Guillem HURAULT | Engineer

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Engineer and PhD candidate in statistical Machine Learning applied to eczema. Hands-on experience in managing research projects Additional background in Economics.

Education

2018–Today **PhD in Biomedical Engineering**, *Department of Bioengineering, Imperial College London*, UK.
Development of machine learning and mathematical models to predict eczema. 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 school.

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

2012-2014 Intensive preparation in Maths and Physics 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.
– Developed statistical machine learning models of eczema for personalised medicine, with a particular focus on: Bayesian modelling, time-series, regularisation, clustering, computer vision.
– Developed software packages, applied reproducible research practices, participated in collaborative projects, performed literature reviews, designed visualisations.
– Communicated results in comprehensive reports, scientific articles and during conferences.
– Co-supervised 25+ student projects, organised group meetings, conducted interviews, maintained the group's website.

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.

Casual Work Manual work in an automated mail centre (4 weeks in July 2015), Tutoring in Maths and Physics to high school students (2012-2014), Archiving in a law office (one week during summer 2012 and 2013).

Other Experiences

2019 – 2021 **Bioengineering PhD representative**, *Imperial College London.*
Represented students in departmental meetings, organised social 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.

Skills

Languages ○ Native **French** ○ Fluent **English** ○ Notions in Portuguese, Italian and Spanish

Programming **Working knowledge**: R (incl. tidyverse, Shiny, package development), Stan, MATLAB (incl. SPM), LaTeX, RegEx.

Basic knowledge: Python, SQL, C# (incl. Infer.NET), Mathematica, HTML, Tableau, JavaScript, C++.

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

Publications & Preprints

[1] **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.

[2] 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*, 2021.

[3] R. Jurakic Toncic, I. Jakasa, Y. Sun, **G. Hurault**, S. Ljubojevic Hadzavdic, R. J. Tanaka, 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*, 2021.

[4] **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 therapy for atopic dermatitis?", *MedRxiv (preprint)*, 2020.

[5] 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.

[6] **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.

[7] 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*, 2020.

[8] 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.

[9] **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