

Antoine Van Biesbroeck

CMAP - Ecole Polytechnique
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PhD candidate in applied Bayesian statistics

Research in Bayesian statistics, sensitivity analysis and uncertainty quantification.

Professional experience

2021-2022 Data Scientist - EDF China, Beijing (China)

Research & Development on Machine Learning projects within the Digital Innovation team of EDF China.

2021 Research intern in Bayesian statistics - CEA, Paris-Saclay (France)

Research subject: 'Objective prior construction for Bayesian estimation of seismic fragility curves'.

2019 Research intern in Deep Learning - Institute of Industry and Sciences, Guangzhou (China)

Research subject: 'Surface mesh generation based on segmentation via Deep Learning'.

2018 Research intern in applied mathematics - CMLA, Cachan (France)

Research subject: 'Systemic risk control in financial networks'.

Education

2022-2025 PhD - Ecole Polytechnique, Palaiseau (France)

*Thesis subject: 'Bayesian estimation of the seismic fragility for industrial structures and equipment'.
Supervised by Josselin Garnier. Collaboration with CEA (French atomic energy commission).*

2020-2021 Master's degree MVA - Université Paris-Saclay, Paris-Saclay (France)

Master's degree 'Mathématiques Vision Apprentissage'. Training in applied maths to statistical learning.

2017-2021 Normalien - Ecole Normale Supérieure Paris-Saclay, Paris-Saclay (France)

*4 years graduate program which aims at training high level researchers in sciences.
(2020) Laureate of the 'agregation' competitive examination in mathematics, ranked 3rd.*

2014-2017 Classes préparatoires - Lycées Daudet & Champollion, Nîmes & Grenoble (France)

Post-secondary intensive program in sciences to pass competitive examination for graduate schools.

2014 High School diploma - Lycée Saint-Stanislas, Nîmes (France)

Teaching

2022-2024 Teaching assistant in mathematics - Ecole Polytechnique, Palaiseau (France)

*Courses: Introduction to probability & statistics (Bachelor of Science program, 2nd year);
Introduction to python (Engineer program, 1st year);
Measure and integration theory (Bachelor of Science program, 3rd year).
Mathematical foundation of Data Science (Master of Science program, 1st year).*

2019-2021 Examiner in mathematics - Lycée Saint-Louis, Paris (France)

Publications

Regular papers

2024 A. Van Biesbroeck, Properly constrained reference priors decay rates for efficient and robust posterior inference, *arXiv*. 2024.

2024 A. Van Biesbroeck, C. Gauchy, C. Feau and J. Garnier, Design of experiments based on a low fidelity model for seismic fragility curves estimation, *ESAIM:ProcS*. 2024.

2023 A. Van Biesbroeck, Generalized mutual information and their reference priors under Csizar f-divergence, *arXiv 2310.10530*. 2023.

2023 A. Van Biesbroeck, C. Gauchy, C. Feau and J. Garnier, Reference prior for Bayesian estimation of seismic fragility curves, *Probabilistic Engineering Mechanics* 76. 2024.

2021 A. Van Biesbroeck, F. Shang and D. Bassir, CAD model segmentation via Deep Learning, *International Journal of computational methods* 18.3. 2021.

Proceedings

- 2023** C. Gauchy, **A. Van Biesbroeck**, C. Feau and J. Garnier, [Inférence variationnelle de lois a priori de référence](#), *proceedings des 54èmes Journées de Statistique de la SFDS*. 2023.
- 2023** **A. Van Biesbroeck**, C. Gauchy, J. Garnier and C. Feau, [Connections between reference prior theory and global sensitivity analysis, an illustration with f-divergences](#), *proceedings des 54èmes Journées de Statistique de la SFDS*. 2023.
- 2023** **A. Van Biesbroeck**, C. Gauchy, C. Feau and J. Garnier, [Influence of the choice of the seismic Intensity Measure on fragility curves estimation in a Bayesian framework based on reference prior](#), *proceedings of the 5th ECCOMAS Thematic Conference on Uncertainty Quantification in Computational Sciences and Engineering*. 2023.

Contributions in international conferences

- 2024** **ISBA** (*ISBA world meeting*). [Poster](#). Venice, Italy, 3 Jul. 2024.
- 2024** **SIAM UQ** (*SIAM Conference on Uncertainty Quantification*). [Contributed talk](#). Trieste, Italy, 1 Mar. 2024.
- 2023** **JdS** (*54èmes Journées de Statistique de la SFDS*). [Contributed talk and proceeding](#). ULB, Brussels, Belgium, 6 Jul. 2023.
- 2023** **UNCECOMP** (*5th ECCOMAS Thematic Conference on Uncertainty Quantification in Computational Sciences and Engineering*). [Contributed talk and proceeding](#). Athens, Greece. 13 Jun. 2023.

Contributions in main national conferences

- 2024** **MASCOT-NUM** (*Méthodes d'Analyse Stochastique pour les Codes et Traitements Numériques*). [Poster](#). Giens, France, 3 Apr. 2024.
- 2024** **RJS** (*Rencontres Jeunes Statisticiens*). [Contributed talk](#). Porquerolles, France, 2 Apr. 2024.
- 2023** **SEISM** (*Seismology and earthquake engineering for risk assessment*). [Contributed talk](#). EDF, Palaiseau, France, 1 Dec. 2023.
- 2023** **CJC-MA** (*Congrès des Jeunes Chercheurs en Mathématiques Appliquées*). [Contributed talk](#). CentraleSupélec, Gif-sur-Yvette, France, 25 Sept. 2023.
- 2023** **MASCOT-NUM** (*Méthodes d'Analyse Stochastique pour les Codes et Traitements Numériques*). [Poster](#). Le Croisic, France, 5 Apr. 2023.
- 2022** **AppliBUGS** (*Applications du Bayesian Unified Group of Statisticians*). [Contributed talk](#). Villeurbanne, France, 10 Jun. 2022.

Grants and awards

- 2024** **ISBA travel award** - *The International Society for Bayesian Analysis*
- 2024** **ISAS best oral award** - *Science days of ISAS, CEA (French atomic energy commission)*
- 2024** **SIAM student travel award** - *Society for Industrial and Applied Mathematics*
- 2022** **CFR grant for doctoral studies** - *CEA (French atomic energy commission)*
- 2017** **Normalien civil servant grant** - *ENS Paris-Saclay*

Additional skills

Programming Proficiency in **LaTeX** and **Python**.

Languages **French** (Native), **English** (Cambridge Advanced English grade C), **Chinese** (Notions).

Involvement

- 2024-2025** PhD student representative at the CMAP lab council.
- 2023-2024** PhD student representative at the EDMH doctoral school council.
- Since 2020** Co-founder and vice president of the Delaney Automobile Club.