

Pierre Amenoagbadji

Postdoctoral researcher

APAM - Columbia University

Born 21/12/1997 in Lomé, TG. Togolese citizenship

APAM, Columbia University

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Education

- 2020–2023 **Ph.D. in Applied Mathematics**, *POEMS team*, *ENSTA Paris*, Palaiseau, FR.
Thesis defended on December 13, 2023.
○ Title: Wave propagation in quasiperiodic media.
○ Committee: David Gérard-Varet (President), Éric Bonnetier and Antoine Levitt (Reviewers), Bérangère Delourme, Sébastien Guenneau, and Claude Le Bris (Examiners), Sonia Fliss and Patrick Joly (Advisors).
- 2019–2020 **Master in Analysis, Modeling, Simulation**, *Université Paris-Saclay*, Palaiseau, FR.
○ Main topics: Partial Differential Equations, Wave propagation, Numerical Analysis, High Performance Computing.
- 2017–2020 **Engineering degree in Applied Mathematics**, *ENSTA Paris*, Palaiseau, FR.
○ Courses: Mathematics (analysis, numerical methods, optimization, probability theory), Mechanics (solid, fluids), Physics (quantum, statistical), Computer science (C/C++).
- 2015–2017 **CPGE**, *Lycée César Baggio*, Lille, FR, PCSI-PSI*.
○ Two-year undergraduate intensive courses for nationwide competitive entrance exams to top French engineering schools, also called ‘Grandes Écoles’.
- 2014 **Togolese scientific Baccalaureate**, *Lycée 02 Février*, Lomé, TG.

Research Experience

- 2024–Pres. **Postdoctoral position**, *Department of Applied Physics and Applied Mathematics*, *Columbia University*, New York, US.
○ Advisor: Michael Weinstein.
- 2020–2023 **Ph.D. student**, *POEMS team*, Palaiseau, FR.
- 2020 **6-month research internship**, *POEMS team*, Palaiseau, FR.
○ Title: Wave propagation in quasiperiodic media (introduction to the Ph.D.); advised by Sonia Fliss and Patrick Joly.
○ Survey of the theory of almost-periodic and quasiperiodic functions; numerical study of the truncation effects related to cell problems with quasiperiodic coefficients in the homogenization setting; numerical solution of a 1D Helmholtz equation with quasiperiodic coefficients.
- 2019 **3-month research internship**, *Karlsruhe Institute of Technology*, Karlsruhe, DE.
○ Title: The Galerkin method for one-dimensional Fredholm integral equations: analysis and implementation on BIEPack; supervised by Tilo Arens.
○ Implementation of Galerkin and collocation methods on the Matlab library BIEPack.

Publications

Peer-reviewed journals

- [2] P. Amenoagbadji, S. Fliss, and P. Joly. “Time-harmonic wave propagation in junctions of two periodic half-spaces”. In: *Pure and Applied Analysis* 7.2 (2025), pp. 299–357.

- [1] P. Amenoagbadji, S. Fliss, and P. Joly. “Wave propagation in one-dimensional quasiperiodic media”. In: *Communications in Optimization Theory* 2023.17 (2023).

Ph.D. thesis

- [1] P. Amenoagbadji. “Wave propagation in quasiperiodic media”. PhD thesis. École Doctorale de Mathématiques Hadamard, 2023.

Oral communications

Conferences

- 06/2025 ETOPI13 **13th International Conference on Elastic, Electrical, Transport, and Optical Properties of Inhomogeneous Media**, New York, US
- 05/2025 SIAM DS25 **SIAM Conference on Applications of Dynamical Systems**, Denver, US in the minisymposium “Recent Advances in Wave Propagation and Dispersive Dynamics”
- 01/2025 AMS **Joint Mathematics Meetings**, Seattle, US in the minisymposium “Mathematics of Topological Insulators”
- 06/2024 WAVES2024 **16th International Conference on Mathematical and Numerical Aspects of Wave Propagation**, Berlin, DE
- 05/2024 SIAM MS24 **SIAM Conference on Mathematical Aspects of Materials Science**, Pittsburgh, US
Invited talk in the minisymposium “Analysis, Homogenization, and Spectral Problems in Materials Science”.
- 09/2022 Conference Aspect’22 **Asymptotic Analysis & Spectral Theory**, Oldenburg University, Oldenburg, DE.
- 06/2022 WAVES2022 **15th International Conference on Mathematical and Numerical Aspects of Wave Propagation**, Palaiseau, FR
- 06/2022 CANUM 45e **Congrès National d’Analyse Numérique**, SIAM, Evian-les-Bains, FR
- 02/2022 **Conference on Mathematics of Wave Phenomena**, KIT, Karlsruhe, DE (online)
- 10/2021 CJCMA 2021 **Congrès des Jeunes Chercheuses et Chercheurs en Mathématiques Appliquées 2021**, Palaiseau, FR
- 06/2021 10e **Biennale Française des Mathématiques Appliquées et Industrielles**, SIAM, La Grande-Motte, FR

