AIT AMEUR, Katia
E-mail: katia.ait-ameur@polytechnique.edu
Telephone: 06 67 94 69 65
Date of birth: 30/08/1993
Nationality: French and Algerian

## Positions

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| 10/20-.. | **Post-doctoral researcher** , CMAP, École Polytechnique |
| Supervisors: | Marc Massot, Teddy Pichard and Samuel Kokh |
| Subject: | Derivation of two-phase flow models from separated to dispered-flows regime and numerical methods within a massively parallel computing context |
| 2016-2020 | **PhD in Numerical Analysis and Scientific Computing**, LJLL, Sorbonne University and CEA |
| Supervisors: | Yvon Maday and Marc Tajchman |
| Subject: | Time parallel method for the CATHARE code, dedicated to the simulation of two-phase flows within a nuclear reactor and analysis of finite volume schemes on staggered grids (part of the ANR project CINE-PARA) |
| 03/16 - 09/16 | **Internship**, LAGA, University Sorbonne Paris Nord and CEA |
| Supervisors: | Caroline Japhet, Pascal Omnes and Mathieu Peybernes |
| Subject: | Optimized Schwarz Waveform Relaxation methods with Robin transmission conditions for the incompressible Stokes system. Application to the Trio-CFD code, dedicated to the simulation of turbulent flows within nuclear reactor cores |
| | • 18/07/16 - 26/08/16: Participation to the CEMRACS summer school *Numerical challenges in parallel scientific computing, Marseille* |

## Education

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| 2016-2020 | **PhD in Numerical Analysis and Scientific Computing**, LJLL, Sorbonne University and CEA |
| 2014-2016 | **Master in Mathematical Engineering**, major in Numerical Analysis and Scientific Computing, Sorbonne University, with honors |
| 2011-2014 | **Bachelor in Mathematics**, Sorbonne University, Distance education |

## Publications

1. K. A., Y. Maday, M. Tajchman. Time-parallel algorithm for two phase flows simulation, preprint, PDF, Numerical Simulation in Physics and Engineering : Trends and Applications, Lecture Notes of the XVIII Jacques-Louis Lions Spanish-French School, pp. 169-178 , 2019
2. K. A., Y. Maday, M. Tajchman. Multi-step variant of parareal algorithm, preprint, PDF Domain Decomposition Methods in Science and Engineering XXV, Series Lecture Notes in Computational Science and Engineering, pp. 393-400, 2020
3. K. A., M. Ndjinga. A new class of $L^2$-stable schemes for the isentropic Euler equations on staggered grids, preprint, PDF Finite Volumes for Complex Applications IX, Editors: Robert Klofkorn, Erik Keilegavlen, Adrian Florin Radu, Jurgen Fuhrmann, pp. 425-433, 2020
4. Contributions to the parallel simulation of two-phase flows and analysis of finite volume schemes on staggered grids. PhD thesis. Sorbonne University, 2020.
5. K. A., S. Kokh, M. Massot, M. Pelanti, T. Pichard. A Lagrange-projection like splitting method for the isentropic Baer-Nunziato model, *accepted in ESAIM Proceedings and Surveys*, preprint

6. K. A., Y. Maday. Multi-step variant of the parareal algorithm: convergence analysis and numerics, *under review*, preprint

7. K. A., M. Essadki, S. Kokh, M. Massot, T. Pichard. Limitation strategies for high-order discontinuous Galerkin schemes applied to Eulerian models of polydisperse sprays, *To be submitted to SIAM Journal on Scientific Computing*

## Research software contributions

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| Ongoing | Implementation of high order Discontinuous Galerkin methods for two-phase flow models, in the Python library Josiepy, a 2D PDE solver. |
| 2020 | Implementation of finite volume schemes on staggered grids in the toolbox CDMATH. |
| 2019 | Design of a library in Fortran and parallelization (MPI) allowing to apply a time domain decomposition to the Cathare code . |
| 2018 | Design of a numerical clone (C++) of the Cathare code in 1D with a staggered finite volume scheme. |

## Teaching assistant

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| 11/20, 11/21 | Supervising a project about the simulation of Arenstorf orbits with the parareal algorithm, in the course MAP551, École Polytechnique |
| 2018-2019 | Exercises part of the course Maths for scientific studies for $1^{st}$ year students (60h), BSc. Physics, Sorbonne University |
| Spring 2018 | Computational classes of C programming for the course ODEs and numerical methods for $3^{rd}$ year students (30h), Sup Galilée engineering school, University Sorbonne Paris Nord |

## Side activities

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| 06/22 | Organizer of a mini-symposium dedicated to Lagrange-Projection methods during CANUM Congress. |
| 04/21-.. | Organizer of the team HPC@Maths seminar in CMAP. |
| 09/21-.. | Representative of Post-doctoral researchers at the committee of CMAP laboratory. |
| 03-07/19 | Course on the analysis of numerical methods for fluid mechanics for engineers (15h) with M. Ndjinga, CEA |
| 11/19 | Meeting between Sorbonne master students and LJLL PhD students, Sorbonne University |

## Funding received and award

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| 2020 | DIM-Math-Innov post-doctoral fellowship |
| 2018 | Jacques Louis Lions Summer school travel grant from SMAI |
| 2018 | Best Poster Award, French and spanish Jacques Louis Lions Summer school |

## List of talks and poster presentations

04/23 11th International Conference on Multiphase Flow (ICMF 2023), Kobe, Japan.

02/23 SIAM Conference on Computational Science and Engineering (CSE23), Amsterdam.

11/22 Workshop Schémas numériques de Type Boltzmann, Institut de Mathématiques de Bordeaux.

09/22 New Trends in Complex Flows, Institut Henri Poincaré, Paris.

06/22 CANUM Congress, Evian-les-bains.

06/22 ECCOMAS Congress, Oslo.

03/22 LAGA seminar, Université Sorbonne Paris Nord.

03/22 ANEDP seminar, Laboratoire Paul Painlevé, Université de Lille.

11/21 Seminar EDPA at Poitiers University

10/21 Poster session, Meeting of the MaNu working group, Croisic (France)

06/21 Mini-symposium on "Moment methods derived from a kinetic equation", SMAI Congress, Grande-Motte (France)

03/21 Copper Mountain Conference on Multigrid methods, online

12/20 Numerical Analysis Congress CANUM junior, online conference

09/20 Numerical analysis working group of STMF, CEA (Saclay center)

06/19 ANR project CINE-PARA day, Paris Dauphine University

05/19 SMAI Congress, Morbihan (France)

07/18 DD25, International domain decomposition methods conference, Canada

06/18 Poster session, Spanish-French School Jacques-Louis Lions about Numerical Simulation in Physics and Engineering, Spain

05/18 7th Workshop on Parallel in time integration, Station Marine de Roscoff (France)

02/17 LRC MANON working group, Sorbonne University

## Scientific dissemination to the greater public

07/19 Popularization talk during the Summer school for high school students, ESPCI (Paris)

10/18 Organised science popularization events in high schools during the "Fête de la Science" (Paris)

## Programming and language skills

Programming : C/C++, MPI, Python, Freefem++, Latex Languages : French, English