

Francesco Locatello

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Work Experience

ISTA

Assistant professor, Austria Sept 2023 - present

Amazon AWS Tübingen Lablet

Senior Applied Scientist (L6), Science Lead and Manager, Germany Jan 2021 - July 2023
Lead of the causal representation learning research team.

Google Brain Amsterdam

Research Software Engineer Intern, Netherlands 2020
From March to August (6 months). Manager: Nal Kalchbrenner. Research on object-centric and causal representation learning.

Google Brain Zürich, MSRA partnership with ETH Zürich and MPI Tübingen

Research consultant, Switzerland 2018-2020
Research on disentangled representations

Max Planck - ETH Center for Learning Systems

Ph.D. Representative 2018-2020

ETH Zürich, Data Analytics Lab

Research Assitant, Switzerland 2015
Research on latent variable models.

Education

ETH Zürich and Max Planck Institute for Intelligent Systems Tübingen

Ph.D. student in Computer Science 2016-2020

Supervisor at ETH: Prof. Gunnar Rätsch, Biomedical Informatics Group.

Supervisor at MPI: Prof. Bernhard Schölkopf, Empirical Inference Department.

Doctoral Committee: Prof. G. Rätsch, Prof. B. Schölkopf, Prof. A. Krause, Prof. V. Cevher.

Additional Thesis Reviewer for ETH Medal: Prof. T. Brox (Awarded).

Funded by Max Planck - ETH Center for Learning Systems Fellowship.

Funded by Google Ph.D. Fellowship in Machine Learning since 2019.

ELLIS Ph.D. Student.

ETH Zürich

M.Sc. in Computer Science 2014-2016

Major: Machine Learning, Final GPA: 5.67/6.

Thesis: Greedy Optimization and Applications to Structured Tensor Factorizations (supervised by M. Jaggi)

Thesis Grade: 6/6.

University of Padua

B.Eng. in Information Engineering 2011-2014

Final Grade: 110/110 cum laude.

Honors and Awards

Member of the Young Academy, Heidelberg Academy of Science	2023
Hector Stiftung-Preis for outstanding scientific achievements in the field of Machine Learning	2023
ETH Silver Medal for outstanding doctoral dissertation.	2022
Member of the ELLIS Society	2021
ELLIS Ph.D. fellow	2020
Best Paper Award at the International Conference on Machine Learning “Challenging Common Assumptions in the Unsupervised Learning of Disentangled Representations”.	2019
Google Ph.D. Fellowship in Machine Learning	2019
ISBA@NeurIPS travel award, Advances in Approximate Bayesian Inference Workshop “Boosting Variational Inference: an Optimization Perspective”.	2017
Fellowship at the Max Planck - ETH Center for Learning Systems.	2016

Events Organization

Co-organizer NeurIPS workshop on “UniReps: Unifying Representations in Neural Models New Orleans – LA	2024
3rd Causal Learning and Reasoning Conference – CLear Program chair with Vanessa Didelez Los Angeles – CA	2024
ELLIS workshop on Causal Representation Learning Co-organizer Tübingen – DE	2023
2nd Causal Learning and Reasoning Conference – CLear General Chair with Peter Spirtes Tübingen – DE	2023
UAI Workshop on “Causal Representation Learning” Co-organizer Eindhoven – NL	2022
ICLR Workshop “On the Elements of Reasoning: Objects, Structure, and Causality” Co-organizer Online	2022
1st Causal Learning and Reasoning Conference – CLear Sponsorship chair with Sara Magliacane Eureka – CA	2022
NeurIPS challenge Co-organizer “Advancing state-of-the-art Learning Approaches for Disentangled Representations”	2019

Reviewing Service

Conferences: CLear 2024 (program chair), 2022 (area chair); NeurIPS 2023 (area chair), 2020, 2019 (top 50%), 2018 (top 30%), 2017; ICLR 2023 blogpost track (area chair); ICML 2018, 2019; AISTATS 2018. Journals: International Journal on Computer Vision 2023, IEEE Transactions on Signal Processing 2018. ERC Referee: Starting Grant 2023, Consolidation Grant HORIZON-ERC 2022. Workshops: UAI workshop 2022 (program/area chair), ICLR workshop 2022 (program/area chair), AABI 2018.

