Guillem HURAULT | Data Science Specialist

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ghurault • French

Engineer and **graduating PhD researcher in Statistical Machine Learning** for medical applications with **5 years of experience in data science**. Deep expertise in **Bayesian modelling** and **time-series forecasting**. Highly proficient with the **R** statistical programming language and conscious about reproducible coding practices. Hands-on experience in managing research projects. **Looking to apply my skills to business applications**.

Education

2018–2022 **PhD in Statistical Machine Learning**, *Department of Bioengineering, Imperial College London*, UK
Thesis: Towards a data-driven personalised management of Atopic Dermatitis severity. Supervisor: Dr. Tanaka.

2016–2017 **MSc in Biomedical Engineering, Neurotechnology**, *Imperial College London*, UK, Distinction

2014–2018 **Master's Degree in Engineering**, *Ecole Centrale de Lyon*, one of FRANCE's top engineering schools

2014–2016 **Bachelor's Degree in Economics**, *Université Lyon 2*, FRANCE

2012-2014 Intensive preparation in Maths and Physics (MPSI, MP*) for the highly competitive entrance exams to the French "Grandes Écoles" at *Lycée Chateaubriand*, Rennes (FRANCE).

Professional Experience

October 2017 – Today **Research Assistant**, *Department of Bioengineering, Imperial College London*, UK

- Pioneered research for developing personalised predictive models for eczema. Led the development of the first computer vision CNN to detect and assess the severity of eczema from camera images.
- Extracted insights from complex, small, and imperfect data to generate personalised treatment recommendations.
- Published 10+ scientific articles to clinical and machine learning audiences. Presented work at international conferences. Reviewed several research papers.
- Developed software packages (EczemaPred, Hurformer) and high-quality analysis code following agile and reproducible research practices (version control, documentation, testing, continuous integration).
- Supervised 25+ student projects on topics like statistical modelling, computer vision, clustering, Gaussian Processes.
- Managed our external website, knowledge base and code repositories (GitHub). Set up standard operating procedures for writing and sharing code.

2019 – 2021 **Teaching Assistant**, *Department of Bioengineering, Imperial College London*, UK

- Probability & Statistics
- Mathematics
- Occasional teaching: Machine Learning, Brain Machine Interfaces.

May-July 2016 **Research Intern**, *Laboratoire de Neurosciences Cognitives (CNRS UMR 7291), Aix-Marseille Université*
Analysed fMRI images using Machine Learning to understand the role of the oculomotor cortex in social perception.

Skills

Data Science ○ Machine Learning ○ Statistics ○ Bayesian modelling ○ Time-series forecasting ○ Uncertainty quantification ○ Visualisation ○ Missing values ○ Regularisation ○ Decision-making ○ Clustering ○ Causality

Programming **Working knowledge**: ○ R (incl. tidyverse, Shiny, package development) ○ Stan ○ MATLAB ○ LaTeX ○ RegEx ○ Git/GitHub

Basic knowledge: ○ Python ○ SQL ○ C# (incl. Infer.NET) ○ HTML ○ Tableau

Software ○ Microsoft Office (incl. Publisher) ○ Microsoft Visual Studio ○ Adobe Premiere ○ Gimp

Languages ○ Native **French** ○ Fluent **English** ○ Basic Portuguese

Other Experiences

2019 – 2021 **Bioengineering PhD representative**, *Imperial College London*

Represented 200+ PhD researchers in departmental meetings, organised social and professional events.

2014-2017 **Engineering student**

- Investigated the evolution of eczema using Machine Learning methods in the Biological Control Systems Lab.
- Designed a genetic algorithm in a research project with LIRIS Lab (CNRS) to solve a scheduling problem.
- Supervised a 6-person team for HEXADRONE to design and test a security system to avoid the crash of a drone.

2015 **General Secretary**, *Forum Perspectives*

Organized a yearly career fair with 100 companies, 2000 students participating and a turnover of 250k€.

2015 **Treasurer, Communication coordinator and Editor** of Centrale Lyon's newspaper Piston Hebdo.

