RICCARDO CADEI

Researcher - Machine Learning and Causality

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Education

ISTA — Ph.D. Causal Learning and AI
Jan 2024 - Present — Vienna, Austria

Revisiting representation learning for causal downstream tasks [6, 8, 5, 7] + [11, 12, 13, 14], motivated by scientific experiments in Biology and Neuroscience.
Supervisor: Francesco Locatello (supported by a Google Research Scholar Award)

INRIA (Paris) — **Visiting**
Modern Computer Vision for scientific experiments understanding.
Supervisor: Cordelia Schmid ***Group***: Willow ***Program***: ELLIS (ELSA)

EPFL — M.Sc. Data Science
Sep 2020 – Feb 2023 — Lausanne, Switzerland

Relevant courses: ML, ANN, DL, Applied Data Analysis, Visual Intelligence.
Grade: 5.53/6 ***Teaching Assistant:*** Introduction to Machine Learning

Harvard University (Cambridge, MA) — **Visiting**
Thesis: *Interpretable Het. Treatment Effect discovery and inference* [3, 4] + [a,b].
Grade: 6/6 ***Grant***: Causal Inference for Machine Learning

Politecnico di Milano — B.Sc. Mathematical Engineering
Sep 2017 – Jul 2020 — Milan, Italy

Thesis: *Mathematical Programming for activity planning in Oncology Day-Hospital.*
Grade: 110/110 ***Associations***: PoliMi Data Scientists, Ass. Ing. Matematici

Other Research Appointments

Harvard University
Sep 2022 – Sep 2023 — Cambridge (MA), United States

Research Assistant @NSAPH: Causal Machine Learning for climate change, environmental impacts on health outcomes, and regulatory policy [3, 4] and [10].

Schlumberger-Doll Research
Feb 2022 – Aug 2022 — Cambridge (MA), United States

Machine Learning Researcher: Deep Learning for Causal Modeling and interpretation of acoustic subsurface data for anomaly detection and prevention.

École polytechnique fédérale de Lausanne
Nov 2020 – Feb 2022 — Lausanne, Switzerland

Research Assistant (*Summer Intern*) @iGH: Developing a mobile app for (non-invasive) upper body posture detection using Deep Learning.
Research Assistant @*VITA*: Introducing a Causal formalism and a Robust and Adaptive modular architecture for Motion Forecasting [2] and [9].
Research Assistant @LESO-PB: Introducing a U-Net based model for detecting available rooftop areas to install photovoltaic panels from satellite images [1].

Consulting and Entrepreneurship

Entrepreneur First
Oct 2023 – Dec 2023 — Paris, France

Founder in Residence: Learning entrepreneurial skills while trying to launch a start-up in Responsible AI and Sustainability at StationF.

L.O.L. Consultants
Dec 2020 – Feb 2021 — [remote] Melbourne, Australia

Machine Learning Engineer: Detection of available rooftop area to install photovoltaic panels from high-quality satellite images using Deep Learning.

Awards

Career

Nova 111 Student List 2023
Selected among the 10 most promising Italian Computer Scientists Under25.

Machine Learning

Jane Warren Award 2023
By Health Effects Institute for Causal Rule Ensemble algorithm [3].

Generali Data Challenge 2021
Best model and code in the Churn Classification Datahon at @Generali S.p.a out of 280+ participants.

Higgs Boson Challenge 2020
2nd place in the AICrowd final challenge of Machine Learning course at @EPFL out of 290+ teams.

Oracle GraphML Contest 2019
1st place in the Kaggle final challenge of Graph Machine Learning course at @Politecnico di Milano in partnership with @Oracle Labs.

ML for Networking Contest 2019
1st place in the Kaggle final challenge of ML for Networking course at @Politecnico di Milano.

Mathematics

International competition for mathematical and logical games 2018
5th national place (ITA), class L2 (Under21).

Grand Prix of Applied Mathematics
5th national place (ITA) out of 7500+ students. 2017
6th national place (ITA) out of 7500+ students. 2016

Coding

Machine Learning: Python , R , Julia
Deep Learning: PyTorch , Tensorflow , HuggingFace
Math: MATLAB , Python , R , AMPL
Big Data: Spark , Scala , SQL , HDFS , AWS
Robotics: RobotC , C , Python
App and Web: HTML , CSS , Android Studio

Languages

Italian: C2, **English**: C1, **French**: A1

Referees

Dr. Francesca Dominici — **Harvard**
@ fdominic@hsph.harvard.edu

Dr. Cordelia Schmid — **Google/INRIA**
@ cordelias@google.com

Dr. Francesco Locatello — **ISTA**
@ francesco.locatello@ist.ac.at

Publications

Google Scholar statistics
Total citations: 176
h-index: 5

Full Articles (arxiv, main conferences, journals)

[1] Roberto Castello, Alina Walch, Raphael Attias, **RC**, Shasha Jiang, and Jean-Louis Scartezzini. Quantification of the suitable rooftop area for solar panel installation from overhead imagery using Convolutional Neural Networks. In ***Journal of Physics**: Conference Series*, volume 2042, page 012002. IOP Publishing, 2021.

[2] Yuejiang Liu, **RC**, Jonas Schweizer, Sherwin Bahmani, and Alexandre Alahi. Towards Robust and Adaptive Motion Forecasting: A Causal Representation Perspective. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**)*, pages 17081–17092, 2022.

