Ph.D. Mamadou N'DIAYE

Dual citizenship: Malian and French

11 Rue Lavigne
Pau, 64000, France
https://team.inria.fr/magique3d/team-members/mamadou-ndiaye/

Phone: +33 658-569-722
Email: ndiaye.mamadou24@gmail.com
Alt: mamadou.ndiaye@inria.fr

PARTICULARS

EDUCATION

University of Pau and Pays de l'Adour — Pau, France
Ph. D. in Applied Mathematics — *2015-, Defended 2017*

University Pierre and Marie Curie, Paris VI — Paris, France
Master in Mathematics and Applications — 2011-,*November 2013*

University of Marne La Vallee — Champs-sur-Marne, France
Bachelor in Mathematics and Computer sciences — 2008-, *Sptember 2011*

High School Ibrahima Ly, Banankabougou — Bamako, Mali
Baccalaureat Scientifique — *June 2007*

RESEARCH INTERESTS

My research interests span the areas of numerical analysis, mathematical modeling and scientific computing. I have a specific interest in development of high order time integration schemes, resolution of PDEs, simulation of wave problems and programming.

I am also interested in the development of highly parallel research code which I believe is a key to tackle issues related to computational burden while solving PDEs in a large heterogeneous and complex medium.

I am excited at the prospect of learning, contributing and making an impact in upcoming and challenging field.

Ph.D. DISSERTATION

Title: "On the study and development of high-order time integration schemes for ODEs applied to acoustic and electromagnetic wave propagation problems"
Advisor: Hélène Barucq and Marc Duruflé

My thesis develops a framework for the design of high order A-stable implicit, Optimized CFL number high order esxplict and high order locally implicit time integrations schemes for ODEs. I have implemented the developed schemes in the C++ code Montjoie (`http://montjoie.gforge.inria.fr/`) and used them to solve the acoustic and Maxwell's equations after using FEM and HDG methods for the spatial discretization in 1D, 2D and 3D.

Programming Skill and tools

- C++ more than 4 years work experience.
- C and Java many academic courses and projects.
- Fortran 90 Internship work experience.
- MPI and OpenMP work and academic experience.
- Python, Matlab good working experience.
- Scientific writing with Latex.
- Scientific presentation with Beamer or Powerpoint.
- Excel and Word professional skill.

WORK AND RESEARCH EXPERIENCES

- **Ph.D. Engineer, INRIA**, Jan. 2018 - Jun. 2018. Development and analysis of numerical methods for wave propagation problems.
- **Ph.D. student, UPPA**, Jan. 2015 - Dec. 2017. Ph.D. thesis in Applied Mathematics with a grant of INRIA and CG64.
- **CIEE Internship training program, Total E&P USA Inc.,**, Jun. 2014 - Dec. 2014. Development of new numerical method based on finite-difference method to solve the wave equation in Frequency domain.
- **Master thesis, EDF R&D,** Apr. 2013 - Sep. 2013. Modeling and development of power plant management tools and optimization of production costs subject to electricity demand.
- **Student Job, Argus de la presse,** Sep. 2009 - May 2014. Scan newspaper and identifying articles published on websites for measuring and evaluating customers communication strategy.

TEACHING EXPERIENCE

- **Graduate Teaching Assistant, LMAP-UPPA** Oct. 2016- Sep. 2017
  - Analysis 3A and 3B - Vectorial spaces, Topology, Series and Integral Calculus (L2 Math 19.5 hours), Prof. Pierre-Yves Letort and Prof. Daniel Delabre.
  - Series and Integration (L2 MIASHS 19.5 hours), Prof. Jean-Bernard Betbeder.
  - Real valued function (L1 MIASHS 19.5 hours), Prof. Marc Lavie.
- **Graduate Teaching Assistant, LMAP-UPPA** 0ct. 2015 - Sep. 2016
  - Linear Algebra (L2-Math 19.5 hours), Prof. Pierre-Yves Letort.
  - Elementary Algebra (L1-MIASHS 19.5 hours), Prof. Laurent Levi.
  - Complement Algebra - (L1-Math 19.5 hours), Prof. Jean-François Falliero.

PUBLICATIONS

PAPERS

1. Hélène Barucq, Marc Duruflé and Mamadou N'diaye, "High-order Pad and Singly Diagonally Runge-Kutta schemes for linear ODEs, application to wave propagation problems ", *Numerical Methods for Partial Differential Equations*, Nov. 2017.
2. Marc Duruflé and Mamadou N'diaye, "Optimized High Order Explicit Runge-Kutta-Nyström Schemes". *Proceeding of ICOSAHOM*, Rio de Janeiro, Brazil, June 2016, *Marco Bittencourt, Ney Dumont and Jan S. Hesthaven ICOSAHOM 2016 - International Conference on Spectral and High-Order Methods*
3. Mamadou N'diaye, Russell J. Hewett, Andreas Atle and Henri Calandra, "Optimized Finite Difference Coefficients for the Helmholtz Equation", *SEG Technical Program Expanded Abstracts* New Orleans, USA, 2015.

TALKS

CONFERENCE TALKS

1. "A-stable high-order implicit time schemes", *Waves2017 - 13th International Conference on Mathematical and Numerical Aspects of Wave Propagation*, Minneapolis, Minnesota - USA, May 2017.
2. "Efficient high order time schemes for Maxwell's equations", *ICOSAHOM 2016 - International Conference On Spectral and High Order Methods*, Rio de Janeiro, Brazil, Jun. 2016.

INDUSTRY/OTHER TALKS

3. "On the development of locally implicit schemes for linear wave problems", *Mathias 2017 - TOTAL Symposium on Mathematics*, Val d'Europe, France, Oct. 2017.
4. "A family of A-stable 'Linear'-SDIRK and Padé time schemes for ODEs", *Colloquium LMAP for Ph.D. Student*, Pau, France, Feb. 2017.
5. "A Family of Linear Singly Diagonally Runge-Kutta Methods and High Order Padé's Schemes for ODE", *Mathias 2016 - TOTAL Symposium on Mathematics*, Val d'Europe, France, Oct. 2016.
6. "High order time schemes for ODEs", *Colloquium LMAP for Ph.D. Student*, Pau, France, Jun. 2016.
7. "High order time schemes for Maxwell's equations" *Colloquium Inter'Actions in Mathematics* ENS-Lyon, France, May 2016.

Others ACTIVITIES

- INRIA Bordeaux Sud-Ouest Center Committee Member (Titulaire Collège C), Bordeaux, France, since 2016.
- Member of the Mathematicum group of LMAP-UPPA, since 2015.
- Co-organizer of the colloquium LMAP for Ph.D. student, 2015-2016.
- Former member of A2MAIM (association of former student of the master Engineering Mathematics - MPE of UPMC, 2012-2014.

LANGUAGES

Bambara Mothertongue.

Proficient in French and English.

Basic knowledge of Spanish.