

RESEARCH FOCUS

I am broadly interested in the theory and practice of ethical AI. My current research focuses on **formal verification** of human ethics principles. I develop **formal explanation based frameworks** to assess fairness, identify proxy discrimination, and audit and repair privacy leakage in AI driven decision making. I am open to collaborative projects in public domains where AI outputs may affect individuals, with a particular emphasis on **healthcare applications**. More information can be found on my [webpage](#).

EDUCATION

- Jan. 2022 - **PhD Candidate, School of Computing, Australian National University**, Canberra, Australia, Ongoing.
Exp Dec. 2026 Thesis: A formal framework based on abductive explanations for assessing and verifying alignment with human ethics principles in AI driven decision making, with applications to proxy discrimination, individual fairness, reliability and privacy leakage.
- Oct. 2018 - **African Master's in Machine Intelligence (AMMI)**, *African Institute for Mathematical Sciences (AIMS)*, Kigali, Rwanda, Grade: Good.
Feb. 2020 Thesis: Patient flow forecasting in hospitals using ensemble LSTM models.
- Dec. 2013 - **Master of Computer Science, Electronics and Automation, National School of Agro Industrial Science**, Ngaoundere, Cameroon, Grade: Good.
Oct. 2016 Thesis: Identification of color image attributes for monitoring nutrient growth in algal biomass.

SELECTED PUBLICATIONS

- Jan. 2026 **Sonna, B.** Bridging AI and Clinical Reasoning: Abductive Explanations for Alignment on Critical Symptoms. In Proceedings of 2026 Australasian Computer Science Week (ACSW 2026).
- Jan. 2026 **Sonna, B.**, Kouakep, K. T., Ebongue, J. L. F. K. Patient Flow and AI in the Global South: Designing Contextual, Ethical, and Efficient Health Solutions. In C. El Morr, A. Saab, E. Salem-Sokhn (Eds.), *AI for Epidemic Preparedness: Innovations and Insights from the Global South*. Springer International Publishing.

- Dec. 2025 **Sonna, B.**, Grastien, A., Benn, C. Beyond Verification: Abductive Explanations for Post-AI Assessment of Privacy Leakage. Proceedings of the Workshop on Post-AI Formal Methods at AAAI-26.
- Dec. 2025 **Sonna, B.**, Grastien, A. On Explaining Proxy Discrimination and Unfairness in Individual Decisions Made by AI Systems. Proceedings of the Australasian Joint Conference on Artificial Intelligence (AJCAI 2025)
- July 2025 **Sonna, B.**, Momo, A., Grastien, A. Formal Abductive Explanations for Navigating Mental Health Help-Seeking and Diversity in Tech Workplaces. Proceedings of the Empowering Women of Colour in AI-Driven Mental Health Research Workshop at IJCAI-25.
- Jan. 2025 Marmolejo-Ramos, F., Rebecca, M., Florence, J., **Sonna, B.**, et al. Factors Influencing Trust in Algorithmic Decision-Making: An Indirect Scenario-Based Experiment. Frontiers in Artificial Intelligence (2025).

Research Skills

- Skill: **Formal Verification & Abductive Explanations**
 Tools: Z3 Solver, QBF Solver
 Description: Computation of abductive explanations from AI models using SMT translation and Z3 solver; formal verification of AI ethics principles.
- Skill: **Machine Learning & AI Frameworks**
 Tools: Scikit-learn, PyTorch, and Keras
 Description: Training models, translation of models to SMT files for formal reasoning.
- Skill: **Data Analysis & Programming**
 Tools: Pandas, NumPy, Jupyter, Matplotlib, Python
 Description: Handling tabular datasets and empirical validation on real-world datasets.
- Skill: **AI Ethics Assessment**
 Tools: Formal Abductive explanations
 Description: Assessment of proxy discrimination, individual fairness, and privacy leakage in AI-driven decision making.
- Skill: **Research Methodology**
 Tools: Theorems and proofs, Experimental studies
 Description: Integration of theoretical work and empirical studies.

TECHNICAL SKILLS

- O.S: WINDOWS, LINUX, MAC OS
- Database: MySQL, PostgreSQL, Oracle,XAMP , WAMP, Firebase Storage
- Tools and Environment: Android Studio, Anaconda, Eclipse, Netbeans, Matlab,Webdev, windev, Windev mobile, Spring, OpenCv, Tensorflow,Pytorch,Keras