Selected Talks

Industry Tech Talks

Invited speaker at Google, Amazon, Huawei, IBM, Genetech.

AI Conferences and Workshops

NeurIPS 2024 workshop (invited talk), IROS 2023 workshop (invited talk), ICML 2023 workshop (invited talk), Gatsby25 (invited talk), Bellairs workshop on causality 2023 (invited talk), ICML 2022 workshop (invited talk), Robust Learning Symposium 2020 (invited talk), ICLR 2020 (contributed talk), ICML 2020 (contributed talk), AAAI 2020 sister conference track (invited talk), ICLR 2019 workshop (contributed talk), NeurIPS 2018 spotlight, ICML 2018 (contributed talk), NeurIPS 2017 workshop (contributed talk), ISMP 2018 (contributed talk)

University seminars

UCL Gatsby Unit, CMU, Caltech, NYU, EPFL, ETH Zurich, MPI Leipzig, MPI Tübingen, Saarland University, Vector Institute, Stanford, Imperial College, Genoa, La Sapienza University

Volunteering / Fundraising

AI for Ukraine (attendants make donations to support Ukrainian students)

Teaching

Lectures

- Guest lecture for the class “Causal Representation Learning” (263-5155-00L), ETH Zurich, 2020.
- Reviewer for the Computer Vision Curriculum for the Amazon Machine Learning University.
- UCLA CS201 seminar, 2022.

Teaching Assistant

- Computational Intelligence Lab (263-0008-00L), ETH Zürich, 2017, 2018
- Advanced Machine Learning (252-0535-00L), ETH Zürich, 2018,2019
- Advanced Topics in Machine Learning (252-5051-00L), ETH Zürich, 2017, 2018, 2019

5 Most Important Publications

- [1] Francesco Locatello, Stefan Bauer, Mario Lucic, Gunnar Rätsch, Sylvain Gelly, Bernhard Schölkopf, and Olivier Bachem. “Challenging common assumptions in the unsupervised learning of disentangled representations”. In: International Conference on Machine Learning (ICML), **Best Paper Award** (2019).
- [2] Bernhard Schölkopf*, Francesco Locatello*, Nan Rosemary Ke, Stefan Bauer, Nal Kalchbrenner, Anirudh Goyal, and Yoshua Bengio. “Towards Causal Representation Learning”. In: Proceedings of IEEE (2021).
- [3] Francesco Locatello*, Dirk Weissenborn, Thomas Unterthiner, Aravindh Mahendran, Georg Heigold, Jakob Uszkoreit, Alexey Dosovitskiy, and Thomas Kipf*. “Object-Centric Learning with Slot Attention”. In: Advances in Neural Information Processing Systems (NeurIPS), Spotlight (top 3.3%) (2020).
- [4] Francesco Locatello, Ben Poole, Gunnar Rätsch, Bernhard Schölkopf, Olivier Bachem, and Michael Tschannen. “Weakly-Supervised Disentanglement Without Compromises”. In: Proceedings of the 37th International Conference on Machine Learning (ICML), acceptance rate 21.8% (2020).
- [5] Paul Rolland, Volkan Cevher, Matthäus Kleindessner, Chris Russel, Bernhard Schölkopf, Dominik Janzing, and Francesco Locatello. “Score matching enables causal discovery of nonlinear additive noise models”. In: Proceedings of the 39th International Conference on Machine Learning (ICML), Oral (top 2%) (2022).

