

Research Experience

- November 2024 – now **Postdoctoral Fellowship**, *Mathematical Institute, University of Oxford*, United Kingdom
Research conducted under the supervision of Professor Cartis, with a focus on the following topics
- Developing new complexity bounds for quasi-Newton methods and Tensor methods based on secant equations for nonconvex optimization.
 - Analyzing variants of cubic regularization incorporating momentum and developing new efficient third-order methods.
 - Co-supervision of an MSc dissertation thesis work on the optimization of Physical Informed Neural Network
- February 2024 – Sep 2024 **Postdoctoral Fellowship**, *Toulouse INP, IRIT*, France
Research conducted under the supervision of Serge Gratton and Philippe L. Toint, with a focus on the following topics
- Developing second-order nonconvex optimization methods for locally smooth problems.
 - Deriving global worst-case bounds for stochastic high-order tensor methods.
 - Testing second-order methods for large-scale and noisy Machine Learning problems.
 - Disseminating scientific work through conferences and workshops.
- January 2021 – January 2024 **PhD**, *ANITI, Toulouse INP, IRIT*, France
PhD under the supervision of Serge Gratton and Phillipe L. Toint.
- Complexity analysis of nonconvex tensor methods in infinite-dimensional Banach spaces.
 - Development and numerical testing of new fast Newton method.
 - Analysis of large-scale adaptive gradient methods in a trust-region setting.
 - Analysis and implementation of adaptive optimization schemes that avoid using the function value.
 - Gain expertise in a broad range of topics related to smooth optimization in different settings (exact, noisy, stochastic) and nonlinear optimization, numerical analysis broadly.

Education

- 2021 – 2024 **PhD**, *ANITI, Toulouse INP, IRIT*, France
PhD under the supervision of Serge Gratton and Phillipe L. Toint.
- 2019 – 2020 **MSc**, *MVA, ENS Paris Saclay*, France
MSc in Machine Learning with courses spanning : statistics, computer vision, optimization, and learning theory.
- 2016 – 2019 **Engineering degree**, *École Polytechnique*, France
French "Grande École" with courses on various topics of applied mathematics, mechanics and CS.

2014 – 2016 **Esprit Classes Préparatoires, Tunisia**
Two-year study preparing for the examinations to the French ‘Grandes Écoles’.

Positions

2024 – Now **Postdoctoral Researcher at, Mathematical Institute, Oxford**, United Kingdom.

February 2024 – September 2024 **Postdoctoral Researcher at, IRIT, Toulouse, France.**

2021 – 2024 **Doctoral Student on Contract at, UFTMIP, ANITI, Toulouse, France.**

April 2020 – August 2020 **Research Internship MVA, GIPSA Labs Grenoble, France.**

Technical Skills

Advanced Skills, Algorithms, Numerical Optimization, Machine Learning.
Programming, Python, R, Matlab, JAX, $\text{\LaTeX}$, Pytorch, Git.
Languages, Arabic, French (Mother Tongues), English (Fluent).

Teachings

2021 – 2023 **Practical and tutorial sessions**, Tutoring Engineering students in various topics of Applied Mathematics: Hilbert Analysis and Fourier Transform, Statistics, Lebesgue Integral and Applications at, ENSEEIHT.

Academic Service

2022-2025 **Journal Review**, Review for various scientific journals of numerical optimization: Computational Optimization and Applications, Optimization Methods and Softwares, IMAJNA, SIAM Journal on Optimization, Numerish Mathematike.

Invited Talks and Conferences

2025 **ICCOPT**, Talk at the 2025 International Conference on continuous optimization, [USC, Los Angeles](#).

2025 **EUROPT**, Talk at the 22th Workshop on Advances in Continuous Optimization, [Southampton](#).

2024 **SMAI MODE**, Talk at the Biennial conference of the MODE group of the French Society of Applied Mathematics (SMAI), [Lyon](#).

2023 **EUROPT**, Talk at the 20th Workshop on Advances in Continuous Optimization, [Budapest](#).

2023 **OP23**, Talk at the SIAM Conference on Optimization, [Seattle](#).

2022 **Sparse Days**, Poster at the sparse days colloquium, [Saint-Girons](#).

2022 **SMAI MODE**, Poster at the Biennial conference of the MODE group of the French Society of Applied Mathematics (SMAI), [Limoges](#).