

Lucas Machado Moschen

Email: lucas.moschen@etu.sorbonne-universite.fr

Website: <http://lucamoschen.github.io/>

I am a math student and aspiring scientist with a solid math background. I am interested in Optimal Control, Differential Equations, Probability, and Statistics, with applications in Biology, such as Epidemiology, Public Health, and Climate modeling.

EDUCATION

M.Sc. in Mathematical Modelling
Sorbonne Université, Laboratoire Jacques-Louis Lions - Paris (France)

2023 - current

- ❖ Supervisor: Dr. Luis Almeida
- ❖ Grade Point Average: 17/20

M.Sc. in Mathematical Modelling
Fundação Getulio Vargas, School of Applied Mathematics - Rio de Janeiro (Brazil)

2022 - 2023

- ❖ Supervisor: Dr. Maria Soledad Aronna
- ❖ Grade Point Average: A in all courses
- ❖ Master's Dissertation: Optimal vaccination strategies for epidemics in metropolitan areas

B.Sc. in Applied Mathematics
Fundação Getulio Vargas, School of Applied Mathematics - Rio de Janeiro (Brazil)

2018 - 2021

- ❖ Supervisor: Dr. Luiz Max Carvalho
- ❖ Grade Point Average: 9.65/10 (highest grade in my class)
- ❖ Bachelor Dissertation: Prevalence estimation and binary regression methods for respondent-driven sampling with outcome uncertainty

RESEARCH EXPERIENCE

Sorbonne Université, Laboratoire Jacques-Louis Lions - Paris (France)

2024 - current

- ❖ Dissertation focused on the application of Reinforcement Learning techniques to epidemiologic models of mosquito-borne diseases

Fundação Getulio Vargas, School of Applied Mathematics - Rio de Janeiro (Brazil)

2022 - 2023

- ❖ Paper production entitled "Bivariate beta distribution: parameter inference and diagnostics" with professor Dr. Luiz Max Carvalho
- ❖ Dissertation production with theme "Control in Complex Networks" with professor Dr. Maria Soledad Aronna

2020 - 2021

- ❖ Production of the published papers with professors Dr. Maria Soledad Aronna and Dr. Roberto Guglielmi

2019 - 2020

- ❖ Scientific Initiation with the topic "Optimal Control in Biological Models"

National Institute for Pure and Applied Mathematics - Rio de Janeiro (Brazil)

2014 - 2017

- ❖ Junior Scientific Initiation Program in Mathematics

PUBLICATIONS

Aronna, Maria Soledad, Roberto Guglielmi, and Lucas Machado Moschen. "Estimate of the rate of unreported COVID-19 cases during the first outbreak in Rio de Janeiro." *Infectious Disease Modelling* 7.3 (2022): 317-332.

Aronna, M. Soledad, Roberto Guglielmi, and Lucas Machado Moschen. "A model for COVID-19 with isolation, quarantine and testing as control measures." *Epidemics* 34 (2021): 100437.

(Preprint) Moschen, Lucas M., Carvalho, Luiz M. "Bivariate beta distribution: parameter inference and

diagnostics." arXiv:2303.01271 (2023)

(Preprint) Moschen, Lucas M., Aronna, Soledad A. "Vaccination in metropolitan areas: Should the capital be prioritized in vaccine allocation?" arXiv:2402.00207 (2024)

TEACHING EXPERIENCE

Fundação Getúlio Vargas, School of Applied Mathematics - Rio de Janeiro (Brazil)
2019 - 2023

- ❖ Served as a Teaching Assistant for the courses: M.Sc. Probability (2023), M.Sc. Partial Differential Equations (2023), B.Sc. Partial Differential Equations (2021, 2022), M.Sc. Functional Analysis (2022), M.Sc. Statistical inference (2022), M.Sc. Bayesian Statistics (2022), B.Sc. Curves and Surfaces (2021, 2022), B.Sc. Introduction to Numerical Analysis (2021), B.Sc. Statistical Inference (2020), B.Sc. Ordinary Differential Equations (2020) and B.Sc. Linear Algebra (2019)

Project Elos Educação - Rio de Janeiro (Brazil)
2019 - 2020

- ❖ Volunteer Algebra teacher to prepare students for high school exams

RELATED ACTIVITIES

Imperial College London - London (United Kingdom)
2022

- ❖ Visiting student at the Department of Mathematics with supervisor Dante Kalise to work on Numerical Analysis and Optimal Control of the Fokker-Planck equation.

National Institute for Pure and Applied Mathematics (IMPA) - Rio de Janeiro (Brazil)
Summer of 2020, 2021 and 2022

- ❖ Summer school at IMPA with mathematical courses at the Master's level.

HONORS & AWARDS

2023

Latin American Congress on Industrial and Applied Mathematics (LACIAM 2023)
Best poster presentation for the work on COVID-19 mathematical modeling

IX Congreso de Matemática Aplicada, Computacional e Industrial
Best poster presentation for the work on COVID-19 mathematical modeling

2022

Brazilian Society of Applied and Computational Mathematics (SBMAC)
Scientific Initiation Award SBMAC (3rd place) for my Bachelor Dissertation

2021

Fundação Getúlio Vargas, School of Applied Mathematics
Academic Excellence with the highest final grade

REFERENCES

Maria Aronna Soledad
Fundação Getúlio Vargas, School of Applied Mathematics - Rio de Janeiro (Brazil)
Associate Professor and Coordinator of the Undergraduate Program in Applied Mathematics
soledad.aronna@fgv.br

Roberto Guglielmi
University of Waterloo, Department of Applied Mathematics - Waterloo (Canada)
Assistant Professor
roberto.guglielmi@uwaterloo.ca

Luis Almeida
Laboratoire Jacques-Louis Lions
CNRS Research Director
luis.almeida@sorbonne-universite.fr