Emanuele Sansone

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Fields of Interest: Machine Learning, Artificial Intelligence
Programming Languages

Employment

2024-now	**Marie-Curie Global Fellow, MIT CSAIL & KU Leuven ESAT** *Topic:* Unsupervised Statistical Relational Learning
2023-2024	**Post-Doctoral Researcher, KU Leuven ESAT** *Topic:* Unsupervised Deep Learning
2020-2023	**Post-Doctoral Researcher, KU Leuven CS** *Topic:* Neuro-Symbolic Learning
2018-2020	**Research Scientist, Huawei R&D UK Ltd** *Topic:* Unsupervised Deep Learning
2015-2016	**Visiting Researcher, Nanjing University CS**

Education

2013-2018	**PhD, Inform. Engin. and Computer Science, Unversity of Trento** *Advisor*: Francesco G. B. De Natale *Thesis* : "Towards Uncovering the True Use of Unlabeled Data in Machine Learning"
2011-2012	**Master degree, Telecommunications Engineering, University of Trento** *Advisor*: N. Conci, G. Boato *Thesis*: "Multimodal Photo Galleries Synchronization" *Award*: 110/110 cum laude
2008-2010	**Bachelor degree, Telecommunications Engineering, University of Trento** *Advisor*: D. Petri, M. Corrà *Thesis*: "Master P-NET Protocol Implementation on PIC 32 Architecture"

Grants and Awards

2024-now	**MSCA Postdoctoral Global Fellowship Grant (177.322 €)** *Project:* "Discovering the World Through Unsupervised Statistical Relational Learning"
2025-now	**LUMI Compute Grant Award (162.737 €)** *Project:* "Self-Supervised Learning of Composable Concept Hierarchies".
2024-2025	**FWO Compute Grant Award (32.963 €)** *Project:* "Scaling Failure-Free Representation Learning"
2021-2023	**Outstanding Reviewer Award** ICLR 2021, ICML 2022, NeurIPS 2022, AISTATS 2023, NeurIPS 2023
2016	**Academic Hardware Grant Award, NVIDIA**
2012	**Merit Award for distinguished master students (3.000 €)**

Publication Overview

Published 3 journal, 7 conference and 8 workshop papers (all peer-reviewed) in venues such as ICML, NeurIPS, ICLR, ECAI, TPAMI and TMLR. 2 papers are **single author** and 2 papers are **last author**.

TMLR	**E. Sansone**, R. Manhaeve (2025). Unifying Self-Supervised Clustering and Energy-Based Models. *Transactions of Machine Learning Research*
ICML	**E. Sansone**, T. Lebailly, T. Tuytelaars (2025). Collapse-Proof Non-Contrastive Self-Supervised Learning. *International Conference on Machine Learning*
ECAI	V. Verreet, L. De Smet, L. De Raedt, **E. Sansone** (2024). EXPLAIN, AGREE, LEARN: Scaling Learning for Neural Probabilistic Logic. *European Conference on Artificial Intelligence*
NeurIPS	L. De Smet, **E. Sansone**, P. Z. D. Martires (2023). Differentiable Sampling of Categorical Distributions Using the CatLog-Derivative Trick. *Neural Information Processing Systems*
NeurIPS	E. Misino, G. Marra, **E. Sansone** (2022). VAEL: Bridging Variational Autoencoders and Probabilistic Logic Programming. *Neural Information Processing Systems*
ICML	**E. Sansone** (2022). LSB: Local Self-Balancing MCMC in Discrete Spaces. *International Conference on Machine Learning*
TPAMI	**E. Sansone**, F.G.B De Natale, Z.H. Zhou (2018). Efficient Training for Positive Unlabeled Learning. *IEEE Transactions on Pattern Analysis and Machine Intelligence*

