

Gaspard Kemlin

(last updated on September 24, 2024)

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Current position

Sept. 2023 – **Université de Picardie Jules Verne, Amiens, France**, LAMFA – Laboratoire Amiénois de
... Mathématique Fondamentale et Appliquée.
Maître de conférences.

Previously

Jan. 2023 – **University of Stuttgart**, Institute of Applied Analysis and Numerical Simulation – Numerical
Sept. 2023 Mathematics for High Performance Computing.
Post-doctoral position in the group of Benjamin Stamm.

Sept. 2019 – **INRIA – CERMICS**, *Numerical analysis for Kohn-Sham DFT*, INRIA Team MATHERIALS, École
Dec. 2022 des Ponts ParisTech.
PhD under the supervision of Eric Cancès and Antoine Levitt, defend on December 15th, 2022.

2018 – 2019 **Sorbonne Université**, *Mathematics of Modeling*, Pierre & Marie Curie Campus.
Master of Science in Applied Mathematics. Theoretical and numerical analysis of PDEs, with a focus on modeling.

Feb. – Jun. **ETH Zürich**, *Erasmus semester*.
2017 Functional analysis, numerical methods for hyperbolic PDEs and stochastic calculus.

2015 – 2019 **Engineering student at École des Ponts ParisTech**.
Master of Science in Mathematics and Computer Science, with a focus on the numerical analysis of PDEs.

Awards

2024 Prix de thèse de l'École des Ponts ParisTech.
<https://ingenius.ecoledesponts.fr/articles/vers-une-analyse-numerique-plus-precise/>

Papers

Preprints

- [1] Thiago Carvalho Corso, Gaspard Kemlin, Christof Melcher, and Benjamin Stamm. Numerical simulation of the Gross-Pitaevskii equation via vortex tracking, 2024.
- [2] Andrea Bordignon, Geneviève Dusson, Éric Cancès, Gaspard Kemlin, Rafael Antonio Lainez Reyes, and Benjamin Stamm. Fully guaranteed and computable error bounds on the energy for periodic Kohn-Sham equations with convex density functionals, 2024.

Published

- [3] Eric Cancès, Gaspard Kemlin, and Antoine Levitt. A Priori Error Analysis of Linear and Nonlinear Periodic Schrödinger Equations with Analytic Potentials. *Journal of Scientific Computing*, 98(1):25, 2024.
- [4] Eric Cancès, Michael F. Herbst, Gaspard Kemlin, Antoine Levitt, and Benjamin Stamm. Numerical stability and efficiency of response property calculations in density functional theory. *Letters in Mathematical Physics*, 113(1):21, 2023.
- [5] Eric Cancès, Geneviève Dusson, Gaspard Kemlin, and Antoine Levitt. Practical error bounds for

properties in plane-wave electronic structure calculations. *SIAM Journal on Scientific Computing*, 44(5):B1312–B1340, 2022.

- [6] Eric Cancès, Gaspard Kevlin, and Antoine Levitt. Convergence analysis of direct minimization and self-consistent iterations. *SIAM Journal on Matrix Analysis and Applications*, 42(1):243–274, 2021.
- [7] Joao Guilherme Caldas Steintraesser, Gaspard Kevlin, and Antoine Rousseau. A domain decomposition method for linearized Boussinesq-type equations. *Journal of Mathematical Study*, 52(3):320–340, 2019.

Proceedings

- [8] Eric Cancès, Geneviève Dusson, Gaspard Kevlin, and Laurent Vidal. On basis set optimisation in quantum chemistry. *ESAIM: Proceedings and Surveys*, 73:107–129, 2023.

Softwares

DFTK Contributor

<https://dftk.org>: plane-wave DFT toolkit in Julia, developed by Michael F. Herbst and Antoine Levitt.

Community

- 2024 – ... Organizer of the A3 weekly seminar at LAMFA.
- 2021 – 2022 Organizer of the Young Researchers Seminar at CERMICS.
- Nov. 2022 Scientific Committee for the *Journées Scientifiques des Jeunes du CERMICS*.

Skills

Computer Science

Languages Julia, Python, C/C++, Scilab / Matlab.
Other \LaTeX , Linux and LibreOffice suite.

Languages

French Native language
English C1 : fluent
Spanish B2 : advanced
German A2 : beginner

TOEIC (930/990 in 2015)

Teaching

LAMFA

- 2023 – 2025
 - Optimisation numérique, M1 Mathématiques
 - Analyse numérique et modélisation, M1 Mathématiques
 - Analyse numérique, L2 Mathématiques
 - Introduction à l'analyse de données, M1 Ingénierie des systèmes complexes
 - Modélisation et calcul scientifique, Préparation à l'agrégation externe de Mathématiques.

