Massy, France
claireroche47@gmail.com

Claire ROCHE

Site: claireroche.github.io
GitHub: claireroche
LinkedIn: claire-roche

Education

Ph.D in Applied Mathematics & Computer Science **2021 - 2024 (expected)**
CEA-CESTA and Paris-Saclay university

Title: 3D block-structured automatic mesh generation for atmospheric reentry computational fluid dynamics.
Supervisors: Franck LEDOUX, Jérôme BREIL, and Thierry HOCQUELLET

Engineer Degree in Applied Mathematics and Mechanics **2018 - 2021**
ENSEIRB-MATMECA, Bordeaux INP

Main courses: Numerical Analysis, Numerical Methods, Fortran 90 and C++ Programming

Master Degree in Numerical Methods for High Performance Computing **2019 - 2021**
Bordeaux university

Main courses: High Performance Computing, Open MP/MPI

Bachelor of Engineering Sciences **2016 - 2019**
Bordeaux university

Main courses: Python and Fortran 90 Programming

Work Experience

Internship **May 2023 - Aug. 2023**
Lawrence Livermore National Laboratory *Livermore, United States*

- High-order mesh rp-adaptivity for multi-material interface alignment in MFEM

Supervisor: Ketan MITTAL

Internship **Feb. 2021 - Aug. 2021**
CEA-CESTA *Bordeaux, France*

- Implementation of methods for refinement, regularization, and adaptation of structured meshes.
- Application to simulations of hypersonic flows using a stationary/unsteady 3D Navier-Stokes CFD code.

Supervisors: Marina OLAZABAL-LOUME, and Jérôme BREIL

Publications

Mittal K, Dobrev V.A., Knupp P, Kolev T, Roche C, Tomov V.Z. Mixed-Order Meshing using *rp*-adaptivity for Surface Alignment with Implicit Geometries. *Submitted to International Meshing Roundtable 2024.*

Roche C, Breil J, Hocquellet T, Ledoux F. Block-structured quad meshing for supersonic flow simulations. *International Meshing Roundtable 2023.*
https://internationalmeshingroundtable.com/assets/papers/2023/11-Roche-compressed.pdf

Roche C, Breil J, Olazabal-Loumé M. Mesh regularization of ablating hypersonic vehicles. In *8th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2022).* Jun 2022, Oslo, Norway.
https://hal-cea.archives-ouvertes.fr/cea-03783795/

Communications

Mar. 29 - 31, 2023 *Bordeaux, France*
"Advancing-front block structure generation for atmospheric re-entry simulations". 57th 3AF International Conference on Applied Aerodynamics, High speed aerodynamics, from transonic to hypersonic.

Mar. 6 - 9, 2023 *Amsterdam, The Netherlands*
"Block-structured quad meshing for supersonic flow simulations". SIAM International Meshing Roundtable Workshop.

Dec. 8, 2022 *Paris, France*
Poster. "Block-structured 2D mesh generation for supersonic flow simulation". Scientific evaluation of the CEA in high performance computing.

Nov. 16, 2022 *Bordeaux, France*
Poster. "Automatic 2D curved block-structured mesh generation for atmospheric re-entry". Scientific evaluation of the CEA in atmospheric re-entry.

Jun. 5 - 9, 2022 *Oslo, Norway*
8th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2022).

May 10, 2022 *Arcachon, France*
Poster. "Automatic hexahedral mesh generation for atmospheric re-entry". Journée des doctorants. *Best poster award.*

Project

Mesh adaptation in PETSc **Oct. 2020 - Jan. 2021**
Master's Project

- Replacing Pragmatic remesher by MMG in PETSc.
- Setting up test cases for the implementation.

Skills

Programming	C++, Fortran 90, Python, Git, LaTeX, TikZ, MarkDown
Softwares	CLion, gmsh, Paraview, Visit, SU2 CFD
Communication	French (native), English (B2 - TOEIC: 870), Spanish (beginner)
Other	Mesh Generation, Computational Fluid Dynamics

Interests and Activities

Climbing **2010 - present**
- Bouldering (2016-present)
- Lead climbing (2010-2016)
- President of ENSEIRB-MATMECA climbing association (2019-2020)

Franck LEDOUX
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