

SIMPORE Yacouba

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🌐 <http://yacoubasimpore.net/>



Employment

- 2020... **Research Team:** Member of the LST-Optimal Control team at Université Joseph Ki Zerbo, LAMIA-Optimization and Operational Research team at Université Norbert Zongo, and LST-Systems Control and Analysis team at Université Thomas Sankara.
- 2021... **Associate professor:** Université de Fada N’Gourma.
- 2016-2021 **Assistant professor:** Université de Ouagadougou.

Research Interests and Current Projects

- Mathematical modeling, optimal control, numerical simulation, and machine learning, with applications in hydraulics and biology**
- Internal controllability of linear hyperbolic systems with a reduced number of controls: optimal regularity.** Joint work with Timothée Crin Barat; Karine Beauchard and Enrique Zuazua
- Mathematical modeling, control, and numerical simulations of sediment transport in drainage basins - Application to Lake Bam.** Joint work with SORE Seydou
- Using neural networks to identify mortality and fertility parameters in population dynamics models.** Joint work with Sawadogo Youssef Amine and Enrique Zuazua
- Modeling the transport of substances such as lead and cyanide through a device.** Joint work with Yonli Fabien and Togheyeni David

Teaching Experience

- Introduction to Optimal Control:** Université NAZI Bony and Université Norbert ZONGO; Burkina Faso
- Introduction to the finite element method** Master1 ESI-Université de Fada N’Gourma; Burkina Faso
- Introduction to algorithms and programming** L1-L2 ESI-Université de Fada N’Gourma; Burkina Faso
- Control and stabilization of the world of the living,** EMA (African School of Mathematics) August 2024 - Université Thomas Sankara, Ouagadougou, Burkina Faso

Communication

- Talk: Null Controllability of a Nonlinear Age, Space, and Two-Sex Structured Population Dynamics Model** SAMSA-Masamu CRN Virtual Colloquia Series November 1, 2022
- Talk: Null Controllability for Population Dynamics with age, size Structuring and Diffusion** Mini-workshop: <https://dcn.nat.fau.eu/mini-workshop-analysis-numerics-and-control-27-mar-2023/>
- Talk: Null Controllability of a Nonlinear Age, Space, and Two-Sex Structured Population Dynamics Model** DeustoCCM Seminar and Fau DCN AvH Mini-workshop: Bilbao and Nurnberg, June 20, 2022
- Talk: Controllability and Positivity Constraints in Population Dynamics with Age, Size Structuring, and Diffusion** DeustoTech-Dycon, Bilbao, September 2019
- Talk: Detection of Incomplete Parameter for a Nonlinear Population Dynamics Model** DeustoTech-Dycon, Bilbao, September 2018 and CIMPA DAKAR 2016: Geometric Analysis of Optimal Shapes
- Access link to the presentation: <https://yacoubasimpore.net/exposer>

Research Activities

- Research Stay in Erlangen (Senior Visitor):** <https://dcn.nat.fau.eu/yacouba-simpore/>

Research Activities (continued)

- 📌 **Research Stay in Bilbao (Senior Visitor):** <https://cmc.deusto.eus/yacouba-simpore/>
- 📌 **Research Visit at Laboratoire Jacques Louis Lions (Université Pierre et Marie Curie, Paris):** From October 1, 2017, to October 30, 2017.
- 📌 **Research Visit at Laboratoire Jacques Louis Lions (Université Pierre et Marie Curie, Paris):** From September 1, 2016, to October 30, 2016.
- 📌 **Research Visit to AIMS South Africa:** From May 1, 2015, to July 30, 2015.

Administrative and scientific duties

- 📌 **2021-2023. Quality assurance manager at the Université de Fada N’Gourma.**
- 📌 **Organized the 72 Hours of Research event at the Université de Fada N’Gourma in December 2021 and December 2023.**

Doctoral Direction

- 📌 **2022- PhD thesis of SORE Seydou:** Mathematical modeling, control, and numerical simulations of sediment transport in drainage basins, with an application to Lake Bam
- 📌 **2024- PhD thesis of Bargo Marius :** Mathematical analysis of population dynamics models: modeling, controllability, and "turnpike" properties.
- 📌 **2024- PhD thesis of Sawadogo Yousef:** Neural Networks for the Identification of Mortality and Fertility Parameters in Population Dynamics Models.

Teaching Experience

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- 📌 **Introduction to the finite element method** Master1 ESI-Université de Fada N’Gourma; Burkina Faso
- 📌 **Introduction to algorithms and programming** L1-L2 ESI-Université de Fada N’Gourma; Burkina Faso
- 📌 **Control and stabilization of the world of the living,** EMA (African School of Mathematics) August 2024 - Université Thomas Sankara, Ouagadougou, Burkina Faso

Research Publications

2024 key submitted papers

- 1 M. Bargo and Y. Simpore, "Birth control and turnpike property of lotka-mckendrick models with diffusion," *arXiv, preprint*, 2024. eprint: 2409.11247 (math.OC). [🔗 URL: https://arxiv.org/abs/2409.11247](https://arxiv.org/abs/2409.11247).
- 2 Y. Simpore, "Null controllability of size-age dependent population dynamics models," *arXiv, preprint*, 2024. eprint: 2408.05291 (math.OC). [🔗 URL: https://arxiv.org/abs/2408.05291](https://arxiv.org/abs/2408.05291).

Education

- 📌 **Ph.D., Université de Ouagadougou** UFR SEA-LAMI.
Thesis title: *Controllability of dissipative systems arising from insensitive control theories and sentinels.*
- 📌 **Master degree, Université de Ouagadougou** UFR SEA LANIBIO.
Thesis title: *Insensitizing controls for a semilinear heat equation.*

Skills

- Languages** 📌 Strong reading, writing and speaking competencies for English (Upper intermediate) and French (First language)
- Computing** 📌 Proficient in Matlab and Python; working knowledge of Maple, C++, and Mathematica.