Antoine Van Biesbroeck

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https://vbkantoine.github.io

Assistant professor

My research focuses Bayesian statistics, sensitivity and uncertainty quantification in machine learning frameworks.

Professional experience

Since 2025   **Assistant professor** - *ENS Paris-Saclay (France)*
Research in Bayesian statistics, sensitivity analysis and uncertainty quantification in ML at Centre Borelli.

2022-2025   **Research associate** - *CEA Paris-Saclay (France)*
Research on Bayesian learning for seismic risk assessment studies in the nuclear industry.

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'.

Education

2022-2025   **PhD** - *Ecole Polytechnique, Palaiseau (France)*
Thesis subject: 'Extended reference prior theory for objective and practical inference, application to robust and auditable seismic fragility curves estimation'. Supervised by Josselin Garnier. Collaboration with CEA (French atomic energy commission).

2020-2021   **Master's degree MVA** - *Université Paris-Saclay, Gif-sur-Yvette (France)*
Master's degree 'Mathématiques Vision Apprentissage'. Training in applied maths to statistical learning.

2017-2021   **Normalien** - *ENS 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.

Teaching

Since 2025   **Assistant professor in mathematics** - *ENS Paris-Saclay (France)*

2022-2025   **Teaching assistant in mathematics** - *Ecole Polytechnique, Palaiseau (France)*

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

Publications

Regular papers

2025   **A. Van Biesbroeck**, C. Gauchy, C. Feau and J. Garnier, Robust a posteriori estimation of probit-lognormal seismic fragility curves via sequential design of experiments and constrained reference prior, *Nuclear Engineering and Design*, 448. 2026.

2025   N. Baillie, **A. Van Biesbroeck** and C. Gauchy, Variational inference for approximate objective priors using neural networks, *Computo*. 2025.

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*, 79. 2025.

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

2025 **A. Van Biesbroeck**, C. Feau and J. Garnier, Design of experiments for efficient and conform Bayesian learning of seismic fragility curves, *Proceedings of the 28th International Conference on Structural Mechanics In Reactor Technology (SMiRT)*. 2025.

2025 N. Baillie, **A. Van Biesbroeck**, C. Feau and C. Gauchy, Bayesian estimation of seismic fragility curves based on variational reference priors using neural networks, *Proceedings of the 6th Thematic Conference on Uncertainty Quantification in Computational Sciences and Engineering (UNCECOMP)*. 2025.

2023 C. Gauchy, **A. Van Biesbroeck**, C. Feau and J. Garnier, Inférence variationelle de lois a priori de référence, *Proceedings des 54èmes Journées de Statistiques (JdS)*. 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 Statistiques (JdS)*. 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 Thematic Conference on Uncertainty Quantification in Computational Sciences and Engineering (UNCECOMP)*. 2023.

Contributions in international conference

2025 **SMiRT** (*28th International Conference on Structural Mechanics In Reactor Technology*). Co-chair in technical session. Toronto, Canada. 14 Aug. 2025.

2025 **O'Bayes** (*Objective Bayes Methodology Conference*). Poster. Athens, Greece. 9 Jun. 2025.

2025 **AICOMAS** (*1st ECCOMAS Artificial Intelligence and Computational Methods in Applied Science*). Contributed talk. Paris, France. 20 Feb. 2025.

2024 **ISBA** (*ISBA world meeting*). Poster. Venice, Italy. 4 Jul. 2024.

2024 **SIAM UQ** (*SIAM Conference on Uncertainty Quantification*). Contributed talk. Trieste, Italy. 1 Mar. 2024.

2023 **UNCECOMP** (*5th ECCOMAS Thematic conference on Uncertainty Quantification in Computational Sciences and Engineering*). Contributed talk and proceeding. Athens, Greece. 13 Jun. 2023.

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.