Clément Bénesse | CV

Université du Québec À Montréal, Montréal QC (Canada)
clement.benesse@gmail.com • kleman.github.io • French citizen

Post-doctoral researcher in Computer Sciences, specialized in Statistics and Machine Learning.
I am currently working at *Université du Québec À Montréal* (UQÀM) on various subjects related to a responsible Artificial Intelligence (AI) – eXplainability, Algorithmic Fairness, Privacy – with an emphasis on technical and judicial aspects.
I hold a Ph.D. in Mathematics, delivered by the *Institut de Mathématiques de Toulouse* and was an *élève normalien agrégé* from the *École Normale Supérieure* (ENS) *de Lyon*.

Research interests: eXplainable AI (global tools, local tools), Algorithmic Fairness, Privacy, Data Valuation, Machine Learning, AI regulation

Academic Experience & Education

- **Post-doctoral fellow** — **UQÀM & uOttawa (CA)**
  Privacy in Machine Learning — *2023 -*
  Thematic and universitary double affiliation under the supervision of Pr. S. Gambs (LATECE - UQÀM) & Pr. C. Castets-Renard (Faculty of Law, Civil Law Section - uOttawa). Research led around privacy issues and AI regulation. Strong interest in pluridisciplinary knowledge transmission between technical (maths, computer sciences) and social (law) fields.

- **Ph.D. in Mathematics** — **IMT & ANITI (FR)**
  Sensitivity analysis with geometry and dependence for machine learning and fairness — *2019 - Dec. 2022*
  Grant from ENS Lyon & ANITI, supervisors:F. Gamboa & J-M. Loubes,
  reporters: S. Gambs & M. Mougeot, examinators: B. Laurent-Bonneau (*) & E. Scornet.

- **Master in Mathematics, specialized in Statistics** — **ENS de Lyon – UCBL (FR)**
  Specificity: Biostatistics & Environment Sciences — *2015 - 2019*
  Master with double affiliation between ENS de Lyon and Université Claude Bernard (UCBL).
  Master Thesis: *"Non linear dimensionality reduction for single-cell genomic analysis."*, under the supervision of F. Picard & B. Michel, at Laboratoire de Biométrie et Biologie Évolutive.
  Additional project: *"Around politic abstension modelisation."*, under the supervision of Morgane Bergot & Thibault Espinasse.

- **Agrégation de mathématiques** — **ENS de Lyon (FR)**
  Option A: Probability & Statistics — *2018*
  In France, the agrégation is a competitive examination for civil service in the French public education system.

- **Licence in mathematics** — **CPES-PSL* (FR)**
  Major: mathematics, minor: physics & social sciences — *2012-2015*

Grants & Distinctions

- Qualification from the Conseil National des Universités (CNU), section 26 (2023)
- **Contrat doctoral spécifique normalien (CDSN) - Doctoral Grant (2019 - 2022)**
  Doctoral grant given by the ENS de Lyon, for 3 years. This grant is given after a competitive examination of the candidate application.
- **Complementary grant from ANITI (2019 - 2022)**
  Complementary grant given by the Artificial and Natural Intelligence Toulouse Institute (ANITI).
- **Élève normalien status (2015 - 2019)**
  The French state gave me funding as I was recruited as a public servant as a student. This status is obtained

according to results for a highly competitive exam (success rate usually less than 3%).

Publications

- **Sensitivity analysis and algorithmic fairness for machine learning and artificial intelligence**
  Monograph and Ph.D. manuscript, peer-evaluated in 2022 and accepted by the Université Paul Sabatier, [available here]. Results from two chapters are to be submitted to academical journals.
- **Fairness seen as Global Sensitivity Analysis** *2021*
  Published with F. Gamboa, J-M. Loubes & T. Boissin in *Machine Learning, Special Issue on Safe and Fair Machine Learning*, [DOI]
- **Planned submissions:**
  - "Usage of Gaussian Processes and Data-Shapley indices for efficient Data Valuation.", in collaboration with Pr. S. Gambs & P. Mesana.
  - "Quantification of algorithimic discrimination with metamodels for fair audits.", in collaboration with Pr. S. Gambs & Pr. C. Castets-Renard.
  - "Asymptotic normality of Chatterjee estimator for GSA indices with multivariate outputs." in collaboration with Pr. S. Gambs & Pr. F. Gamboa.