Other Publications at AI Conferences and Journals

- [6] Zixu Zhao, Jiaze Wang, Max Horn, Yizhuo Ding, Tong He, Zechen Bai, Bing Shuai, Dominik Zietlow, Carl-Johann Simon-Gabriel, Zhuowen Tu, Thomas Brox, Bernt Schiele, Yanwei Fu, Tianjun Xiao*, Francesco Locatello*, and Zheng Zhang*. “Object-Centric Multiple Object Tracking”. In: International Conference on Computer Vision (ICCV). 2023.
- [7] Zechen Bai, Ke Fan, Tong He, Tianjun Xiao, Mike Zheng Shou, Yanwei Fu, Dominik Zietlow, Bernt Schiele, Francesco Locatello, Max Horn, Zixu Zhao, Zheng Zhang, Carl-Johann Simon-Gabriel, and Thomas Brox. “Unsupervised Open-Vocabulary Object Localization in Videos”. In: International Conference on Computer Vision (ICCV). 2023.
- [8] Zhenyu Zhu, Fanghui Liu, Grigorios G Chrysos, Francesco Locatello, and Volkan Cevher. “Benign Overfitting in Deep Neural Networks under Lazy Training”. In: International Conference on Machine Learning (ICML). 2023.
- [9] Luca Moschella, Valentino Maiorca, Marco Fumero, Antonio Norelli, Francesco Locatello, and Emanuele Rodolà. “Relative representations enable zero-shot latent space communication”. In: International Conference on Learning Representations (Oral – top 5%). 2023.
- [10] Andrii Zadaianchuk, Matthaeus Kleindessner, Yi Zhu, Francesco Locatello, and Thomas Brox. “Unsupervised semantic segmentation with self-supervised object-centric representations”. In: International Conference on Learning Representations (Spotlight – top 25%). 2023.
- [11] Maximilian Seitzer, Max Horn, Andrii Zadaianchuk, Dominik Zietlow, Tianjun Xiao, Carl-Johann Simon-Gabriel, Tong He, Zheng Zhang, Bernhard Schölkopf, Thomas Brox, and Francesco Locatello. “Bridging the gap to real-world object-centric learning”. In: International Conference on Learning Representations. 2023.
- [12] Yuejiang Liu, Alexandre Alahi, Chris Russell, Max Horn, Dominik Zietlow, Bernhard Schölkopf, and Francesco Locatello. “Causal Triplet: An Open Challenge for Intervention-centric Causal Representation Learning”. In: Causal Learning and Reasoning. 2023.
- [13] Francesco Montagna, Nicoletta Noceti, Lorenzo Rosasco, Kun Zhang, and Francesco Locatello. “Scalable Causal Discovery with Score Matching”. In: Causal Learning and Reasoning. 2023.
- [14] Francesco Montagna, Nicoletta Noceti, Lorenzo Rosasco, Kun Zhang, and Francesco Locatello. “Causal Discovery with Score Matching on Additive Models with Arbitrary Noise”. In: Causal Learning and Reasoning. 2023.
- [15] Matthias Tangemann, Steffen Schneider, Julius Von Kügelgen, Francesco Locatello, Peter Gehler, Thomas Brox, Matthias Kümmerer, Matthias Bethge, and Bernhard Schölkopf. “Unsupervised object learning via common fate”. In: Causal Learning and Reasoning. 2023.
- [16] Florian Wenzel, Andrea Dittadi, Peter Vincent Gehler, Carl-Johann Simon-Gabriel, Max Horn, Dominik Zietlow, David Kernert, Chris Russell, Thomas Brox, Bernt Schiele, Bernhard Schölkopf, and Francesco Locatello. “Assaying Out-Of-Distribution Generalization in Transfer Learning”. In: Advances in Neural Information Processing Systems (NeurIPS). 2022.
- [17] Martin Weiss*, Nasim Rahaman*, Francesco Locatello, Christopher Pal, Yoshua Bengio, Bernhard Schölkopf, Erran Li, and Nicolas Ballas. “Neural Attentive Circuits”. In: Advances in Neural Information Processing Systems (NeurIPS). 2022.
- [18] Jian Yao, Yuxin Hong, Chiyu Wang, Tianjun Xiao, Tong He, Yanwei Fu, Francesco Locatello, David Wipf, and Zheng Zhang. “Self-supervised Amodal Video Object Completion with Test-time Adaptation”. In: Advances in Neural Information Processing Systems (NeurIPS). 2022.
- [19] Michael Lohaus, Matthäus Kleindessner, Krishnam Kenthapadi, Francesco Locatello, and Chris Russell. “Are Two Heads the Same as One? Identifying Disparate Treatment in Fair Neural Networks”. In: Advances in Neural Information Processing Systems (NeurIPS). 2022.