Service

Action Editor	**TMLR**: Transactions of Machine Learning Research (2024-now)
Guest Editor	**Machine Learning (Springer)**: Special Issue on Learning and Reasoning (2024-now)
Area Chair	**IJCLR**: International Joint Conference on Learning & Reasoning (2024-now) **ICLR**: International Conference on Learning Representations (2026)
Organizer	**Hybrid micro-workshop**: "Synergies among Neuro-Symbolic, Graph Embeddings and Language Models", KU Leuven Attendees/speakers from KU Leuven, TU Darmstadt, EPFL, Fraunhofer IAIS and University of Siena.
Co-Organizer	**Online workshop**: "What are the Next Measurable Challenges in AI?" **Online workshop**: "Learning and Reasoning" Invited talk from Richard Evans (DeepMind) **Online workshop**: "Unifying AI Paradigms and Representations"
Reviewer	**TPAMI**: IEEE Transactions on Pattern Analysis and Machine Intelligence (2022-now) **TNNLS**: IEEE Transactions on Neural Networks and Learning Systems (2022-now) **JMLR**: Journal of Machine Learning Research (2020-now) **Machine Learning (Springer)** (2020-now) **IJAR**: International Journal of Approximate Reasoning (2022-now) **TIP**: IEEE Transactions on Image Processing (2023-now)
PC Reviewer	**ICLR**: International Conference on Learning Representations (2021-2025) **NeurIPS**: Neural Information Processing Systems (2021-2025) **ICML**: International Conference on Machine Learning (2022-2025) **AISTATS**: Artificial Intelligence and Statistics (2022-2024) **CogSci**: Cognitive Science (2024-2025) **CVPR**: Computer Vision and Pattern Recognition (2024-2025)

Teaching, Mentorship in Academia

2022	**Teaching Assistant, Uncertainty in Artificial Intelligence** (B-KUL-H00H2a), *KU Leuven*
2020-2022	**Teaching Assistant, Machine Learning and Inductive Inference** (B-KUL-H00G6a), *KU Leuven*
2016	**Teaching Assistant, Computer Vision** (Code 140266), *University of Trento*
2015	**Teaching Assistant, Multimedia Networking** (Code 140151), *University of Trento*

2021-now **Co-supervision of PhD Students**
2025-now Leonardo Hernandez Cano: "Compositional Generation", *MIT*
2025-now Sergi Masip Cabeza: "Compositional Generation", *KU Leuven*
2025-now Nikola Dukic: "Compositional Self-Supervised Learning", *KU Leuven*
2024-2025 Tim Lebailly: "Collapse-Proof Self-Supervised Learning", *KU Leuven*
2024-2025 Lennert De Smet: "Scalable Neurosymbolic Learning", *KU Leuven*
2024 Victor Verreet: "Probabilistic Neurosymbolic Learning", *KU Leuven*
2024-now Vincenzo Collura: "Benchmarking Neurosymbolic Generation", *University of Luxembourg*
2022-2025 Eleonora Misino: "Integrating Domain Knowledge in Data-Driven AI Approaches", *University of Bologna*

2020-now **Supervision of Master Theses**
2022-2023 Vincenzo Collura: "Neurosymbolic Learning: Challenges and Benchmarks", *University of Bologna*
2021-2022 Rik Bossuyt: "Predicting SAT with Graph Neural Networks", *KU Leuven*
2020-2021 Eleonora Misino: "Deep Generative Models with Probabilistic Logic Priors", *University of Bologna*

2021-now **Supervision of Honor/Undergraduate Students**
2025-now Yifei Jin, Naaisha Agarwal: "Neuro-Symbolic Generative AI Challenge", *MIT*
2025-now Andrew Zhang: "What is the Similarity Metric in Diffusion Models?", *MIT*
2022-2023 Felix Huyghe, Sander Schildermans: "Learning to Predict the Ball Trajectory in Foosball Tables", *KU Leuven*
2021-2022 Xander Haijen: "Comparison of Reinforcement Learning Methods Applied to Tetris", *KU Leuven*

2018-2020 **Industry Supervision of Intern Students** at Huawei
Yinbai Li (Bachelor student in Mathematics at *University of Cambridge*), Xingyu Jin (Master student in Computer Science at *University of Edinburgh*)

Teaching, Mentorship in Sports

2011-now **Ski Master Instructor**
Certificate released by *Federazione Italiana Sport Invernali* (FISI), Milan (Italy).
Description: Highest professional degree in alpine skiing in Italy, which can be achieved by demonstrating excellent skiing capabilities as well as strong organizational, didactical and methodological skills used when teaching/coaching. (The total number of ski master instructors in Italy is around 200 (scroll "Sci Alpino" in "Disciplina" and check "Istruttori").

