Maxime Jonval

PhD in Applied Mathematics

Research interests

- High Performance Scientific Computing

- Numerical Analysis

- Non-Linear Systems of Equations

Experience

2021 – 2024 **PhD in Applied Mathematics**, *Inria & IFPEN*, Villeneuve d'Ascq & Rueil-Malmaison, France.
Advanced numerical methods for high stiffness problems in reactive transport,
supervised by: Clement Cancès, Quanf-Huy Tran, Thibault Faney, Ibtihel Ben Gharbia

- Implemented a novel Cartesian representation formulation to improve the convergence of non-linear Newton solvers for multiphase chemical equilibrium problems

03-09/2020 **Engineer internship**, *CERFACS*, Toulouse, France.
Large eddy simulations of unsteady flows with high order numerical methods,
supervised by Marc Montagnac

- Performance comparison of two CFD solvers (in Fortran and C++) on an HPC cluster and implementation of new features.

06-07/2019 **Research internship**, *Inria*, Villeneuve d'Ascq, France.
Nonlinear finite volumes schemes for 2D convection-diffusion problems,
supervised by Claire Chainais

- Development of a 2D non-linear finite volume code on unstructured meshes in Python with an adaptive time step strategy.

Education

2018 – 2020 **Master's degree in Scientific Computing with highest honors**, *Université de Lille*, Villeneuve d'Ascq, France.
Applied mathematics, computer science, high performance computing, numerical simulation, convex optimization, CFD, machine learning.

2015 – 2018 **Bachelor's degree in Mathematics**, *Université de Lille*, Villeneuve d'Ascq, France.
Fundamental and applied mathematics, computer science.

Skills and languages

Programming: C++, Julia, Python, Fortran 90, Parallel computing
IT: Linux, LaTeX, git, bash
Language: French (Native), English (Proficient)

Interests

Sport: Long-distance running, Trail running, Hiking
Culture: Reading, Music, Cinema

Publications and reports

2023 **Robust resolution of single-phase chemical equilibrium using parametrization and Cartesian representation techniques**, *M. Jonval, I. Ben Gharbia, C. Cancès, T. Faney and Q. H. Tran*, preprint.

2020 **Large Eddy Simulations of unsteady flows with high order numerical methods**, *M. Jonval*, Internship report.

2019 **Approximation of convection-diffusion problems**, *E. Delplace and M. Jonval*, Research work supervised by Claire Chainais.

Scientific communications

2024 **Talk at Doctoral seminar of the applied mathematics department**, *IFPEN*, France.

2024 **Talk at Workshop on the mathematical and numerical modeling of CO_2 storage**, *IFPEN*, France.

2023 **Talk at Journées Scientifiques du GdR MaNu**, *Le Croisic*, Fance.

2023 **Talk at SIAM GeoSciences 2023**, *Bergen*, Norway.

2023 **Poster at ABPDE 5th Edition**, *University of Lille*, France.

2022 **Talk at Doctoral seminar of the Painlevé laboratory**, *University of Lille*.

2022 **Talk at ANEDP Team Day**, *Univeristy of Lille*, France.

2022 **Talk at Doctoral seminar IFPEN**, *Online*.

2022 **Poster at Canum 2020**, Evian les-Bains, France.

2022 **Talk at the kick-off meeting of the Campus France AURORA project**, *University of Bergen*, Norway.

Teaching

Since 2021 **Summer camp in Mathematics**, *SKEMA Business School*, Bac+1 students, TD (30h/year).

Since 2022 **Numerical methods for EDO**, *Centrale Lille*, Bac+3 students, TDTP in Python (16h/year).

2023 **Finite Volumes method**, *University of Lille*, Bac+5 students, TDTP in C++ (16h).

2021 **Fourier and Laplace transforms**, *ISEN Lille*, Bac+3 students, TD (28h).