

Arsene-Brice Zotsa-Ngoufack, Ph.D. student

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Research Interests

- Asymptotic behavior of PDE, Stochastic epidemic, Stochastic particles systems, Branching Process, SPDE, Hawkes Process, Actuarial science, Statistic, Functional Analysis, Complex Analysis.

Education

- April 2021 – ■ **Ph.D. student, Aix-Marseille Université:** Institut de Mathématique de Marseille, France.
Thesis title: *Stochastic epidemic model with varying infectivity and waning immunity.*
Advisor: *Professor Raphael Forien and Professor Etienne Pardoux.*
- 2019 – 2020 ■ **Master's degree in Probabilities-Statistics apply in Biology,** Université Félix Houphouët Boigny d'Abidjan, Côte d'Ivoire .
Master thesis title: *Generalizations of stochastic epidemic models.*
Advisor: *Professor Raphael Forien and Professor Etienne Pardoux.*
- 2013 – 2019 ■ **Master's degree in Mathematics, University of Yaounde I, Cameroon.**
Master thesis title: *Generalization of the properties of classical Bergman spaces to variable exponents Bergman spaces.*
Advisor: *Professor Edgar Tchoundja.*

Grants

- July 2024 ■ CRM-PIMS Probability summer school : \$800 CAD.
- April-May 2023 ■ FRQ support for the CRM-CNRS international research lab: \$5000 CAD.
- November 2021-October 2024 ■ Contrat doctoral Aix-Marseille Université: €60000.
- 2019-2020 ■ Master 2 scholarships: institut Archimède Mathématiques-informatique, Aix-Marseille Université: €5000.

Research Publications

Journal Articles

- 1 **Arsene-Brice Zotsa-Ngoufack**, "Functional central limit theorem for stochastic epidemic models with varying infectivity and waning immunity," *arXiv preprint: 2311.02260* under revision in *ESAIM PS*, 2024⁺.
- 2 R. Forien, G. Pang, É. Pardoux, and A.-B. **Zotsa-Ngoufack**, "Stochastic epidemic models with varying infectivity and susceptibility," *arXiv preprint: 2210.04667* under revision in the *Annals of Applied Probability journal*, 2023⁺.
- 3 D. Békollè, E.-L. Tchoundja, and A.-B. **Zotsa-Ngoufack**, "Weighted norm inequalities in the variable lebesgue spaces for the bergman projector on the unit ball of \mathbb{C}^n ," *arXiv preprint: 2303.07553* to appear in *Transactions of A. Razmadze Mathematical Institute*, 2023.

Works in progress

- 1 R. Forien and A.-B. **Zotsa-Ngoufack**, "Cyclic behavior for stochastic epidemic models with varying infectivity and waning immunity," *Work in progress*, 2023.
- 2 H. Guérin and A.-B. **Zotsa-Ngoufack**, "Stochastic epidemics models with varying infectivity and waning immunity and also with memory," *Work in progress*, 2023.

Visiting







April-May 2023: Université du Québec à Montréal (UQAM), funded by a FRQNT grant supporting research mobility for the IRL CRM-CNRS.

Conferences

- **CRM-PIMS Probability summer school 2024:** , Montréal, Canada
Status: Speaker
Subject: Stochastic epidemic model with varying infectivity and warning immunity.
- **JPS-2023:** Colloque Jeunes Probabilistes et statisticiens, France, Ile d'Oleron
Status: Speaker
Subject: Stochastic epidemic model with varying infectivity and warning immunity.
- **SPA conference 2023,** Lisboa,
Status: Speaker
Subject: Stochastic epidemic model with varying infectivity and warning immunity.
- **Saint-Flour (France)** Summer school, July 2023,
Status: Speaker
Subject: Stochastic epidemic model with varying infectivity and warning immunity.
- **Workshop:** Probability meets Biology II, University of Bath, June 2023,
Status: Speaker
Subject: Stochastic epidemic model with varying infectivity and warning immunity.
- Séminaire des doctorants de l'UQAM, Montréal, May 2023
Status: Speaker
Course: Introduction to epidemic models.
- Séminaire Institut Denis Poisson, Orleans, France, February 2023.
Status: Speaker
Subject: Weighted norms inequalities in the variable exponent Lebesgue space for Bergman Projector on the unit ball of \mathbb{C}^N .
- Rencontres des Jeunes chercheurs Africains en France, Institut Henry Poincaré (Paris), December 2022,
Status: Speaker
Subject: Stochastic epidemic model with varying infectivity and warning immunity.
- **Sport and IA:** Ecole d'automne sport et intelligence artificielle, Antibes, October 2022.
- **MLISTRAL:** Machine Learning in Insurance Sector Targeted to Risk Analysis and Losses, CIRM, September 2022.
- School on Climate Sensitivity and Workshop on Mathematics and Theoretical Physics for Climate Dynamics, Lyon, France, September 2022.
- Séminaire d'Analyse et Géométrie-Institut de mathématiques de Marseille, France, March 2022.
Status: Speaker
Subject: Weighted norms inequalities in the variable exponent Lebesgue space for Bergman Projector on the unit ball of \mathbb{C}^N .