Responsibilities: Holding several professional education and training courses for ski instructors and candidate ski instructors. People prepared by me to become ski instructors (all of them are now coaches and/or ski instructors): Alessandro Berlanda, Camilla Berlanda, Martina Kerschbaumer, Davide Raineri, Valentina Zampedri, Erman Baldessari, Federico Tonezzer, Martina Longobardi, Chiara Villotti, Stefano Gonzo, Francesca Cella, Samuel Piffer, Teo Valle, Martino Santoni, Emma Santoni, Thomas Corradino, Silvia Zeni, Marco Faccenda.

2007-2017 **Ski Coach (3° level)**
Certificate released by *Federazione Italiana Sport Invernali* (FISI), Milan (Italy).
Description: Professional degree in alpine skiing enabling to coach racing teams at a local, regional and also national level.
Responsibilities: Coach of young athletes (6-20 years old) in several racing ski teams: Ski Team Sopramonte (2007/2008), Sci Club Padova (2008/2009), Sci Club Panarotta (2009-2011), Ski Team Paganella (2013/2014), Campiglio Ski Team (2016/2017).

2007-2017 **Ski Instructor**
Certificate released by Autonomous Province of Trento, Trento (Italy).

TALKS

Inv. Talk
○ "How Can We Make Neural Networks Both Unsupervised and Trustworthy?". *Boston AI/ML User Group Meetup, online* (2025)
○ "From Neuro-Symbolic Learning to Unsupervised Deep Induction". *Department of Computer Science, TU Graz* (2025)
○ "What's Past & What's Next: Learning & Learning to Acquire Knowledge". *Department of Computer Science, University of Manchester* (2023)
○ "Discovering the World Through Unsupervised Statistical Relational Learning". *School of Informatics, University of Edinburgh* (2023)
○ "Coulomb Autoencoders". Symposium on Generative Networks in Computer Vision and Machine Learning, *British Machine Vision Association, London* (2019)

Seminar
○ "Unifying Self-Supervised Clustering and Energy-Based Models". *Computer Science & Artificial Intelligence Laboratory, MIT* (2025)
○ "Collapse-Proof Non-Contrastive Self-Supervised Learning". *Computer Science & Artificial Intelligence Laboratory, MIT* (2025)
○ "Self-Supervised . . . Generative Learning: XOR, AND or IFF?". *Department of Mathematics and Statistics, South Dakota State University* (2023)
○ "GEDI: GEnerative and DIscriminative Training for Self-Supervised Learning". *Department of Computer Science, KU Leuven* (2023)
○ "Generative Adversarial Networks". *Fondazione Bruno Kessler, Trento* (2017)

Presentat.
○ "Collapse-Proof Non-Contrastive Self-Supervised Learning". *Computer Science & Artificial Intelligence Laboratory, MIT* (2025)
○ "Collapse-Proof Non-Contrastive Self-Supervised Learning". *Faculty of Arts and Sciences, Harvard University* (2025)
○ "Discovering the World Through Unsupervised Statistical Relational Learning". *Inter-Departmental Postdoc Symposium, MIT* (2025)
○ "GEDI: GEnerative and DIscriminative Training for Self-Supervised Learning". *Department of General and Computational Linguistics, University of Tübingen* (2023)
○ "LSB: Local Self-Balancing MCMC in Discrete Spaces". *ICML, Baltimore* (2022)
○ "Coulomb Autoencoders". *ECAI, online* (2020)
○ "Classtering: Joint Classification and Clustering with Mixture of Factor Analysers". *ECAI, The Hague* (2016)

JOURNAL PUBLICATIONS

TMLR **E. Sansone**, R. Manhaeve (2025). Unifying Self-Supervised Clustering and Energy-Based Models. *Transactions of Machine Learning Research*

