



# Benjamin Vial

Postdoctoral Research Assistant | Wave Physics and Metamaterials

## Contact

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## Information

date of birth  
09/11/1984  
French citizenship

## Languages

French mother tongue  
English fluent  
Spanish basic

## Programming

operating systems  
Linux, Windows  
languages and scripts  
Python, Matlab,  
Mathematica, L<sup>A</sup>T<sub>E</sub>X, C,  
C++, Q#, HTML, CSS  
applications  
git, Comsol  
Multiphysics, Fenics,  
Gmsh, GetDP, Gimp,  
LibreOffice, Labview

## Interests

professional  
Optics  
Photonics  
Metamaterials  
wave physics  
light-matter interaction  
homogenization  
methods  
computational EM  
numerical modelling  
optimization  
techniques  
inverse design  
finite element method  
Fourier modal method  
modal analysis  
machine learning  
Transformation Optics  
invisibility cloaking  
fabrication  
characterization  
open source science  
personal  
playing the guitar  
listening to music  
football, snowboard,  
hiking

## Education

Apr. 2013	PhD in Physics Marseille, France Optics, Photonics and image processing	Institut Fresnel, CNRS, Centrale Marseille, Aix Marseille Université,
Oct. 2009	Master's degree in Physics d'Acoustique, CNRS, Marseille, France Mechanics, Physics and Engineering, specialization in Acoustics	Centrale Marseille / Laboratoire de Mécanique et
Oct. 2009	Master's degree in Engineering High level scientific and technical training	Centrale Marseille, Marseille, France

## Research activities

Aug. 2022	Postdoctoral Research Assistant	Imperial College London, London, UK
Now	Projet METAVEH: energy harvesting with elastic metamaterials. Developing and optimizing models of discrete mechanical lattices and resonators on thin plates.	
Jan. 2019	Postdoctoral Research Assistant	Queen Mary, University of London, London, UK
Jul. 2022	ANIMATE project: nonlinear coupling model, homogenization of ferroelectric metamaterials, inverse design for tunability enhancement, microwave and THz material characterization.	
Jan. 2017	Postdoctoral Research Assistant	Queen Mary, University of London, London, UK
Dec. 2018	AOTOMAT project : Optimization tools and machine learning for the design of electromagnetic devices and materials.	
Jul. 2014	Postdoctoral Research Assistant	Queen Mary, University of London, London, UK
Dec. 2016	QUEST project Transformation Optics applied to the design, fabrication and characterization of novel electromagnetic devices using metamaterials. Development of simulation tools and optimization techniques.	
Nov. 2013	Postdoctoral Research Assistant	Institut Fresnel, Marseille, France
Jan. 2014	Numerical study of the coupling of light to subwavelength resonant optical antennas and control of the local density of states.	
May 2013	Postdoctoral Research Assistant	Institut Fresnel, Marseille, France
Oct. 2013	Development of simulation tools for ray tracing in complex media, inverse problem of finding index distribution to make light follow a prescribed path, deshomogenization technique with graded index photonic crystals.	
Oct. 2009	PhD in Physics	Institut Fresnel – Silios Technologies, Marseille, France
Apr. 2013	Study of open electromagnetic resonators by modal approach. Application to infrared multispectral filtering. (joint academia/industry funding) FEM modelling of metamaterials, spectral analysis quasi-normal mode expansion. Application to the design of infrared filters for multispectral imaging devices. Fabrication and characterization of reflexion bandcut and transmission bandpass filters.	

## Awards and honours

- Best PhD thesis 2014 award from the Doctoral School 352, Physics and Condensed Matter Science  
Best PhD thesis 2014 award from CNano PACA, finalized research category

## Teaching/supervising experience

feb. 2023 -	PhD co-supervision	Imperial College London, London, UK.
sept. 2023	Visiting student from Politecnico di Milano. Isospectral open cavities and curvilinear homogenization.	
jul. 2023 -	Summer project supervision	Imperial College London, London, UK.
sept. 2023	Applied mathematics undergrad student, 3 months. Optimizing dispersion in discrete phononic lattices.	
sept. 2018 - apr. 2022	PhD co-supervision Work with 2 PhD students. Data-driven optimisation of metasurfaces.	Queen Mary University of London, London, UK.
nov. 2019 - apr. 2020	Teaching Assistant Quantum Programming. Lectures and tutorials on quantum physics, gates and circuits. Coding laboratory and projects in Q# and Python. Preparation and correction of exams. (10 Master students, 6 months)	Queen Mary University of London, London, UK.
nov. 2018 - apr. 2019	Co-supervision undergraduate project Multidisciplinary project, 4 students. Detecting emotions with physiological and microwaves measurements.	Queen Mary University of London, London, UK.
may-june 2012	Internship tutor Tutor for an internship, 3rd year student of École Centrale Marseille. Optimization of infrared diffractive filters for infrared imaging.	Institut Fresnel, Marseille, France.
jan.-feb. 2011	Project tutor Tutor for final year project, 5 students, 2nd year in École Centrale Marseille. Design of high efficiency solar cells with metamaterials	Institut Fresnel, Marseille, France.

## Administrative experience

nov. 2023	Workshop organization Meeting and workshop on two European projects. Invitations, logistics, catering, technical programme writing.	Imperial College London, London, UK.
2017	Seminars organization Internal seminar of Antennas and Electromagnetics research group	Queen Mary University of London, London, UK.
2017-2018	Grant projects writing Help in writing 2 projects to obtain grants from EPSRC. Both (AOTOMAT et ANIMATE) got accepted.	Queen Mary University of London, London, UK.
Sept. 2018- Jul. 2022	Project management Management of the ANIMATE project: website creation, planning meetings, liaising with academic and industrial partners.	Queen Mary University of London, London, UK.

## Publications