Julia Linhart, Ph.D. Student

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Education

2021 – · · · · **Ph.D. Computational Mathematics, Inria (Parietal-MIND), University of Paris-Saclay.**
Machine Learning, Bayesian Inference, Deep Generative Models, Statistical Testing.
Title: *Simulation-based inference with deep learning: application to neuroscience time series data.*
Supervisors: Alexandre Gramfort and Pedro L. C. Rodrigues.
– *Scholarship "Jean-Pierre Aguilar"*, Foundation CFM.

2020 – 2021 **M.Sc. "MVA", École Normale Supérieure Paris-Saclay.**
Research Master in Mathematics, Vision and Learning.
Computational Statistics, Convex Optimization, Bayesian ML, Kernel Methods for ML, Graphs in ML, Object Recognition, Numerical and Medical Imaging.
– *Scholarship „Bourse Excellence Majorde l'AEFE"*, Campus France.

2017 – 2021 **Engineering Degree, École Nationale des Ponts et Chaussées, ParisTech.**
Department of Applied Mathematics and Computer Science.
Statistics, Machine Learning, Computer Vision, Operational Research, Stochastic Processes, Game Theory, Fourier Analysis.
– *Scholarship „Bourse Excellence Majo de l'AEFE"*, Campus France.

2015 – 2017 **French Preparatory Classes (MP), Lycée Saint-Louis, Paris.**
Intensive courses in Mathematics and Physics.
– *Scholarship „Bourse Excellence Major de l'AEFE"*, Campus France.

2008 – 2015 **French Baccalauréat, Lycée Français de Vienne** in Science.
2013: Semester abroad at Avondale College in Auckland, New Zealand.

Employment History

04 – 10 / 2021 **Machine Learning Research Intern** Owkin, Paris, France. Medical Imaging.
Project: *Prediction of breast cancer relapse using deep learning methods on histology data.*
- Multimodal survival prediction
- Calibration of deep survival models

01 – 07 / 2020 **AI Research Intern** Covera Health, New York, USA. Computer Vision.
Project: *Uncertainty measurement of deep neural networks for pathology detection in MRI data.*
- Uncertainty quantification in classification with Bayesian Neural Networks
- Evidential deep learning for handling distributional uncertainty

06 – 12 / 2019 **Data Science Intern** Orange Silicon Valley, San Francisco, USA. Quantitative Marketing.
Project: *Novel machine learning tools to enhance costumer service for the OCS TV network.*
- Churn prediction and personalized movie recommendations with graphs
- Sentiment analysis with NLP for NPS calculations

08 / 2018 **Intern** Linz Center of Mechatronics GmbH, Linz, Austria. Mechanics and Control.
Project: *Modeling and simulation of metal forming processes.*
- Simulation automation in Python
- Machine learning for process optimization

Skills

Languages English, German and French (all fluent). Spanish (beginner).
Coding Python, ML-related programming, collaborative coding on Github
Academic Research, Teaching, LaTeX typesetting and publishing
Misc. Experienced and ambitious skier and handball player, passionate piano player

Miscellaneous Experience

Academic
- Teaching assistant
  - Probability 101 with Francesco Russo and Benjamin Bonrepaux, ENSTA, 2023.
  - Statistics 101 with Francesco Russo , ENSTA, 2023.
- Auditor at Lycée Saint-Louis in Mathematics (MPSI-MP) and German (advanced), 2020/21.

Other
- Treasurer of the Sports Association at ENPC, 2018/19.

Software / Open Source

Contributions
- Major contributor to the `sbi` toolkit for simulation-based inference
  - Implementation of the L-C2ST diagnostics: code and tutorial
  - Continuous feature integration for the neural density estimation back-end
  - Issues and code reviewing, regular participation in sprints
- Contributor to the `benchopt` package for benchmarking ML methods
  - Implementation of a benchmark for simulation-based inference
  - Regular participation in sprints

Research
- Public code for research projects and publications: Github profile

List of Publications

Conference Proceedings

1. **J. Linhart**, A. Gramfort, and P. L. C. Rodrigues, "L-c2st: Local diagnostics for posterior approximations in simulation-based inference," in *Advances in Neural Information Processing Systems (NeurIPS)*, 2023.
2. **J. Linhart**, P. L. Coelho Rodrigues, T. Moreau, G. Louppe, and A. Gramfort, "Neural Posterior Estimation of hierarchical models in neuroscience," in *GRETSI 2022 - XXVIIIème Colloque Francophone de Traitement du Signal et des Images*, 2022, pp. 1–3.
3. **J. Linhart**, A. Gramfort, and P. L. C. Rodrigues, "Validation diagnostics for sbi algorithms based on normalizing flows," in *NeurIPS 2022 Workshop 'Machine Learning for Physical Sciences'*, 2022.

Preprints

1. A. Blain, B. Thirion, **J. Linhart**, and P. Neuvial, "When knockoffs fail: Diagnosing and fixing non-exchangeability of knockoffs," 2024. arXiv: `2407.06892 [stat.ME]`.
2. **J. Linhart**, G. V. Cardoso, A. Gramfort, S. L. Corff, and P. L. C. Rodrigues, "Diffusion posterior sampling for simulation-based inference in tall data settings," 2024. arXiv: `2404.07593 [stat.ML]`.

Invited Talks

May 2024
- **Diagnostics in SBI**
  PHYSTAT Workshop on statistical methods in fundamental physics.
  Session on *Simulation-Based Inference* by Kyle Cranmer, Gilles Louppe, Ann Lee and others.
  Max-Planck Institute for Physics, Garching near Munich, Germany.

Jan 2024
- **L-C2ST: Local diagnostics for posterior approximations in simulation-based inference**
  Journées YSP: Young Statisticians and Probabilists.
  Session on *Simulations and Generative Models* by Marylou Gabrié.
  Institut Henri Poincaré, Paris, France.