Sergio Hernan Garrido Mejia

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Professional Summary

Machine Learning Engineer and Researcher with 5+ years of experience across industry, academia, and public institutions, specialised in Causality, Bayesian Inference, and Deep Generative Models. Experienced in research, teaching, and supervising advanced ML projects, building and shipping product improvements in industry. Strong mathematical foundations, and skilled in several programming paradigms and frameworks.

Education

Ph.D. Machine Learning, Max Planck Institute - Amazon *Feb 2022 – Present*
Tübingen, Germany

- **Industrial ELLIS Ph.D.** advised by Dominik Janzing at Amazon and Bernhard Schölkopf at the Max Planck Institute for Intelligent Systems.
- **Developing causal inference frameworks** for heterogeneous data environments, focusing on the mathematical interplay between data aggregation and causal discovery.

B.Sc. (Top 5%) and M.Sc. Economics, Universidad de los Andes *2012 – 2018*
Bogotá, Colombia

- **Engineered a spatio-temporal kernel method** to predict urban crime with high resolution data in Bogota for my thesis.
- **Completed advanced mathematical courses** during academic exchanges at the University of Melbourne (2015) and University of Bristol (2014). Coursework: **Real Analysis, Stochastic Processes, and Numerical Mathematics**.

Experience

Machine Learning PhD Research Intern, Amazon *Aug 2020 – Sep 2024*

- **Engineered and deployed** causal-based Root Cause Analysis (RCA) tools for cloud infrastructure; transitioned proof-of-concept prototypes into production-grade AWS features.
- **Optimized high-dimensional correlation estimators** for causal inference on large-scale AWS metrics, improving the scalability and precision of automated diagnostic systems.
- **Authored 3+ publications** in top ML venues (NeurIPS, ICML, AISTATS), bridging the gap between theoretical causality and industrial cloud applications.

PhD Researcher (transferred to MPI), Danmarks Tekniske Universitet *2019 – 2021*

- **Designed and implemented deep generative models (VAEs, GANs)** to synthesize high-fidelity artificial populations for agent-based modelling, achieving state of the art results in synthetic data quality, leading to two publications.

- **Supervised 4 M.Sc. theses** in deep learning and probabilistic modelling, resulting in two publications: Bayesian Hierarchical Invariant Prediction (Causal Learning and Reasoning, 2026), and Population synthesis for urban resident modelling (Neural computing and applications, 2022).
- Served as teaching assistant for **Deep learning, Bayesian inference and Model Based Machine Learning** courses.

Visiting Research Fellow, Hebrew University of Jerusalem *2017 – 2018*

- **Developed NLP pipelines** in Python to digitize and extract structured datasets from unstructured historical industrial archives.
- **Completed graduate level coursework** in Generalized Linear Models (GLMs), Advances topics in Machine Learning and Artificial Intelligence.

Highlighted Scientific Achievements and Service

- "Causality for Large Language Models" – **Tutorial NeurIPS 2024**
  We gave a tutorial on the relationship between LLMs and causality, and how causality is a promising research direction for improving the performance of LLMs.
- Secured funding from Amazon for my PhD (~200,000 euros).
- 10+ papers in top Machine Learning conferences and journals (NeurIPS, ICML, AISTATS, CLeaR, Journal of Causal Inference).
- 15+ times reviewer for top machine learning conferences and journals (NeurIPS, ICML, AISTATS, CLeaR).

Technical Skills

- **Programming languages:** Python, R, C
- **Frameworks:** PyTorch, JAX, Sklearn, Pyro, STAN
- **Tools:** Git, UNIX, LaTeX, (LLM based) Coding agents
- **Languages:** Spanish (Native), English (C2), German (C1), Polish, Danish

Publications

Peer Reviewed Conference Articles

Francisco Madaleno, Pernille J. Viuff S., Francisco C Pereira, **Sergio H. Garrido M.**(2026). Bayesian Hierarchical Invariant Prediction. *Accepted at Causal Learning and Reasoning 2026*

Sergio H. Garrido M., Elke Kirschbaum, Armin Kekić, Bernhard Schölkopf, Atalanti Mastakouri (2026). Estimating Joint Interventional Distributions From Marginal Interventional Data. *Accepted at Causal Learning and Reasoning 2026*

William R. Orchard*, Nastaran Okati*, **Sergio H. Garrido M.**, Patrick Blöbaum, Dominik Janzing (2024). Root Cause Analysis of Outliers with Missing Structural Knowledge. *Advances in Neural Information Processing Systems* 38.

Sergio H. Garrido M., Patrick Blöbaum, Bernhard Schölkopf, Dominik Janzing (2024). Causal vs. Anticausal merging of predictors. *Advances in Neural Information Processing Systems* 37.

Armin Kekić, **Sergio H. Garrido M.**, Bernhard Schölkopf (2024). Learning Joint Interventional Effects from Single-Variable Interventions in Additive Models. *International Conference on Machine Learning*.

Yuchen Zhu*, **Sergio H. Garrido M.***, Bernhard Schölkopf, Michel Besserve (2024). Unsupervised causal abstraction. *CRL Workshop, NeurIPS.*

Sergio H. Garrido M.*, Elke Kirschbaum*, Dominik Janzing (2022). Obtaining causal information by merging datasets with maxent. *International Conference on Artificial Intelligence and Statistics*. PMLR.

Sergio H. Garrido M., Emiliano Isaza (2020). A hierarchical Bayesian model of Coca production in Colombia. *Oral at LXAI workshop at ICML*.

Jeppe Rich, Gunnar Flotterod, **Sergio H. Garrido M.**, Francisco Camara Pereira (2019). Review of population synthesis methodologies. *hEART conference*

Sergio H. Garrido M. (2018). Predicting crime in Bogota using Kernel Warping. *Colombian conference of industrial and applied mathematics*.

Peer Reviewed Journal Articles

Dominik Janzing, **Sergio H. Garrido M.** (2024). A phenomenological account for causality in terms of elementary actions. *Journal of Causal Inference*, 12(1).

Martin Johnsen, Oliver Brandt, **Sergio H. Garrido M.**, Francisco C. Pereira (2022). Population synthesis for urban resident modeling using deep generative models. *Neural Computing and Applications*.

Sergio H. Garrido M., Stanislav S. Borysov, Jeppe Rich, Francisco C. Pereira (2020). Causal Effect Estimation with Neural Autoregressive Density Estimators. *Journal of Causal Inference*, 9(1).

Sergio H. Garrido M., Stanislav S. Borysov, Francisco C. Pereira, Jeppe Rich (2019). Prediction of rare feature combinations in population synthesis: Application of deep generative modelling. *Transportation Research Part C: Emerging Technologies*.

Carlos Arango, Nicolas Suarez, **Sergio H. Garrido M.** (2016). ¿Cómo pagan los colombianos y por qué? *Coyuntura Economica*, 46(2).