



MARIE SKŁODOWSKA-CURIE POSTDOCTORAL FELLOWSHIPS 2024 EXPRESSION OF INTEREST FOR HOSTING MARIE CURIE FELLOWS

HOST INSTITUTION

Faculdade de Ciências e Tecnologias, Universidade Nova de Lisboa

RESEARCH GROUP AND URL

Analysis group at Center for Mathematics and Application (NOVA Math)

SUPERVISOR (NAME AND E-MAIL)

Fabio A. C. C. Chalub, <u>facc@fct.unl.pt</u>

SHORT CV OF THE SUPERVISOR

Ph.D. in Mathematics, Associate Professor at the Department of Mathematics, FCT NOVA. Working in mathematical biology, specially in mathematical models for evolution and epidemiology.

5 SELECTED PUBLICATIONS

- Fabio A. C. C. Chalub, Antonio Gómez-Corral, Martín López-García, and Fátima Palacios-Rodríguez. A Markov chain model to investigate the spread of antibiotic-resistant bacteria in hospitals. Stud. Appl. Math., 151(4):1498–1524, 2023.
- Fabio A. C. C. Chalub, Léonard Monsaingeon, Ana Margarida Ribeiro, and Max O. Souza. Gradient flow formulations of discrete and continuous evolutionary models: A unifying perspective. Acta Appl. Math., 171(1):24, Feb 2021.
- Fabio A. C. C. Chalub and Max O. Souza. From fixation probabilities to d-player games: An inverse problem in evolutionary dynamics. Bull. Math. Biol., 81(11):4625–4642, Nov 2019.
- Olga Danilkina, Max O. Souza, and Fabio A. C. C. Chalub. Conservative parabolic problems: Nondegenerated theory and degenerated examples from population dynamics. Math. Meth. Appl. Sciences, 41:4391–4406, 2018.
- Fabio A. C. C. Chalub and Max O. Souza. On the stochastic evolution of finite populations. J. Math. Biol., 75(6-7):1735–1774, 2017.

PROJECT TITLE AND SHORT DESCRIPTION

Rigorous study of the Kimura Equation. The Kimura equations is a degenerated partial differential equations of drift-diffusion type that models the evolution of the presence of a gene in a finite population. Recent works have derived this equations a a particular limit of certain stochastic processes, have studies if from a mathematically rigorous point of view, and reformulate it as gradient flow. In this project, we will continue the study of the Kimura Equation, considering time dependent parameters, high-dimensionality, coupling with other effects, and variational formulation.

SCIENTIFIC AREA WHERE THE PROJECT FITS BEST*

Mathematics (MAT)