Houssam Zenati

h.zenati@ucl.ac.uk
https://houssamzenati.github.io

25 Howland St, London W1T 4JG, United Kingdom

Research Interests

Statistical and algorithmic questions in machine learning systems, especially sequential decision-making, policy learning, causal inference, nuisance-robust methods, and inference under adaptive data collection.

Professional Experience

Gatsby Computational Neuroscience Unit, University College London, United Kingdom
Research Fellow 2025–present
Developing methods for semiparametric efficient distributional causal inference, adaptive data collection, and sequential decision-making.

INRIA MIND / PreMeDical, France
Postdoctoral Researcher 2023–2024
Research on causal inference and mediation analysis, including double machine learning estimators and open-source software development.

Criteo AI Lab, France
PhD Researcher 2020–2023
Research Engineer 2019–2020
Worked on counterfactual policy learning and online/bandit problems, including optimization methods, contextual bandits, and kernel methods.

Institute for Infocomm Research (ASTAR), Singapore
Research Intern / Research Experience 2017–2018
Worked on deep representation learning, generative adversarial networks, anomaly detection, and semi-supervised learning, with applications to medical imaging.

Education

Université Grenoble Alpes / INRIA Thoth, France 2023
Ph.D. in applied mathematics and machine learning.
Thesis: *Efficient Methods in Counterfactual Policy Learning and Sequential Decision Making.*

ENS Paris-Saclay / MVA, France 2019
M.Sc. in mathematics, vision, and learning.

CentraleSupélec, France 2015–2019
M.Eng. in applied mathematics and computer science.

Selected Publications

S. Girard, A. Bibaut, A. Gretton, N. Kallus, **H. Zenati** (2026). *Fast Best-in-Class Regret for Contextual Bandits.* Preprint.
arXiv:2510.15483

Z. Shen*, **H. Zenati***, N. Kallus, A. Gretton, K. Khamaru, A. Bibaut (2026). *Efficient Inference after Directionally Stable Adaptive Experiments.* Preprint.
arXiv:2602.21478

H. Zenati, B. Bozkurt, A. Gretton (2025). *Doubly-Robust Estimation of Counterfactual Policy Mean Embeddings.* NeurIPS.

H. Zenati, E. Diemert, M. Martin, J. Mairal, P. Gaillard (2023). *Sequential Counterfactual Risk Minimization.* ICML.

H. Zenati, A. Bietti, E. Diemert, J. Mairal, M. Martin, P. Gaillard (2022). *Efficient Kernelized UCB for Contextual Bandits.* AISTATS.

Other Publications

H. Zenati, B. Bozkurt, A. Gretton (2026). *Kernel Treatment Effects with Adaptively Collected Data.* AISTATS.

A. Bibaut, **H. Zenati**, T. Rahier, N. Kallus (2026). *Functional Natural Policy Gradients.* Preprint.

H. Zenati, J. Abecassis, J. Josse, B. Thirion (2025). *Double Debiased Machine Learning for Mediation Analysis with Continuous Treatments.* AISTATS.

J. Abecassis, **H. Zenati**, S. Boumaiza, J. Josse, B. Thirion (2025). *Causal Mediation Analysis with One or Multiple Mediators: A Comparative Study.* Psychological Methods.

B. Bozkurt, **H. Zenati**, D. Meunier, L. Xu, A. Gretton (2025). *Density Ratio-Free Doubly Robust Proxy Causal Learning.* NeurIPS.

H. Zenati, A. Bietti, M. Martin, E. Diemert, P. Gaillard, J. Mairal (2025). *Counterfactual Learning of Stochastic Policies with Continuous Actions.* Transactions on Machine Learning Research.

J. Zhou, P. Gaillard, T. Rahier, **H. Zenati**, J. Arbel (2024). *Towards Efficient and Optimal Covariance-Adaptive Algorithms for Combinatorial Semi-Bandits.* NeurIPS.

M. Martin, P. Mertikopoulos, T. Rahier, **H. Zenati** (2022). *Nested Bandits.* ICML.

H. Zenati, A. Bietti, M. Martin, E. Diemert, J. Mairal (2020). *Optimization Approaches for Counterfactual Risk Minimization with Continuous Actions.* ICLR Workshop on Causal Learning for Decision Making.

P. Mertikopoulos, B. Lecouat, **H. Zenati**, C.-S. Foo, V. Chandrasekhar, G. Piliouras (2019). *Optimistic Mirror Descent in Saddle-Point Problems: Going the Extra (Gradient) Mile.* ICLR.