- Séminaire internationale d'analyse classique à Yaoundé, December 2021,
Status: Speaker
Subject: Weighted variable inequality for Bergman Projector on the unit ball.
- Conférence internationale de mathématiques du GIRAGA au Cameroun, December 2021
Status: Speaker
Subject: Stochastic epidemic model with warning immunity.
- Conférence de la Chaire Modélisation Mathématique et Biodiversité: Aussois, France, June 2021
Status: Speaker
Subject: Stochastic epidemic model with varying infectivity and warning immunity.
- Conférence internationale de mathématiques au Cameroun parrainé par les universités Saint Cyr de France, 2019-2020
Status: Speaker
Subject: Variable exponent Bergman spaces.

Teaching experience



- 2023–2024  **Teaching assistant.** Aix-Marseille Université,
- Financial Mathematic: Pricing, Arbitrary theory, Stochastic calculus,
 - Linear Algebra and real Analysis.
- 2022–2023  **Tutor.** Aix-Marseille Université,
Mathematical tools for physic L2PASS.
- 2021–2022  **Teaching assistant.** Aix-Marseille Université,
Mathematical language course L1enzans portail René Descartes, classe inversée (special pedagogy).
- 2018–2019  **Teaching.** Institut international d'Afrique centrale(IIAC)
- Introduction to Matlab,
 - Numerical methods of ODE and application to Matlab.
-  **Tutor.** ESSFAR Cameroun,
- Real Analysis (first year),
 - Linear Algebra (first year).
- 2016 – 2019  **Tutor.** University of Yaounde 1
- Real Analysis (first year),
 - Topology of metric space (Second years),
 - Differential calculus (Second years),
 - Integral calculus (Second years),
 - Complex Analysis (Third years).

Miscellaneous Experience


Association and responsibility

- 2022–2024  **Representative of p.h.d students of the doctoral school 184 (i.e doctoral school of Mathematics and computer science), Aix-Marseille Université.**
-  **Co-organizer of Aix-Marseille Université p.h.d student's day.**
- December 2022  **Scientific mediation in high schools, Marseille.**

Research and Development

- August 2023  **Treizième atelier de résolution de problèmes industriels de Montréal**
Organizer: CRM-IVADO
The objective was to compute the customer life value (CLV) in insurance. To do this we first use regression tree on the data to identify the different group (i.e. the states of the Markov chain) with the profit as a target variable, secondly we estimate the transition probabilities between each group/state and finally we compute the CLV by Monte Carlo method.
- May 2022  **Semaine de mathématiques-entreprises, France.**
Organizer: AMIES
The objective was to use mathematical tools to propose solutions to business problems. Based on mathematical achievements, we proposed three methods that are less costly in complexity, which we implemented on Python that can allow the Cailabs structure to perform a non-homogeneous smoothing of the light.






Professional experiences

- March-June 2021  **Assistant Statistical Engineer, INRAE-France.**
- Development of an application for monitoring an epidemic in real time;
 - Collection and processing of data in the application.

Certification

- 2023  **Exam P. SOA.**

Skills

- Languages  Strong reading, writing and speaking competencies for English, French (Mother tongue), Yemba (Mother tongue), German.
- Coding  Matlab, PHP, Python, R, SQL, XML/XSL, \LaTeX , C.
- Databases  MySQL, SQLite.
- Web Dev  HTML, CSS, JavaScript, PHP, Apache Web Server.
- Hobbies.  Karate, Football, Hiking, Music, Cinema, Game.