programming Python, java, C/C++, Visual Basic, Wlanguage, html/css, PHP
language

EMPLOYMENT HISTORY

- Feb. 2022 - Tutor of statistical machine learning and Introduction to machine learning
May 2023 courses at the Australian National University, Canberra, Australia, 18
Months.
- Dec. 2020 - Manager, Ethics and Gender Issue at AfroLeadership, Yaounde,
Now Cameroon, Ongoing
- Sept. 2020 - AI Instructor at Vecademy , Yaounde, Cameroon, 9 Months.
May 2021
- Oct. 2019 Research AI Intern at Future Corporation, Tokyo, Working on eye recog-
-Dec.2019 nition and gaze tracking for early detection of Dementia, 2 Months.
- Jul. 2019 - Research Intern at Montreal AI Ethics Institute, My project is on Social
Sept.2019 impact of AI, 2 Months.
- Oct. 2017 - Teaching Assistant of Computer sciences at ISSTMADD(Higher
Jul.2018 Institute of Management Science and Sustainable Develop-
ment),Ngaoundere,Cameroon, 10 Months.
- Jan. 2017 - Teaching Assistant at the Computer Science Department ENSAI (National
Jul.2017 School of Agro-Industrial Sciences) Ngaoundere,Cameroon, 7 months.

HONOURS AND AWARDS

- Nov.2025 Africa Top 40 under 40 AI Achievers 2025 by Society for AI as Promoter
of BEL'S AI Initiative.
- Sep.2025 Best Paper award at the Empowering Women of Colour in AI-Driven
Mental Health Research workshop at IJCAI 2025.
- Dec.2021 100 Brilliant women in AI Ethics-2022 list by Women in AI Ethics, as
Promoter of the Be Educated and Learn Skills in AI Initiative (BEL'S AI
Initiative).
- Oct.2021 80 African women advancing AI in Africa and around the world list by
African Shapers, as Promoter of BEL'S AI Initiative.
- Feb.2019 Best project in Building a machine learning-based system for breast
cancer prognosis from gene expression data, discerned by Dr.Jean-Philippe
Vert,MINES ParisTech and Google AI, during African Master of Machine
Intelligence Program.
- Dec.2018 Certificate of Excellence for Best Debate Questions, discerned by Marc
Deisenroth, Imperial College UK, during African Master of Machine
Intelligence Program.

- Feb.2018 Youth Excellence Award for Technological Innovation by Ministry of Youth and Civic Education of Cameroon.
- Dec.2017 Laureate of the 2nd Edition of the Nanas Awards (first prize): National Competition for the Promotion of Entrepreneurship and Leadership of the Girl, Edition 2017,My project was to build a Mobile App to help people suffering to malnutrition to easily follow their diets.

WORKSHOP AND SEMINARS

- Feb. 2026 Oral presentation at the Adaptive Learning and Intelligent Systems, as part of the Australasian Computer Science Week (ACSW) 2026, Melbourne, Australia.
- Jan. 2026 Oral presentation at the Workshop on Post-AI Formal Methods at AAAI-26, Singapore, Singapore.
- Dec. 2025 Oral presentation at Australasian Joint Conference In Artificial Intelligence 2025, Canberra, Australia.
- Dec. 2025 Poster Presentation Next Generation Responsible AI Symposium 2025, Adelaide, Australia.
- Aug. 2025 Oral Presentation the Empowering Women of Colour in AI-Driven Mental Health Research workshop at IJCAI 2025, Montreal, Online.
- Aug. 2024 Oral presentation Workshop on AI Explainability,Virtual, International Joint Conference on Artificial Intelligence 2024, Jeju, Online.
- Sep. 2023 AI and Machine Learning Summer School 2023,Virtual, Cambridge Centre for AI in Medecine, University of Cambridge, Online.
- Jul. 2020 Attended the Machine Learning Summer School 2020,Virtual, Max Planck Institute for Intelligent systems, Tubingen, Online.
- Dec. 2019 Poster Presentation at Women in Machine Learning Workshop at NeurIPS Conference in Vancouver, Canada.
- August. 2019 DEEP LEARNING INDABA in Kenya
- Apr. 2019 Teaching Assistant in Computer vision Tutorial during INDABA X RWANDA.
- Nov. 2018 Seminar presented by me on Image segmentation at African Master's in Machine Intelligence - AIMS.

CIVIC ENGAGEMENT

- Jul. 2021 Founder of the [BEL'S AI Initiative](#)
- Fev. 2021 Co-organizer of the [WiMLDS Yaounde chapter](#)
- Dec. 2020 Manager, Ethics and Gender Issue at [AfroLeadership](#)
- Jun. 2020 Member of the [Deep Decisions](#)

REFERENCES

Name: *Dr. Alban Grastien*
Relationship: Primary supervisor of my PhD at the Australian National University.
Contact: ban@grastien.net

Name: *Dr. Michael Norrish*
Relationship: Chair of my PhD supervisory panel at the Australian National University.
Contact: Michael.Norrish@anu.edu.au

Name: *Prof. Lexing Xie*
Relationship: Member of my PhD supervisory panel at the Australian National University.
Contact: lexing.xie@anu.edu.au

Name: *Dr. Jean-Louis Kedieng Ebongue Fendji*
Relationship: Former Computer Science lecturer at the University of Ngaoundere.
Contact: lfendji@gmail.com

LANGUAGES

French: Native
English: Professional
German: Basics
Yemba: Native