

# Antoine Van Biesbroeck

CMAF - Ecole Polytechnique  
91120 Palaiseau  
France

[antoine.van-biesbroeck@polytechnique.edu](mailto:antoine.van-biesbroeck@polytechnique.edu)  
+33 6 72 23 43 70  
[researchgate.net/profile/Antoine-Van-Biesbroeck](https://researchgate.net/profile/Antoine-Van-Biesbroeck)

PhD candidate in applied Bayesian statistics

Research in Bayesian statistics applied to the quantification of seismic fragility of industrial equipment.

## Professional experience

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- 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

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- 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

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- 2022-2024 Teaching assistant in mathematics** - Ecole Polytechnique, Palaiseau (France)  
*Courses: Introduction to probability & statistics (Bachelor of Science program, 1st year); Introduction to python (Engineer program, 1st year); Mathematical foundation of Data Science (Master of Science program, 1st year).*
- 2019-2021 Examiner in mathematics** - Lycée Saint-Louis, Paris (France)

## Publications

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- 2023 A. Van Biesbroeck**, Generalized mutual information and their reference prior under Csizar f-divergence, *arXiv 2310.10530*. 2023.
- 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.
- 2023 A. Van Biesbroeck, C. Gauchy, C. Feau and J. Garnier**, Reference prior for Bayesian estimation of seismic fragility curves, *arXiv 2302.06935*. 2023.
- 2021 A. Van Biesbroeck, F. Shang and D. Bassir**, CAD model segmentation via Deep Learning, *International Journal of computational methods* 18.3. 2021.

## Contributions in conferences and seminars

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- 2024** **SIAM UQ** (*SIAM Conference on Uncertainty Quantification*). [Contributed talk in international conference](#). Trieste, Italy, 1 Mar. 2024.
- 2023** **SEISM** (*Seismology and earthquake engineering for risk assessment*). [Contributed talk in seminar](#). EDF, Palaiseau, France, 1 Dec. 2023.
- 2023** **ALLEGRIA** (*Applications et développement d'algorithmes d'Intelligence Artificielle*). [Contributed talk in seminar](#). CEA, Saclay, France, 16 Nov. 2023.
- 2023** **ETICS** (*Ecole Thématique sur les Incertitudes en Calcul Scientifique*). [Contributed talk in national conference](#). Cap Ferret, France, 12 Oct. 2023.
- 2023** **CJC-MA** (*Congrès des Jeunes Chercheurs en Mathématiques Appliquées*). [Contributed talk in national conference](#). CentraleSupélec, Gif-sur-Yvette, France, 25 Sept. 2023.
- 2023** **PSPP** (*Proba-Stats pour les Phénomènes Physiques*). [Contributed talk in seminar](#). EDF, Chatou, France, 21 Sept. 2023.
- 2023** **JdS** (*54èmes Journées de Statistique de la SFDS*). [Contributed talk and proceeding in international conference](#). ULB, Brussels, Belgium, 6 Jul. 2023.
- 2023** **UNCECOMP** (*5th ECCOMAS Thematic Conference on Uncertainty Quantification in Computational Sciences and Engineering*). [Contributed talk and proceeding in international conference](#). Athens, Greece. 13 Jun. 2023.
- 2023** **MASCOT-NUM** (*Méthodes d'Analyse Stochastique pour les Codes et Traitements Numériques*). [Poster in international conference](#). Le Croisic, France, 5 Apr. 2023.
- 2022** **AppliBUGS** (*Applications du Bayesian Unified Group of Statisticians*). [Contributed talk in national conference](#). Villeurbanne, France, 10 Jun. 2022.

## Grants and awards

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- 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

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

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

## Involvement

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- 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.