at MIT-IBM Watson AI Lab**.

Feb. 2021 - May 2024 (part-time)

- PI on exploratory MIT-IBM project with Douglas Lauffenburger (MIT) on cross-species translation and applications of causal domain adaptation and representation learning to system biology (funding acquired by MIT: $150k).
- PI on MIT-IBM project with Armando Solar-Lezema (MIT) on safe AI approaches and program synthesis (funding acquired by MIT: $700k)
- Co-PI on MIT-IBM project with Dean Eckles (MIT) and Manish Raghavan (MIT) on differentially private causal inference (funding acquired by MIT: $700k).

Nov. 2017 - Apr. 2019 **Postdoctoral researcher at AI Foundations group in IBM Research NY**.

- MIT-IBM project on learning causal graphs from data, experiment/intervention design, causal transfer learning with Caroline Uhler (MIT) and Guy Bresler (MIT).
- MIT-IBM project on learning logic rules from data with Josh Tenenbaum (MIT).

Mar. 2016 - Nov. 2017 **Researcher at Causality Group at University of Amsterdam**.

Causal transfer learning and causal learning from data in different experimental settings.

May 2014 - Aug. 2014 **Research Intern at Google Research NYC (hosts: Cong Yu, Flip Korn)**.

Extracting information from semi-structured data in the WebTables team.

June 2013 - Sept. 2013 **Software Engineering Intern at Google Zürich (host: Selen Basol)**.

Machine learning on location data in the Your Timeline team, Google Maps Zürich.

April 2011 - Oct. 2011 **Research Associate at the Database Group, Politecnico di Milano**.

Education

Oct. 2011 - June 2017 **PhD in Computer Science at VU Amsterdam**.

Title: Logics for causal inference under uncertainty
Advisors: Joris Mooij (UvA), Paul Groth (Elsevier Labs/VU), Frank van Harmelen (VU)

- Use of probabilistic logics for discovering causal relations from noisy data, potentially with latent confounders and different experimental settings.
- Scaling probabilistic logic inference, focusing on a probabilistic fuzzy logic (PSL) with a distributed implementation of ADMM for MAP inference in continuous MRF.
- Teaching: TA for Intelligent Systems (BSc AI '13, '14), Course coordinator for Seminar "Combining Symbolic and Statistical methods in AI" (MSc AI '16).

Oct. 2008 – Mar. 2011 **MEng in Computer Engineering (110/110 cum laude) at Politecnico di Milano and Politecnico di Torino (double degree)**.

Top 5 recent publications

ICML 2024 D. Xu, D. Yao, S. Lachapelle, P. Taslakian, J. von Kügelgen, F. Locatello, **S. Magliacane**. *A Sparsity Principle for Partially Observable Causal Representation Learning*.

NeurIPS 2023 F. Feng, **S. Magliacane**. *Learning dynamic attribute-factored world models for efficient multi-object reinforcement learning*.

UAI 2023 P. Lippe, **S. Magliacane**, S. Löwe, Y. M. Asano, T. Cohen, E. Gavves. *BISCUIT - Causal Representation Learning from Binary Interactions*.

ICLR 2023 P. Lippe, **S. Magliacane**, S. Löwe, Y. M. Asano, T. Cohen, E. Gavves. *Causal Representation Learning for Instantaneous and Temporal Effects in Interactive Systems*, *Patent WO2023146868A1*

NeurIPS 2022 F. Feng, B. Huang, K. Zhang, **S. Magliacane**. *Factored Adaptation for Non-Stationary Reinforcement learning*.

Recent awards

2024 ELLIS Scholar in the Interactive Learning and Interventional Representations program.

2021 ACM HSCC Best paper award for [Hunt et al. 2021] *Verifiably Safe Exploration for End-to-End Reinforcement Learning*.

2021 NeurIPS 2021 Outstanding Reviewer Award (8% reviewers).

2015 First prize at Centre de Recherches Mathématiques Causal Inference Challenge.

Keynotes, invited talks and invited workshops

Keynote Speaker Probabilistic Graphical Models 2024, ELLIS Doctoral Symposium 2023, Young European Statisticians Causal Inference workshop 2023, Danish Data Science 2022, CausalItaly 2021, Causal Data Science meeting 2021

Invited lectures Lectures at SIKS causal inference course 2023, Barcelona School of Economics at the ML and causality course 2023, Advanced ML for innovative Drug Discovery Summer School 2022, Advanced in AI summer school lecture in Como 2022, SIKS course Integrating Learning and Reasoning 2021.