- [20] Samarth Sinha, Peter Gehler, Francesco Locatello, and Bernt Schiele. “TeST: Test-time Self-Training under Distribution Shift”. In: Winter Conference on Applications of Computer Vision (WACV). 2022.
- [21] Andrea Dittadi, Samuele Papa, Michele De Vita, Bernhard Schölkopf, Ole Winther, and Francesco Locatello. “Generalization and robustness implications in object-centric learning”. In: Proceedings of the 39th International Conference on Machine Learning (ICML). 2022.
- [22] Andrea Dittadi, Frederik Träuble, Manuel Wüthrich, Felix Widmaier, Peter Gehler, Ole Winther, Francesco Locatello, Olivier Bachem, Bernhard Schölkopf, and Stefan Bauer. “Representation learning for out-of-distribution generalization in reinforcement learning”. In: International Conference on Learning Representations. 2022.
- [23] Osama Makansi, Julius von Kügelgen, Francesco Locatello, Peter Gehler, Dominik Janzing, Thomas Brox, and Bernhard Schölkopf. “You Mostly Walk Alone: Analyzing Feature Attribution in Trajectory Prediction”. In: International Conference on Learning Representations. 2022.
- [24] Lukas Schott, Julius von Kügelgen, Frederik Träuble, Peter Gehler, Chris Russell, Matthias Bethge, Bernhard Schölkopf, Francesco Locatello*, and Wieland* Brendel. “Visual representation learning does not generalize strongly within the same domain”. In: International Conference on Learning Representations. 2022.
- [25] Dominik Zietlow, Michael Lohaus, Guha Balakrishnan, Matthäus Kleindessner, Francesco Locatello, Bernhard Schölkopf, and Chris Russell. “Leveling Down in Computer Vision: Pareto Inefficiencies in Fair Deep Classifiers”. In: IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR). 2022.
- [26] Gideon Dresdner, Maria-Luiza Vladarean, Gunnar Rätsch, Francesco Locatello, Volkan Cevher, and Alp Yurtsever. “Faster One-Sample Stochastic Conditional Gradient Method for Composite Convex Minimization”. In: International Conference on Artificial Intelligence and Statistics. PMLR. 2022, pp. 8439–8457.
- [27] Nasim Rahaman, Muhammad W. Gondal, Shruti Joshi, Peter Gehler, Yoshua Bengio*, Francesco Locatello*, and Bernhard Schölkopf*. “Dynamic Inference with Neural Interpreters”. In: Advances in Neural Information Processing Systems (NeurIPS), acceptance rate 26%. 2021.
- [28] Julius von Kügelgen, Yash Sharma, Luigi Gresele, Wieland Brendel, Bernhard Schölkopf*, Michel Besserve*, and Francesco Locatello*. “Self-Supervised Learning with Data Augmentations Probably Isolates Content from Style”. In: Advances in Neural Information Processing Systems (NeurIPS), acceptance rate 26%. 2021.
- [29] Frederik Träuble, Julius von Kügelgen, Matthäus Kleindessner, Francesco Locatello, Bernhard Schölkopf, and Peter Gehler. “Backward-Compatible Prediction Updates: A Probabilistic Approach”. In: Advances in Neural Information Processing Systems (NeurIPS), acceptance rate 26%. 2021.
- [30] Gideon Dresdner, Saurav Shekhar, Fabian Pedregosa, Francesco Locatello, and Gunnar Rätsch. “Boosting Variational Inference With Locally Adaptive Step-Sizes”. In: IJCAI. 2021.
- [31] Frederik Träuble, Elliot Creager, Niki Kilbertus, Francesco Locatello, Andrea Dittadi, Anirudh Goyal, Bernhard Schölkopf, and Stefan Bauer. “On Disentangled Representations Learned from Correlated Data”. In: Proceedings of the 38th International Conference on Machine Learning (ICML), Oral (top 3.5%). 2021.
- [32] Hugo Yèche, Gideon Dresdner, Francesco Locatello, Matthias Hüser, and Gunnar Rätsch. “Neighborhood Contrastive Learning Applied to Online Patient Monitoring”. In: Proceedings of the 38th International Conference on Machine Learning (ICML), acceptance rate 21.5%. 2021.
- [33] Andrea Dittadi*, Frederik Träuble*, Francesco Locatello, Manuel Wüthrich, Vaibhav Agrawal, Ole Winther, Stefan Bauer, and Bernhard Schölkopf. “On the Transfer of Disentangled Representations in Realistic Settings”. In: 9th International Conference on Learning Representations (ICLR), acceptance rate 28.7%. 2021.

