

Malek Ben Salah

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Presentation

PhD student in statistical machine learning at Université Paris-Saclay, specializing in causal inference and survival analysis applied to oncology. I'm particularly interested in probabilistic deep learning, reinforcement learning, and optimal control for sequential decision making in healthcare. I'm also very passionate about software development and open-source projects, with a focus on bridging the gap between research and practical applications.

Education

2025 – 2028	PhD in statistics and machine learning applied to healthcare Université Paris-Saclay — CentraleSupélec & Institut Gustave Roussy & INSERM Causal survival analysis for treatment recommendation: learning and optimizing sequential treatment decisions from counterfactual predictions on longitudinal clinical data.
2023 – 2024	MSc mathematics for life sciences Institut Polytechnique de Paris Coursework: reinforcement learning, causal inference, high-dimensional statistics, large scale optimization
2021 – 2024	Engineering degree in applied mathematics ENSTA Paris - ENIT Tunis Coursework: Optimization, probabilities and stochastic calculus, statistical modeling, Deep learning
2018 – 2021	Pre-engineering in physics and chemistry — IPEST Tunis

Awards

2026	2nd place, best presentation at the AI in Oncology conference
2021 – 2024	Full 3-year scholarship for the ENSTA Paris – ENIT Tunis double-degree engineering program
2021	1st nationally at the Tunisian engineering entrance exam (Concours National d'Entrée aux Écoles d'Ingénieurs)

Experience

Research internship - MICS laboratory, CentraleSupélec 	Apr 2024 – Oct 2024
Supervised by Pr. Paul-Henry Cournède and Pr. Véronique Letort	
– Reviewed uncertainty quantification methods in machine learning and empirically evaluated their performance.	
– Developed a tree-based conformal prediction algorithm for post-hoc uncertainty quantification.	
Research internship - MICS Laboratory, CentraleSupélec 	Jun 2023 – Sep 2023
Supervised by Dr. Kaniav Kamary	
– Developed Bayesian Gaussian mixtures to characterize cardiovascular risk in pediatric cancer survivors using clinical data.	
– Implemented MCMC algorithms for parameter estimation and uncertainty quantification in probabilistic models.	
– Presented results at the AppliBUGS workshop and accepted at the annual meeting of the French Statistical Society (SFDS).	

Projects and Research

Causal survival analysis of treatment effects in metastatic breast cancer (AI in oncology conference)	2026
Developed causal inference methods on the ESME/Unicancer real-world cohort to estimate counterfactual treatment effects across treatment strategies. Model enables individual treatment recommendation and emulated clinical trial studies.	
Image generation for fetal ultrasound	2024
Developed generative models (CVAEs, GANs, diffusion) to simulate realistic fetal ultrasound images and improve dataset diversity for medical applications, in collaboration with Sonio.	
Kairos: JAX-based survival analysis library 	2026
Developed a lightweight, JAX-based toolkit for survival analysis, enabling efficient implementation of flexible survival models. Designed for research and clinical applications, fully JIT-compatible, and integrates with modern deep learning workflows.	
PRINCEPS NSCLC clinical trial analysis (AACR conference) 	2025
Analyzed tumor-immune profiles from the phase 2 PRINCEPS lung cancer trial, evaluating biomarkers and residual tumor metrics to assess treatment response. Performed statistical comparisons and subgroup analyses to identify predictive immune features. Abstract accepted to the 2026 AACR conference.	

Skills

Programming	Python, C++, R, Rust(beginner)
Tools	Git, Bash, HPC, Docker, Databricks, llama.cpp
Frameworks	JAX, PyTorch, scikit-learn, Lightning

Languages

Arabic - Native	French - Bilingual	English - C1+ (Cambridge Linguaskill)	Italian - A2
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