Stuttgart University

- 2022 Höhere Mathematik 2 für Ingenieurstudiengänge, teaching assistant.

École des Ponts

- 2020 & 2021 Analysis and scientific calculus, flipped classes for undergraduate engineering students.
- 2019 & 2020 Introduction to Optimization, exercises classes for undergraduate engineering students.
- 2020 Patterns formation in reaction-diffusion systems and links with morphogenesis in biology, project for undergraduate engineering students.

Talks

- Sep. 2024 Numerical Linear Algebra, CIRM, Marseille, France.
- Aug. 2024 SiQuMa, Dagstuhl, Germany.
- Jul. 2024 EMC2@Roscoff, Roscoff, France.
- Jun. 2024 Journée du LAMFA, Amiens, France.
- May. 2024 FORTH, Heraklion, Greece.
- Apr. 2024 Séminaire Analyse Numérique, Besançon, France.
- Mar. 2024 GAMM jahrestagung, Magdeburg, Germany.
- Feb. 2024 SFB S^3 conference, Aachen, Germany.
- Nov. 2023 Journées CPER Manifest, Amiens, France.
- Oct. 2023 Journée Analyse Appliquée Hauts de France, Amiens, France.
- Jun. 2023 SFB S^3 Seminar, Aachen, Germany.
- May. 2023 GAMM jahrestagung, Dresden, Germany.
- Mar. 2023 A3 seminar, Amiens, France.
- Aug. 2022 GAMM jahrestagung, Aachen, Germany.
- Jul. 2022 JuliaCon, virtual.
- Jun. 2022 CECAM, Lausanne, Switzerland.
- Jun. 2022 CANUM, Évian-les-Bains, France.
- May. 2022 IPAM, UCLA, United States.
- Feb. 2022 ACoM seminar, Aachen, Germany.
- Jan. 2022 GDR NBODY meeting, virtual.
- Sep. 2021 MOANSI meeting, virtual.
- May. 2021 SIAM MS, virtual.
- Mar. 2021 SIAM CSE, virtual.
- Dec. 2020 CANUM-J, virtual.
- Oct. 2020 EMC2 Seminar, LJLL, Paris, France.
- Sept. 2020 MOANSI meeting, virtual.
- Sept. 2020 AlgDynQua workshop, CIRM, Marseille, France.
- Sept. 2019 MOANSI meeting, TUM, München, Germany.
- Nov. 2018 16ème Journées de l'Hydrodynamique, Marseille, France.

Posters

- May 2023 SFB S^3 Spring school, Aachen, Germany.
- Mar. 2022 SIAM PDE, virtual.
- Jan. 2020 GDR NBODY meeting, Lille, France.

Workshops

- Aug. 2024 Dagstuhl, Germany, *Workshop on the simulation of quantum matter.*
- May. 2024 Heraklion, Greece, *PDEs in Physics and Materials Science.*
- Jun. 2023 Augsburg, Germany, *Numerical analysis for nonlinear Schrödinger equations.*
- Jun. 2022 CECAM-HQ-EPFL, Lausanne, Switzerland, *Error control in first-principles modeling.*
- May. 2022 IPAM, UCLA, United States, *Large-Scale Certified Numerical Methods in Quantum Mechanics.*

- Aug. 2021 CEMRACS, CIRM, Marseille, France, *Data Assimilation and Reduced Modeling for High Dimensional Problems*.
5 weeks research session: Optimal Gaussian basis sets for electronic structure calculation.
- Sept. 2020 AlgDynQua workshop, CIRM, Marseille, France.

Past experiences

- Feb. – Mar. 2022 **RWTH Aachen, ACoM**, *Visiting PhD student*, Benjamin Stamm's researchgroup.
Perturbative approaches for automatic differentiation in DFT computations.
- Apr. – Aug. 2019 **INRIA – CERMICS**, *Research internship*, Supervisor: Antoine Levitt.
Numerical and theoretical analysis of some electronic structure calculation algorithms.
- Jan. – Jul. 2018 **INRIA Chile**, *Research internship*, Supervisor: Antoine Rousseau.
Transparent boundary conditions for Boussinesq type equations and application to domain decomposition methods.
- Jul. – Dec. 2017 **EDF R&D**, *Research internship*, Supervisors: Frank Hülsemann, Jérôme Bonelle.
Fast linear solvers for Hybrid High-Order discretizations.
- 2015 – 2016 **Voluntary classes for highschool students**, École des Ponts ParisTech.

Interests and Hobbies

- Hobbies Music, Reading, Sciences, Games, History.
- Community BAFA (French Youth Worker Qualification), voluntary work in several music and board games festivals, former president and co-creator of the board games association of ENPC, former member of the comics, computer, cinema and political clubs of ENPC.