- [34] Francesco Locatello, Stefan Bauer, Mario Lucic, Gunnar Rätsch, Sylvain Gelly, Bernhard Schölkopf, and Olivier Bachem. “A Sober Look at the Unsupervised Learning of Disentangled Representations and their Evaluation”. In: *Journal of Machine Learning Research (JMLR)*. Vol. 21. 209. 2020, pp. 1–62. URL: <http://jmlr.org/papers/v21/19-976.html>.
- [35] Geoffrey Négier, Gideon Dresdner, Alicia Tsai, Laurent El Ghaoui, Francesco Locatello, Robert M. Freund, and Fabian Pedregosa. “Stochastic Frank-Wolfe for Constrained Finite-Sum Minimization”. In: *Proceedings of the 37th International Conference on Machine Learning (ICML)*, acceptance rate 21.8%. 2020.
- [36] Stefan G Stark*, Joanna Ficek*, Kjong Lehmann, Ximena Bonilla, Francesco Locatello, Gunnar Rätsch, Stephane Chevrier, and Franziska Singer. “SCIM: Universal Single-Cell Matching with Unpaired Feature Sets”. In: *Bioinformatics*. 2020. DOI: [10.1093/bioinformatics/btaa843](https://doi.org/10.1093/bioinformatics/btaa843).
- [37] Francesco Locatello, Michael Tschannen, Stefan Bauer, Gunnar Rätsch, Bernhard Schölkopf, and Olivier Bachem. “Disentangling factors of variation using few labels”. In: *International Conference on Learning Representations (ICLR)*, acceptance rate 26.5%. 2020.
- [38] Francesco Locatello, Stefan Bauer, Mario Lucic, Gunnar Rätsch, Sylvain Gelly, Bernhard Schölkopf, and Olivier Bachem. “A commentary on the unsupervised learning of disentangled representations”. In: *Proceedings of the AAAI Conference on Artificial Intelligence, Sister Conference Track*. 2020.
- [39] Francesco Locatello, Gabriele Abbati, Tom Rainforth, Stefan Bauer, Bernhard Schölkopf, and Olivier Bachem. “On the Fairness of Disentangled Representations”. In: *Advances in Neural Information Processing Systems (NeurIPS)*, acceptance rate 21.6%. 2019.
- [40] Francesco Locatello, Alp Yurtsever, Olivier Fercoq, and Volkan Cevher. “Stochastic Frank-Wolfe for Composite Convex Minimization”. In: *Advances in Neural Information Processing Systems (NeurIPS)*, acceptance rate 21.6%. 2019.
- [41] Sjoerd van Steenkiste, Francesco Locatello, Jürgen Schmidhuber, and Olivier Bachem. “Are Disentangled Representations Helpful for Abstract Visual Reasoning?” In: *Advances in Neural Information Processing Systems (NeurIPS)*, acceptance rate 21.6%. 2019.
- [42] Waleed M. Gondal*, Manuel Wuthrich*, Djordje Miladinovic, Francesco Locatello, Martin Breidt, Valentin Volchkov, Joel Akpo, Olivier Bachem, Bernhard Schölkopf, and Stefan Bauer. “On the transfer of inductive bias from simulation to the real world: a new disentanglement dataset”. In: *Advances in Neural Information Processing Systems (NeurIPS)*, acceptance rate 21.6%. 2019.
- [43] Luigi Gresele*, Paul Rubenstein*, Arash Mehrjou, Francesco Locatello, and Bernhard Schölkopf. “The incomplete rosetta stone problem: Identifiability results for multi-view nonlinear ica”. In: *Conference on Uncertainty in Artificial Intelligence (UAI)*, acceptance rate 26.0%. 2020.
- [44] Vincent Fortuin, Matthias Hüser, Francesco Locatello, Heiko Strathmann, and Gunnar Rätsch. “Deep self-organization: Interpretable discrete representation learning on time series”. In: *International Conference on Learning Representations (ICLR)*, acceptance rate 31.4%. 2019.
- [45] Francesco Locatello*, Gideon Dresdner*, Rajiv Khanna, Isabel Valera, and Gunnar Rätsch. “Boosting black box variational inference”. In: *Advances in Neural Information Processing Systems (NeurIPS)*, Spotlight (top 3.5%). 2018.
- [46] Francesco Locatello*, Anant Raj*, Sai Praneeth Reddy Karimireddy, Gunnar Rätsch, Bernhard Schölkopf, Sebastian Urban Stich, and Martin Jaggi. “On Matching Pursuit and Coordinate Descent”. In: *Proceedings of the 35th International Conference on Machine Learning (ICML)*, acceptance rate 25.1%. 2018.
- [47] Alp Yurtsever, Oliver Fercoq, Francesco Locatello, and Volkan Cevher. “A Conditional Gradient Framework for Composite Convex Minimization with Applications to Semidefinite Programming”. In: *Proceedings of the 35th International Conference on Machine Learning (ICML)*, Oral. 2018.