Invited Speaker 25+ invited talks at international venues, with audiences ranging from machine learning and data science to statistics, healthcare and robotics, e.g. Harvard Data Science Initiative Causal Seminar 2024, UAI Causality workshop 2024, CVPR workshop on Causal and Object centric representations for robotics 2024, ICML Spurious Correlations Workshop 2023, IROS workshop on Causality for Robotics 2023, KNAW Webinar "Causality in economics, computer science, logic and language". Additionally various invited talks at U Edinburgh, U Copenhagen, IIT Genoa, MIT, KTH, IST Lisboa, TU Berlin, Booking.com, U Oslo etc.

Invited participant Bellairs Causal Representation Learning workshop 2023, 2024, Lorentz center workshop on Counterfactual Prediction for Personalized Healthcare 2022, Dagstuhl 2024 Explainability in Focus: Advancing Evaluation through Reusable Experiment Design , Dagstuhl 2024 Artificial Intelligence and Formal Methods Join Forces for Reliable Autonomy, Dagstuhl 2022 Recent Advancements in Tractable Probabilistic Inference, Dagstuhl 2021 Approaches and applications of inductive programming.

Academic service and event organization

Conference organizer (Co)-organized various conferences, as program chair(UAI 2025), sponsorship chair (CLeaR 2022), proceedings chair (UAI 2022), communication chair (CLeaR 2023 and 2025), online chair (UAI 2023) and volunteer chair (ICLR 2024).

Workshop organizer	Organized various workshops, mostly on causality, including at NeurIPS 2024, 2023, 2022, 2020 and UAI 2024, 2023, 2022 & 2021.
Event organizer	ELLIS sponsored Amsterdam Causality Meeting (https://amscausality.github.io/)
Moderator	Online Causal Inference Seminar (https://sites.google.com/view/ocis/home)
Area editor	Causality area editor at International journal of Approximate Reasoning, Elsevier
Special issue editor	Causality issue in IEEE Transactions on Neural Networks
Area-chair	UAI 2024, CleaR 2024, AAAI 2023, UAI 2023, CleaR 2023, WIML 2021
Reviewer	Machine learning reviewer since 2016 for conferences (NeurIPS, ICML, ICLR, AISTATS, UAI, AAAI, IJCAI) and journals (JMLR, TMLR, IEEE TNNLS, Nature Machine Intelligence, PNAS), Cambridge University Press review for chapter in "Causal Reasoning" by Kiciman and Sharma
Mentor	Women in Machine Learning 2017-2021, HackMIT 2019, 2020, AISTATS 2022

Mentoring and Supervision

Mentor: Closely collaborating with two PhD students since 2021:
- Fan Feng (City University Hong Kong)

PhD advisor:
- Advising since 2021:
  - Phillip Lippe (co-supervised with E. Gavves, T. Cohen and Y. Asano)
- Advising since 2022:
  - Yongtuo Liu (co-supervised with E. Gavves)
- Advising since 2023:
  - Mátyas Schubert (promoter: Max Welling),
  - Danru Xu (co-supervised with P. Groth),
  - Daan Roos (co-supervised with J.W. van de Meent),
  - Nadja Rutsch (co-supervised with S. van der Pas at AUMC),
  - Jakub Reha (co-supervised with A. Mićković, promoter: Max Welling)
  - Riccardo Massidda (ELLIS PhD student at University of Pisa, co-supervised with Davide Bacciu)
  - Roel Hulsman (promoter: J.W. van de Meent)

PhD committee	Stephan Bongers (UvA), Qi Wang (UvA), Maximilian Ilse (UvA), Kirthan Padh (Helmholtz AI), Mike Huisman (Leiden), Ali Vardasbi (UvA), Miguel Suau de Castro (TU Delft), Jin Huang (UvA), Jan Wöhlke (UvA), Ghadi Al Hajj (University of Oslo), Sindy Löwe (UvA), Emanuele Marconato (U Trento).
Thesis advisor	Advised 4 Master theses in IS, 10 Master theses in AI, 2 Bachelor theses in KI.
Intern mentor at IBM	Mentored Chandler Squires (MIT), Basil Saeed (MIT), Biwei Huang (CMU).
Internal service	Exam commission for Bachelor and Master AI since Sept 2023, Assistant professor hiring committee for AMLab, ADS thesis awards Program committee 2021, organizing Amsterdam Tech Week 2021.

