Antoine Van Biesbroeck

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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 mathemetics, 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 2409.13041*. 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

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

2023 C. Gauchy, **A. Van Biesbroeck**, C. Feau and J. Garnier, Inférence variationelle 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.