Nathan Quiblier

Ph.D. in applied mathematics to biology

PERSONAL DETAILS

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RESEARCH THEME

Keywords	mathematical modelling, physics-informed machine learning, intracellular signaling pathway, statistical learning methods, photonics measurements, inverse problem
Interest	I am particularly interested in bridging the gap between complex physical and biological modeling through physics-driven statistical learning. My research focuses on developing advanced mathematical and machine learning methods to enhance parameter inference and simulation accuracy, ultimately improving our understanding of intricate biological and physical systems.

PROFESSIONAL EXPERIENCE AND EDUCATION

Ph.D. 2021 - 2024

Intracellular Signalling in Spatially Heterogenous Media. Modeling and statistical learning methods

Inria Lyon, Aistrosight Team

Developed a computational model to study endocytosis in intracellular signaling pathways, integrating spatial constraints and compartmentalized transport. Designed realistic simulations and applied statistical inference on microscopy data to analyze spatial heterogeneity in transcription factor diffusion using fluorescence correlation spectroscopy (FCS). Created physics-informed AI tools for biologists, enhancing FCS and single-particle tracking (SPT) for improved model selection and parameter estimation. Investigated the theoretical scaling limits of a given continuous-time random walks (CTRWs), particularly its convergence to time fractional diffusion equations.

Advisor: Hugues BERRY

MASTER DEGREE 2020 - 2021

MATHEMATICS AND APPLICATIONS

Sorbonne Université - École Polytechnique, Paris

Major : Applied Mathematics to biological and medical sciences

INTERNSHIP 2021 - 6 month

MODELLING OF MULTIMODAL PHOTONIC SETUP OBSERVING TRANSCRIPTION FACTORS
Inria Grenoble - Rhône-Alpes, BEAGLE Team

Understanding how transcription factors (TFs) explore the nucleus to find their specific binding site.
We developed a multimodal and multiscale experimental simulator based on simultaneous fluorescence correlation spectroscopy (FCS) and single particle tracking (SPT) to map the spatiotemporal dynamics of the transcription factor P- TEFb.
Advisors: Hugues BERRY

MASTER DEGREE 2020 - 2021

MATHEMATICS AND APPLICATIONS
Université Paris Dauphine - PSL, Paris

Major : Advanced Mathematics

INTERNSHIP 2020 - 1 month

MULTISCALE MODEL OF BONE REGENERATION : PARAMETERS' ESTIMATION
Université Lyon 1 Claude Bernard, Institut Camille Jordan

Giving a model of bones regeneration based on osteoblasts, osteoclasts and some mRNA. A model composed of integro-differential equations (coagulation - fragmentation) and ordinary differential equation.
We implemented an optimization method to matchthe model to biological datas.
Advisor: Laurent PUJO-MENJOUET

ACADEMIC PROJECT 2020 - 4 month

BANACH-TARSKI PARADOX
Université Paris Dauphine - PSL, Paris

We did a bibliographic study about the Banach-Tarski paradox.
This study had 3 goals : understand what is the paradox, what was the genesis of this paradox and what could we learn about this.
Advisor: Olivier GLASS

BACHELOR'S DEGREE 2019

MATHEMATICS - ECONOMICS - FINANCE - ACTUARIAL SCIENCES
Université Paris Dauphine - PSL, Paris

TEACHING

ISFA Lyon Game and Information Theory - Master 1 Econometrics and Statistics
2022-2024

ISFA Lyon Risk and Insurance Economics - Master Actuarial Sciences
2022-2024

SERVICE

2021 - 2024 Member of organizing committee of GDR *Imabio - Young Scientist Network* - We organised YSN Summer conference 2022 and 2024 - `https://sites.google.com/view/iysn/home`

PUBLICATIONS

02 - 2025 Nathan Quiblier, Jan-Michael Rye, Pierre Leclerc, Henri Truong, Abdelkrim Hannou, Laurent Heliot, Hugues Berry, Enhancing Fluorescence Correlation Spectroscopy with machine learning to infer anomalous molecular motion, Biophysical Journal

11 - 2024 Claire Alamichel, Juan Calvo, Erwan Hingant, Saoussen Latrach, Nathan Quiblier, Romain Yvinec, Modeling compartmentalization within intracellular signaling pathway, ESAIM: ProcS 77 100-122

12-2022 Valenta H, Quiblier N, Laghi V, Cabriel C, Riti J., Latest trends in bioimaging and building a proactive network of early-career young scientists around bioimaging in Europe. Biol Open. 2022 Dec 15;11(12):bio059630.

CONFERENCES AND SEMINARS

2024 YSN Summer conference 2024 - Lille - Selected Speaker - Enhancing Fluorescence Correlation Spectroscopy with Machine Learning for Advanced Analysis of Anomalous Diffusion - `https://sites.google.com/view/iysn/home`

2023 Mifobio - Workshop on Molecular dynamics and interactions in cells and tissues : experimentation and modeling

2023 Journées des doctorants du Liris 2023