K. Ouardini, H. Yang, B. Unnikrishnan, M. Romain, C. Garcin, **H. Zenati**, J. P. Campbell, M. F. Chiang, J. Kalpathy-Cramer, V. Chandrasekhar, et al. (2019). *Towards Practical Unsupervised Anomaly Detection on Retinal Images.* MICCAI Workshop on Domain Adaptation and Representation Transfer.

M. Romain*, **H. Zenati***, C.-S. Foo, B. Lecouat, V. Chandrasekhar (2018). *Adversarially Learned Anomaly Detection.* ICDM.

H. Zenati, C.-S. Foo, B. Lecouat, G. Manek, V. R. Chandrasekhar (2018). *Efficient GAN-Based Anomaly Detection.* ICLR Workshop.

B. Lecouat, C.-S. Foo, **H. Zenati**, V. Chandrasekhar (2018). *Semi-Supervised Learning with GANs: Revisiting Manifold Regularization.* ICLR Workshop.

B. Lecouat, C.-S. Foo, **H. Zenati**, V. Chandrasekhar (2018). *Manifold Regularization with GANs for Semi-Supervised Learning.* arXiv preprint.

B. Lecouat, K. Chang, C.-S. Foo, B. Unnikrishnan, J. M. Brown, **H. Zenati**, A. Beers, V. Chandrasekhar, J. Kalpathy-Cramer, P. Krishnaswamy (2018). *Semi-Supervised Deep Learning for Abnormality Classification in Retinal Images.* NeurIPS Workshop on Machine Learning for Health.

Teaching

Data Visualisation, Université Paris Dauphine – PSL 2021–2022
Instructor for Master's students in the IASD program. Covered visualisation as a statistical and algorithmic tool for exploring, summarizing, and communicating complex data, with topics including graphical principles and dimensionality-reduction methods such as PCA, multidimensional scaling, and t-SNE.

Advanced Machine Learning, CentraleSupélec 2024–2025
Teaching assistant alongside Emilie Chouzenoux. Helped students connect the formal ideas in modern machine learning, statistics, and optimization to practical algorithms and empirical behavior.

Causal Inference, New York University Paris 2024–2025
Co-instructor with Judith Abecassis. Taught lectures and recitations on randomized and observational causal inference, including identification assumptions, weighting, matching, instrumental variables, and regression discontinuity.

Teaching philosophy: conceptual clarity, mathematical rigor, and active engagement.

Student Supervision

- Julien Zhou, Master's student 2023
- Samuel Girard, PhD student 2025–2026
- Robin Leman, Master's student 2026

Talks

- *Doubly-Robust Estimation of Counterfactual Policy Mean Embeddings*, INRIA Thoth, France Oct. 2025
- *Doubly-Robust Estimation of Counterfactual Policy Mean Embeddings*, Symposium on Mathematical Foundations of Trustworthy Learning, Switzerland Oct. 2025
- *Sequential Counterfactual Risk Minimization*, ELLIS Unconference, France Jul. 2023
- *Sequential Counterfactual Risk Minimization*, INRIA Lille, France Jun. 2023
- *Nested Bandits*, ICML, United States Jul. 2022
- *Efficient Kernelized Contextual Bandits*, virtual talk May 2022
- *Optimization Approaches for Counterfactual Risk Minimization with Continuous Actions*, virtual talk Apr. 2020
- *Adversarially Learned Anomaly Detection*, ICDM, Singapore Nov. 2018
- *Efficient GAN-Based Anomaly Detection*, DL2.0 Workshop, I2R, ASTAR, Singapore Apr. 2018

Service

Reviewing
AISTATS, ICML, NeurIPS, ICLR, TMLR

Reading Group Organization
Co-organized a reading group at Gatsby, UCL on van der Vaart's *Asymptotic Statistics* 2026
Organized a reading group at Inria Paris-Saclay on Wainwright's *High-Dimensional Statistics* 2023–2024

Workshop and Seminar Organization
Advances on Adaptive Experimentation (AAE) Workshop, Gatsby Unit 2026
External machine learning seminars, Gatsby Unit, UCL since Sept. 2025

Software

med_bench: Python package for causal mediation analysis with a unified implementation of common estimators and flexible nuisance models.

Open-source research code:

- adaptive-KTE
- counterfactual-policy-mean-embedding
- double-debiased-machine-learning-mediation-continuous-treatments
- sequential-counterfactual-risk-minimization
- Efficient-Kernel-UCB
- Nested-Exponential-Weights
- optimization-continuous-action-crm
- Adversarially-Learned-Anomaly-Detection
- Efficient-GAN-Anomaly-Detection