TPAMI **E. Sansone**, F.G.B De Natale, Z.H. Zhou (2018). Efficient Training for Positive Unlabeled Learning. *IEEE Transactions on Pattern Analysis and Machine Intelligence*

TMM **E. Sansone**, K. Apostolidis, N. Conci, G. Boato, V. Mezaris, F. G. B. De Natale (2017). Automatic Synchronization of Multi-User Photo Galleries. *IEEE Transactions on Multimedia*

CONFERENCE PUBLICATIONS

ICML **E. Sansone**, T. Lebailly, T. Tuytelaars (2025). Collapse-Proof Non-Contrastive Self-Supervised Learning. *International Conference on Machine Learning*

ECAI V. Verreet, L. De Smet, L. De Raedt, **E. Sansone** (2024). EXPLAIN, AGREE, LEARN: Scaling Learning for Neural Probabilistic Logic. *European Conference on Artificial Intelligence*

NeurIPS L. De Smet, **E. Sansone**, P. Z. D. Martires (2023). Differentiable Sampling of Categorical Distributions Using the CatLog-Derivative Trick. *Neural Information Processing Systems*

NeurIPS E. Misino, G. Marra, **E. Sansone** (2022). VAEL: Bridging Variational Autoencoders and Probabilistic Logic Programming. *Neural Information Processing Systems*

ICML **E. Sansone** (2022). LSB: Local Self-Balancing MCMC in Discrete Spaces. *International Conference on Machine Learning*

ECAI **E. Sansone**, H. T. Ali, J. Sun (2020). Coulomb Autoencoders. *European Conference on Artificial Intelligence*

ECAI **E. Sansone**, A. Passerini, F. G. B. De Natale (2016). Classtering: Joint Classification and Clustering with Mixture of Factor Analysers. *European Conference on Artificial Intelligence*

PEER-REVIEWED WORKSHOPS AND TECHNICAL REPORTS

ICML B. Kim, M. Puthawala, J. Chul Ye, **E. Sansone** (2024). (Deep) Generative Geodesics. *ICML Workshop GRaM*

NeurIPS **E. Sansone** (2023). The Triad of Failure Modes and a Possible Way Out. *NeurIPS Workshop SSLTheoryPractice*

ICML L. De Smet, **E. Sansone**, P. Z. D. Martires (2023). Differentiable Sampling of Categorical Distributions Using the CatLog-Derivative Trick. *ICML Workshop DiffAE*

ICML V. Verreet, L. De Smet, **E. Sansone** (2023). EXPLAIN, AGREE and LEARN: A Recipe for Scalable Neurosymbolic Learning. *ICML Workshop KLR*

NeSy E. Misino, G. Marra, **E. Sansone** (2023). VAEL: Bridging Variational Autoencoders and Probabilistic Logic Programming (Extended Abstract). *NeSy Workshop*

ICLR E. Misino, G. Marra, **E. Sansone** (2023). VAEL: Bridging Variational Autoencoders and Probabilistic Logic Programming. *ICLR Workshop NeSy-GeMs*

IJCAI **E. Sansone**, R. Manhaeve (2023). Learning Symbolic Representations Through Joint GEnerative and DIscriminative Training (Extended Abstract). *IJCAI Workshop KBCG*

ICLR   **E. Sansone**, R. Manhaeve (2023). Learning Symbolic Representations Through Joint GEnerative and DIscriminative Training. *ICLR Workshop NeSy-GeMs*

Report   **E. Sansone**, R. Manhaeve (2022). GEDI: GEnerative and DIscriminative Training for Self-Supervised Learning

Report   **E. Sansone** (2021). Leveraging Hidden Structure in Self-Supervised Learning. *Technical Report*

Thesis   **E. Sansone** (2018). Towards Uncovering the True Use of Unlabeled Data in ML. *PhD Thesis*

Report   **E. Sansone**, F.G.B. De Natale (2017). Training Feedforward Neural Networks with Standard Logistic Activations is Feasible. *Technical Report*