Xavier Loizeau | Higher research scientist

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Professional experiences

NPL (National Physical Laboratory)   **Teddington, England**

Higher Research Scientist 21st of January 2019 – present

Contributing to scientific projects by developping mathematical models, and statistical estimators, identifying appropriate statistical methods, implementing software solutions, deriving mathematically founded, data driven conclusions.

Developping a mathematical model for the image generation process in Mass Spectrometry Imaging, deriving optimal estimators for its parameters, allowing estimation of surface concentration by image reconstruction. Providing uncertainty quantification in Global Mean Sea Level rise from satellite altimetry data, increasing confidence in data derived quantities that motivate policy making. Improving the assessment of kidneys which are candidate for transplant by making it robust to technical variability, resulting in the reduction the number of discarded kidneys that were suitable for transplant. Developing an Optimal Transport based Computer Vision model to visualise the impact of biopsy technique on on-slide artery aspect. Analysing statistical properties of satellite sensors based on thermal model.

Ruprecht-Karls-Universität, Institute of applied mathematics,   **Heidelberg, Germany**

Philosophiæ doctor (PhD) student in Mathematic   2015–2018

Hierarchical Bayes and frequentist aggregation in inverse problems: proved oracle and minimax optimal contraction rates for posterior distribution from hierarchical sieve priors, and oracle and minimax optimal convergence rate for aggregated projection estimators in the context of statistical linear inverse problems with unknown operator;

ONERA (National Agency of Study and Research in Aerospace)   **Palaiseau, France**

Internship   2015

Building a multi-fidelity surrogate model for Infra-Red emission by space-rocket engines.

CREST (Research Center for Economics and Statistics)   **Rennes, France**

Internship   2014

Studied, implemented and compared two methods for illumination bias removal on electronic microscope images.

Topics of interest..

MATHEMATICS: statistical ill-posed inverse problems, Bayesian and frequentist methods for non parametric models, minimax theory, point processes, functional analysis, probability theory, approximation algorithms, survival analysis, Hidden Markov Models, Kalman and particle filters, stochastic processes;

DATA SCIENCE: image processing, uncertainty quantification in sparse model estimation (LASSO, conformal estimation, perturbation methods), Optimal Transport based methods (morphometry, distribution free testing), functional data analysis, MCMC methods, network analysis, surrogate models, design of experiments.

Education

ENSAI - National School for Statistics and Information Analysis Rennes, France
MSc in Advanced Statistical Engineering; 2012–2015

University of Rennes 1, department of mathematics Rennes, France
MSc in Mathematical Statistics; 2015

University of Rennes 1, department of mathematics Rennes, France
BSc in Mathematics; 2012

Lycée Clemenceau Nantes, France
Post secondary classes préparatoires Specialisation in Mathematic and Physics 2010–2012
undergraduate-level courses required in preparation for competitive entrance exams into top graduate and engineering schools (France's grandes écoles).

Subjects in study program...

MATHEMATICS: probability theory, complex analysis, topology, functional analysis, measure theory, numerical analysis, group theory, arithmetic, linear algebra;
STOCHASTIC: survival analysis, Le Cam theory, test theory, generalized additive models, non linear regression, time series;

DATA SCIENCE: neural networks, SVM, random forests, classification/regression trees, CART, BAGGING, MSMS algorithms, image processing (filtering, Markov fields, MAP classification, MAP reconstruction), kNN, surrogate models, design of experiments, quality control of industrial processes.

Online lectures (certificates available on request)...
Unreal engine and C++ (currently following), Initiation à la théorie des distributions (Coursera, École Polytechnique), Approximation Algorithms Part I (Coursera, École Normale Supérieure), Introduction to Complex Analysis (Coursera, Wesleyan University)

Programing languages

Python (wrote several packages for analysis of data - MSI, satellite imaging, altimetry data, high resolution microscopy, ...), **R** (many projects during studies, intensive use during internships for simulations and real data applications, data simulations during my PhD, and since joining NPL), **C++** (using for video game development with Unreal Engine), **Matlab** (used in research context, during studies for image treatment projects).

Languages

French (native), English (fluent), German (basic), Spanis (basic).

Interests

Music (Guitar, singing, composition), **sport** (sport climbing, bouldering, cycling, dancing), **reading** (fictions, popular science, philosophy, sociology, technological surveillance), **traveling**.