- [48] Francesco Locatello, Rajiv Khanna, Joydeep Ghosh, and Gunnar Rätsch. “Boosting Variational Inference: an Optimization Perspective”. In: Proceedings of the 21st International Conference on Artificial Intelligence and Statistics (AISTATS), acceptance rate 33.2%. 2018.
- [49] Francesco Locatello, Michael Tschannen, Gunnar Rätsch, and Martin Jaggi. “Greedy algorithms for cone constrained optimization with convergence guarantees”. In: Advances in Neural Information Processing Systems (NeruIPS), acceptance rate 20.9%. 2017, pp. 773–784.
- [50] Francesco Locatello, Rajiv Khanna*, Michael Tschannen*, and Martin Jaggi. “A Unified Optimization View on Generalized Matching Pursuit and Frank-Wolfe”. In: Artificial Intelligence and Statistics (AISTATS), acceptance rate 31.7%. 2017, pp. 860–868.

Patents

- [53] Joanna Ficek, Kjong-van Lehmann, Francesco Locatello, Gunnar Raetsch, and Stefan Stark. METHODS OF DETERMINING CORRESPONDENCES BETWEEN BIOLOGICAL PROPERTIES OF CELLS. US Patent App. 17/920,378. May 2023.
- [54] Dirk Weissenborn, Jakob Uszkoreit, Thomas Unterthiner, Aravindh Mahendran, Francesco Locatello, Thomas Kipf, Georg Heigold, and Alexey Dosovitskiy. Object-Centric Learning with Slot Attention. US Patent App. 16/927,018. Dec. 2021.