Complete list of publications and patents

Total numbers	30 peer-reviewed publications, 4 papers under submission, 3 patents
Webpage	Google Scholar profile, Personal webpage

Publications

Yongtuo Liu, Sara Magliacane, Miltiadis Kofinas, and Efstratios Gavves. Amortized equation discovery in hybrid dynamical systems. In *ICML*, 2024.

Riccardo Massidda, Sara Magliacane, and Davide Bacciu. Learning causal abstractions of linear structural causal models. In *UAI*, 2024.

Nikolaos Meimetis, Krista M Pullen, Daniel Y Zhu, Avlant Nilsson, Trong Nghia Hoang, Sara Magliacane, and Douglas A Lauffenburger. Autotransop: translating omics signatures without orthologue requirements using deep learning. *NPJ Systems Biology and Applications*, 10(1):1–19, 2024.

Davide Talon, Phillip Lippe, Stuart James, Alessio Del Bue, and Sara Magliacane. Towards the reusability and compositionality of causal representations. In *CLeaR Oral*, 2024.

Danru Xu, Dingling Yao, Sébastien Lachapelle, Perouz Taslakian, Julius von Kügelgen, Francesco Locatello, and Sara Magliacane. A sparsity principle for partially observable causal representation learning. In *ICML*, 2024.

Dingling Yao, Danru Xu, Sebastien Lachapelle, Sara Magliacane, Perouz Taslakian, Georg Martius, Julius von Kügelgen, and Francesco Locatello. Multi-view causal representation learning with partial observability. In *ICLR Spotlight*, 2024.

Phillip Lippe, Sara Magliacane, Sindy Löwe, Yuki M. Asano, Taco Cohen, and Efstratios Gavves. Causal representation learning for instantaneous temporal effects, August 3 2023. WO Patent WO2023146868A1.

Lior Horesh, Kenneth L Clarkson, Cristina Cornelio, and Sara Magliacane. Experimental design for symbolic model discovery, May 23 2023. US Patent 11,657,194.

Ilze Amanda Auzina, Çağatay Yıldız, Sara Magliacane, Matthias Bethge, and Efstratios Gavves. Invariant neural ordinary differential equations. *NeurIPS*, 2023.

Fan Feng and Sara Magliacane. Learning dynamic attribute-factored world models for efficient multi-object reinforcement learning. *NeurIPS*, 2023.

Phillip Lippe, Sara Magliacane, Sindy Löwe, Yuki M. Asano, Taco Cohen, and Efstratios Gavves. Biscuit: Causal representation learning from binary interactions. In *UAI*, 2023.

Phillip Lippe, Sara Magliacane, Sindy Löwe, Yuki M. Asano, Taco Cohen, and Efstratios Gavves. Causal representation learning for instantaneous and temporal effects in interactive systems. In *ICLR*, 2023.

Yongtuo Liu, Sara Magliacane, Miltiadis Kofinas, and Efstratios Gavves. Graph switching dynamical systems. *ICML*, 2023.

Angelos Nalmpantis, Phillip Lippe, and Sara Magliacane. Hierarchical causal representation learning. In *Causal Representation Learning Workshop at NeurIPS*, 2023.

Fan Feng, Biwei Huang, Kun Zhang, and Sara Magliacane. Factored adaptation for non-stationary reinforcement learning. In *NeurIPS*, 2022.

Biwei Huang, Fan Feng, Chaochao Lu, Sara Magliacane, and Kun Zhang. AdaRL: What, where, and how to adapt in transfer reinforcement learning. In *ICLR Spotlight*, 2022.

Phillip Lippe, Sara Magliacane, Sindy Löwe, Yuki M. Asano, Taco Cohen, and Efstratios Gavves. CITRIS: Causal Identifiability from Temporal Intervened Sequences. In *ICML Spotlight*, 2022.