Seminars, Working groups, Workshops

- 05/2025 SAYAS **Numerics Day**, University of Delaware, Newark, US.
- 04/2025 **Computational and Applied Mathematics Colloquium**, University of Chicago, Chicago, US.
- 02/2025 **Applied and Computational Mathematics Seminar**, Rutgers University, New Brunswick, US.
- 07/2024 **Simons Collaboration on Extreme Wave Phenomena**, (online).
- 01/2024 APAM **Colloquium**, Columbia University, New York, US.
- 11/2023 **Séminaire de l’équipe Modélisation et Calcul Scientifique**, LAGA, Université de Sorbonne Paris-Nord University, Villetaneuse, FR.
- 06/2023 AQW2023 **The Arctic Quasiperiodic Workshop**, Luleå, SE (online).
- 04/2023 **Workshop on Computational Methods for Multiple Scattering**, Isaac Newton Institute, Cambridge, UK.

- 12/2022 **EDP Nancy Seminar**, *Institut Élie-Cartan de Lorraine*, Nancy, FR.
- 11/2022 **Rencontre JCJC Ondes**, *INRIA Université Côte d'Azur*, Nice, FR.
- 06/2022 **AQW2022 The Arctic Quasiperiodic Workshop**, Luleå, SE (online).

Posters

- 02/2025 **Reduced-Order Modeling for Complex Engineering Problems (from Analysis to Practical Implementation)**, Chicago, US.
- 07/2023 **Mathematical Aspects of Condensed Matter Physics**, Zurich, CH.

Teaching and supervision

Lecturing

- Spring 2025 **APMA E4301 Numerical methods for PDEs**, *Columbia University*, Palaiseau, FR, Graduate level.
 - Finite differences and finite elements for ODEs and PDEs

Teaching assistantship

- 2021-2023 **MA103 Introduction to PDEs and their Discretization by Finite Differences**, *ENSTA Paris*, Palaiseau, FR, L3 level, 15h/year.
 - Hyperbolic equations, Method of Characteristics, Finite differences.
- 2021-2022 **ANN201 Finite Elements**, *ENSTA Paris*, Palaiseau, FR, M1 level, 15h/year.
 - Elliptic equations, the Finite Element Method.

Internship supervision

- Claire Daignan (2023) **Spectral analysis of weighted shift operators**, *ENSTA Paris*, Palaiseau, FR, M1 student advised with Patrick Joly for 10 weeks.
 - Spectral properties of weighted shift operators, acting on scalar-valued and periodic functions of several real variables, depending on the properties of the shift.

Collective responsibilities

- 2024–Pres. **Co-organiser of the Waves Working Group**, with Xuenan Li and Michael Weinstein, New York, US
 - Weekly seminars featuring speakers from the field of wave theory.
- 2022-2023 **Co-organiser of the POEMS team seminar**, with Maryna Kachanovska, Palaiseau, FR
 - Bi-weekly seminars featuring speakers from the field of wave theory.
- 2021-2022 **Buddy program**, *Fondation Mathématique Jacques Hadamard*, Orsay, FR.
 - Mentoring of two foreign MSc. students from Université Paris-Saclay.

Spoken and written languages

- French Native
- Ewe Native
- English Professional Proficiency

TOEIC score 990/990 in 2019

Programming languages and platforms

- Computing Matlab, C/C++, XLIFF++
- Notions MPI with C/C++, Pascal, Python, html