

# 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

- 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

- 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).

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## 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.

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## Teaching and supervision

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### Lecturing

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

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### 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.

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### 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.

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## 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.

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## Spoken and written languages

French Native

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English Professional Proficiency

TOEIC score 990/990 in 2019

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## Programming languages and platforms

Computing Matlab, C/C++, XLiFE++

Notions MPI with C/C++, Pascal, Python, html