Phillip Lippe, Sara Magliacane, Sindy Löwe, Yuki M. Asano, Taco Cohen, and Efstratios Gavves. Intervention design for causal representation learning. In *UAI Workshop on Causal Representation Learning*, 2022.

Nathan Fulton, Nathan Hunt, Sara Magliacane, Nghia Hoang, Subhro Das, and Armando Solar-Lezama. Verifiably safe exploration for end-to-end reinforcement learning. *HSCC Best paper*, 2021.

Xue Li, Sara Magliacane, and Paul Groth. The challenges of cross-document coreference resolution for email. In *KCAP 2021*, pages 273–276, 2021.

Bernhard Schölkopf, Francesco Locatello, Stefan Bauer, Nan Rosemary Ke, Nal Kalchbrenner, Anirudh Goyal, and Yoshua Bengio. Toward causal representation learning. *Proceedings of the IEEE*, 109(5):612–634, 2021.

Joris M Mooij, Sara Magliacane, and Tom Claassen. Joint causal inference from multiple contexts. *JMLR*, 2020.

Chandler Squires, Sara Magliacane, Kristjan Greenewald, Dmitriy Katz, Murat Kocaoglu, and Karthikeyan Shanmugam. Active structure learning of causal dags via directed clique trees. In *NeurIPS*, 2020.

Kristjan Greenewald, Dmitriy Katz, Karthikeyan Shanmugam, Sara Magliacane, Murat Kocaoglu, Enric Boix Adsera, and Guy Bresler. Sample efficient active learning of causal trees. *NeurIPS*, 2019.

Tineke Blom, Anna Klimovskaia, Sara Magliacane, and Joris M. Mooij. An upper bound for random measurement error in causal discovery. In *UAI*, 2018.

Sara Magliacane, Thijs van Ommen, Tom Claassen, Stephan Bongers, Philip Versteeg, and Joris M. Mooij. Domain adaptation by using causal inference to predict invariant conditional distributions. In *NeurIPS*, 2018.

Sara Magliacane, Tom Claassen, and Joris M Mooij. Ancestral causal inference. In *NIPS*, 2016.

Sara Magliacane, Philip Stutz, Paul Groth, and Abraham Bernstein. Foxpsl: An extended and scalable psl implementation. In *AAAI 2015 Spring Symposium on Knowledge Representation and Reasoning*, 2015.

Tom De Nies, Sara Magliacane, Ruben Verborgh, Sam Coppens, Paul Groth, Erik Mannens, and Rik Van de Walle. Git2prov: Exposing version control system content as w3c prov. In *ISWC (Posters & Demos)*, pages 125–128, 2013.

Sara Magliacane and Paul Groth. Repurposing benchmark corpora for reconstructing provenance. In *SePublica workshop at ISWC 2013*, pages 39–50, 2013.

Alessandro Bozzon, Emanuele Della Valle, and Sara Magliacane. Extending sparql algebra to support efficient evaluation of top-k sparql queries. *Search Computing*, pages 143–156, 2012.

Paul Groth, Yolanda Gil, and Sara Magliacane. Automatic metadata annotation through reconstructing provenance. In *Third International Workshop on the role of Semantic Web in Provenance Management at ESWC*, 2012.

Rinke Hoekstra, Sara Magliacane, Laurens Rietveld, Gerben de Vries, Adianto Wibisono, and Stefan Schlobach. Hubble: Linked data hub for clinical decision support. In *ESWC Demo*, 2012.

Sara Magliacane. Reconstructing provenance. In *ISWC Doctoral Consortium*. Springer, 2012.

Sara Magliacane, Alessandro Bozzon, and Emanuele Della Valle. Efficient execution of top-k sparql queries. In *ISWC*, 2012.

Sara Magliacane and Paul Groth. Towards reconstructing the provenance of clinical guidelines. In *Proceedings of the 5th International Workshop on Semantic Web Applications and Tools for Life Sciences (SWAT4LS)*, 2012.

A Bozzon, E Della Valle, and S Magliacane. Towards an efficient sparql top-k query execution in virtual rdf stores. In *5th International Workshop on Ranking in Databases (DBRANK) at VLDB*, 2011.