[3] Falco J Bargagli-Stoffi*, **RC***, Kwonsang Lee, and Francesca Dominici. Causal rule ensemble: Interpretable Discovery and Inference of Heterogeneous Treatment Effects. ***arXiv** preprint arXiv:2009.09036*, 2023.

[4] **RC***, Naeem Khoshnevis*, Kwonsang Lee, Daniela Maria Garcia, and Falco J. Bargagli-Stoffi. CRE: an R package for interpretable discovery and estimation of Heterogeneous Treatment Effect. ***Journal of Open Source Software***, 2023.

[5] **RC**, Lukas Lindorfer, Sylvia Cremer, Cordelia Schmid, and Francesco Locatello. Smoke and mirrors in causal downstream tasks. *Advances in Neural Information Processing Systems (**NeurIPS**)*, 2024.

[6] **RC**, Ilker Demirel, Piersilvio De Bartolomeis, Lukas Lindorfer, Sylvia Cremer, Cordelia Schmid, and Francesco Locatello. Causal lifting of neural representations: Zero-shot generalization for causal inferences. *arXiv preprint arXiv:2502.06343* ***arXiv***, 2025.

[7] Dingling Yao, Shimeng Huang, **RC**, Kun Zhang, and Francesco Locatello. The third pillar of causal analysis? a measurement perspective on causal representations. *arXiv preprint arXiv:2505.17708*, 2025.

[8] Dingling Yao, Dario Rancati, **RC**, Marco Fumero, and Francesco Locatello. Unifying Causal Representation Learning with the Invariance Principle. *Proceedings in the Thirteenth International Conference on Learning Representations (**ICLR**)*, 2025.

Workshop Articles

[9] Yuejiang Liu, **RC**, and Alexandre Alahi. Towards Robust and Adaptive Motion Forecasting: A Causal Representation Perspective. In ***NeurIPS** Workshop on Distribution Shifts: Connecting Methods and Applications*, 2021.

[10] Mauricio Tec, **RC**, Francesca Dominici, and Corwin Zigler. Projecting the climate penalty on $PM_{2.5}$ pollution with spatial deep learning. In ***ICLR** Workshop in Tackling Climate Change with Machine Learning*, 2023.

[11] **RC**, Lukas Lindorfer, Sylvia Cremer, Cordelia Schmid, and Francesco Locatello. Smoke and mirrors in causal downstream tasks. ***ICML**, Workshop in AI for Science: Scaling in AI for Scientific Discovery*, 2024.

[12] Dingling Yao, Dario Rancati, **RC**, Marco Fumero, and Francesco Locatello. Unifying Causal Representation Learning with the Invariance Principle. ***NeurIPS** Workshop on (i) Causal Representation Learning and (ii) UniReps*, 2024.

[13] **RC**, Ilker Demirel, Piersilvio De Bartolomeis, Lukas Lindorfer, Sylvia Cremer, Cordelia Schmid, and Francesco Locatello. Causal lifting of neural representations: Zero-shot generalization for causal inferences. ***ICLR** Workshop on (i) Spurious Correlation and Shortcut Learning and (ii) XAI4Science*, 2025.

[14] Dingling Yao, Shimeng Huang, **RC**, Kun Zhang, and Francesco Locatello. The third pillar of causal analysis? a measurement perspective on causal representations. ***ICML** Workshop on Scaling Up Intervention Models*, 2025.

* Co-first authors.

Software Packages

[a] Naeem Khoshnevis, **Riccardo Cadei**, Daniela Maria Garcia, Kwonsang Lee, Falco Joannes Bargagli Stoffi, "CRE: R Package Causal Rule Ensemble Algorithm", CRAN, 2023 (10 000+ downloads, Website, Github).

[b] **Riccardo Cadei**, Naeem Khoshnevis, Falco Joannes Bargagli Stoffi "pycre: Python Package Causal Rule Ensemble Algorithm", pypy, 2023 (Github).

Projects

For a structured summary of my personal/academic projects and software releases publicly available (25+ repositories; >100 ★ on GitHub), visit my Portfolio at `https://www.riccardocadei.com/projects/` or scanning the QR Code on the top-right of the first page and clicking on '*Projects*'.

Events

Talks

Causality in the era of AI **@Huawei x IHES**

Representation Learning for Causal Downstream Tasks **@NeurIPS'25**

Summer Schools

M^{2}L Summer School: Milan 2020-22 (online)

Neurosymbolic Programming: Los Angeles 2022

Causality: Barbados 2025

MLSS: Senegal 2025

Reviewer

NeurIPS: 2024, 2025

Other Workshops and minor journals

Main Conferences

NeurIPS: 2021 (online), New Orleans 2022, Vancouver 2024

ICML: Vienna 2024

ICLR: 2023 (online), Vienna 2024

CVPR: New Orleans 2022

Other Interests

Sport: Marathon Runner (2:42:35) @VRC, Long distance Hiker, Cycle Tourist, Skier and Skater.
Volunteer: NeurIPS and ICLR (logistic), LeadTheFuture (mentoring), Africatlethics (teaching and coaching), BrixiAmaTe (teaching), CARITAS (childcare), Operazione Mato Grosso (various), AVIS (blood donor).