Selected talks

- **Research seminary from the department of mathematics of Université de Franche-Comté** *(2023)*
  Talk requested by the department of mathematics of Université de Franche-Comté(Besançon, FR)
- **Summer School «Global Sensivivity Analysis and Poincaré inequalities.»** *(2022) "A common framework for Global Sensitivity Analysis and Fairness"*
  Talk given in-person for a thematic summer school.
  Organized by IMT.
- **52èmes & 53èmes Journée des Statistiques** *(2021, 2022) "Fairness seen as Global Sensitivity Analysis"*
  Two distinct talks given after abstract selection by the organizing committee.
  Organized by the Société Française de Statistiques (SFdS).
- **GDR MASCOT-NUM** *(2021) "Fairness seen as Global Sensitivity Analysis"*
  Talk given as an invited speaker after selection of 8 Ph.D. students among 48.
  Organized by the Groupe de Recherche MASCOT-NUM.
- **Stochastic processes and statistical machine learning III** *(2021) "On Global Sensitivity Analysis and its use in a Fairness framework"*
  Talk given as an invited speaker for an inter-university meeting.
  Organized by University of Potsdam, Germany, on behalf of the Collège Doctoral Franco-Allemand.
- **DEEL Days** *(2020) "A common framework for Global Sensitivity Analysis and Fairness"*
  Talk given for industrial meetings between ANITI (formerly DEEL) and DEEL Québec.
  Jointly organized by DEEL & ANITI.
- **Some other talks:**
  - «3IA doctoral workshop»: seminary between AI labs in France "Instituts Interdisciplinaires d'Intelligence Artificielle (3IA)" (2022)
  - «Afterworks d'ANITI» (industrials x academicals meeting): two participation on different subjects (2021).
  - Research seminary of Électricité de France (EdF) (2020).
  - Team meeting for statistic team of IMT, for various teams of ANITI, etc. (2020 - 2022)

Teaching & Pedagogical Projects

- **Co-teaching for a law summer school on AI regulation** *(2023)*
  Courses given to law students from uOttawa and Université Toulouse Capitole, on the social challenges of AI. Length: 8 days, followed by an international seminary for 2 days.
- **Courses given at Université Paul Sabatier**

Taught courses (French nomenclature):
- Introduction to statistics for biologists (L3, 2020 - 2022, Lecture courses, around 54h)
- Stochastic simulations (M1, 2019 - 2022, Practicals, around 86h)
- Big Data / Machine Learning (M2, 2019 - 2022, Practicals and tutorials, around 36h)
- Numeric tools for Mathematics (L1, 2019 - 2020, Practicals, around 12h)

- **Master student supervision** *(2021)*
  With the help of Pr. J-M. Loubes (IMT), supervision of S. Kalleli, élève normalienne from ENS-Cachan on: "Second-level sensitivity analysis for Algorithmic Fairness".

Academic commitment

- **Member of scientific societies:** SIAM, IEEE, Société Française des Statistiques, GDR Mascot-Num.
- **Co-administrator of bi-monthly meetings and of mailing lists** (2020 - 2022).
- **Co-organizer of thematic workshops**, among which three iterations of the international "Workshop Toulouse comes to Bern" in remote (2) and in-person (1) at Bern, Switzerland (2021 - 2022)
- **Co-creator of a seminary for students / Ph.D.** , started after the COVID-19 pandemy. This seminary is now perennial. (2020 - 2021)

Community involvement & Volunteering

- **Expert member of consultations** on AI regulation, mandated by the Quebec government (2023).
- **Elected doctoral student representative on the IMT laboratory council** (2020 - 2022), with responsibility for the office allocation committee.
- **Elective positions representing my peers**: Generally speaking, I've always been a peer representative on more global bodies, from a very early age (class delegate from 2007 to 2012, member of the student office 2013-2014 then 2016-2017, elected doctoral student 2020-2022).
- **Scientific vulgarisation for parents** (2018): Project in collaboration with the Maison des Mathématiques et de l'Informatique (ENS Lyon). Cycle of lectures for parents of schoolchildren.
- **Scientific vulgarisation in high-schools** (2018): Project «MaTH.en.JEANS», science popularization workshops in various middle and high schools in Lyon.

Complementary skills

- **Programming languages:** Python, LaTeX, R.
- **Spoken languages:** French (mother-tongue), English (bilingual, CLES), Spanish (intermediate level), Russian (learning).
- **Other:** Regular cook, art and crafts amateur and rail-travel *afficionado*.