2015 Active committee member of Centrale Lyon's Cinema Society.

Publications & Preprints

[1] **G. Hurault**, J-F Stalder, S. Mery, A. Delarue, M. Saint Aroma, G. Josse and R. J. Tanaka, "EczemaPred: A computational framework for personalised prediction of eczema severity dynamics", *submitted to publication.*

[2] **G. Hurault**, K. Pan, R. Mokhtari, B. Olabi, E. Earp, L. Steele, H. Williams and R. J. Tanaka, "Detecting eczema areas in digital images: an impossible task?", *submitted to publication.*

[3] **G. Hurault**, E. Roekevisch, M.E. Schram, K. Szegedi, S. Kezic, M.A. Middelkamp-Hup, P.I. Spuls and R. J. Tanaka, "Can serum biomarkers predict the outcome of systemic immunosuppressive therapy in adult atopic dermatitis patients?", *Skin and Health Disease*, 2022.

[4] **G. Hurault**, V. Delorieux, Y-M. Kim, K. Ahn, H. Williams and R. J. Tanaka, "Impact of environmental factors in predicting daily severity scores of atopic dermatitis", *Clinical and Translational Allergy*, vol. 11, no. 2, 2021.

[5] J. G. Holm, **G. Hurault**, T. Agner, M.L. Clausen, S. Kezic, R. J. Tanaka, S. F. Thomsen, "Immunoinflammatory Biomarkers in Serum Are Associated with Disease Severity in Atopic Dermatitis", *Dermatology*, vol. 237, no. 4, pp. 513–520, 2021.

[6] R. Jurakic Toncic, I. Jakasa, Y. Sun, **G. Hurault**, S. Ljubojevic Hadzavdic, R. J. Tanaka, B. Pavicic, A. Balic, K. Zuzul, M. Petkovic, S. Kezic and B. Marinovic, "Stratum corneum markers of innate and T helper cell-related immunity and their relation to the disease severity in Croatian patients with atopic dermatitis", *Journal of the European Academy of Dermatology & Venereology*, vol. 35, no. 5, pp. 1186–1196, 2021.

[7] K. Pan, **G. Hurault**, K. Arulkumaran, H. Williams and R. J. Tanaka, "EczemaNet: Automating Detection and Assessment of Atopic Dermatitis", *International Workshop on Machine Learning in Medical Imaging*, 2020.

[8] **G. Hurault**, E. Domínguez-Hüttinger, S. M. Langan, H. C. Williams and R. J. Tanaka, "Personalised prediction of daily eczema severity scores using a mechanistic machine learning model", *Clinical & Experimental Allergy*, vol. 50, no. 11, pp. 1258–1266, 2020.

[9] J. Nousbeck, M.A. McAleer, **G. Hurault**, E. Kenny, K. Harte, S. Kezic, R.J. Tanaka and A.D. Irvine, "miRNA analysis of Childhood Atopic Dermatitis reveals a role for miR-451a" *British Journal of Dermatology*, vol. 184, no. 3, pp. 514–523, 2020.

[10] M.A. McAleer, I. Jakasa, **G. Hurault**, P. Sarvari, W.H.I. McLean, R.J. Tanaka, S. Kezic and A.D. Irvine, "Systemic and stratum corneum biomarkers of severity in infant AD include markers of innate and Th-related immunity and angiogenesis", *British Journal of Dermatology*, vol. 180, no. 3, pp. 586–596, 2019.

[11] **G. Hurault**, M. Schram, E. Roekevisch, P. Spuls and R. Tanaka, "Relationship and probabilistic stratification of EASI and oSCORAD severity scores for atopic dermatitis", *British Journal of Dermatology*, vol. 179, no. 4, pp. 1003-1005, 2018.

Talks & Posters

[1] "Computational tools for data-driven personalised medicine for Atopic Dermatitis", poster presented at the International Symposium on Atopic Dermatitis, 2021

[2] "A Bayesian Hidden Markov model to predict the dynamic evolution of disease severity in eczema", poster presented at the International Conference on Systems Biology of Human Diseases, 2019

[3] "Bayesian Modelling to Predict the Evolution of Eczema Severity", poster presented at the International Conference on Systems Biology, 2018.

[4] "Bayesian Machine Learning to Predict Short-term Course of Eczema Severity", presented at BioMedEng18, 2018

[5] "Predicting short- and long-term outcomes of a systemic therapy for atopic dermatitis using machine learning methods", presented at the International Symposium on Atopic Dermatitis, 2018

[6] "How can Machine Learning help our understanding of Atopic Dermatitis?", presented at the London Skin Club, 2017