

Camille CARVALHO

Applied Maths Unit, 5200 N. Lake Rd, 95348 Merced CA

carvalho0camille@gmail.com

<http://carvalhocamille.github.io/index.html>

CURRENT POSITION

Visiting Assistant Professor at University of California Merced, CA

07/2016-

Research on boundary integral methods to compute near electromagnetic fields in plasmonic structures (work with A.D. Kim and S. Khatri).

Lecturer for Vector Calculus at University of California Merced.

EDUCATION

Post-doc at CMAP École Polytechnique, team DEFI, France (METAMATH grant)

02/16-06/16

Numerical investigation of interior transmission eigenvalues (work with L. Chesnel and H. Haddar).

PhD in Applied Mathematics at École Nationale de Techniques Avancées (ENSTA), France

2012-2015

Title : Mathematical and numerical study of plasmonic structures with corners.

Laboratory: Unité de Mathématiques Appliquées (UMA) of ENSTA, team POems, Palaiseau, France.

PhD advisors: A.-S. Bonnet-Ben Dhia, P. Ciarlet Jr.

Master Degree of Applied Mathematics at Université Pierre et Marie Curie (UMPC), France

2011-2012

Partial Differential Equations and Numerical Analysis. Master with honors.

Engineer School ENSTA ParisTech, France

2009-2012

Engineer diploma with mathematical engineering education.

HONORS AND AWARDS

DGA (Direction Générale de l'Armement) Ph.D fellowship, France

2012-2015

ENSTA ParisTech Ph.D fellowship, ENSTA, France

2012-2015

TEACHING EXPERIENCE

Lecturer at University of California Merced

07/2016-

Vector Calculus (second year) for Fall 2016.

Teaching Assignments at ENSTA

02/16-06/16

Quadratic optimization (10h).

Teaching Assignments at ENSTA

2012-2015

Quadratic optimization (3x15h), Stability and control of dynamic systems (2x15h), Complex analysis (3x15h), (occasionally Finite Elements Method (4h) and Discretization of PDE's (4h)), Tutoring activity for students with difficulties in applied mathematics.

SKILLS

Languages

French: mother tongue

English: fluent

Spanish: basic

Japanese: good knowledge

Computer skills

Windows, Linux, Mac OS

Programming: C, C++, FORTRAN, Git, Matlab, Maple, FreeFem++, LaTeX

Infographics: Inkscape, Adobe Photoshop

RESEARCH ACTIVITIES

Research interests

Partial Differential Equations, Waves propagation, Electromagnetism, Scattering, Metamaterials and Plasmonics, Modelling, Numerical Analysis, Simulation and Scientific Computing, Finite Elements Method, Spectral theory, waveguides, PMLs, Kondratiev theory, Singularities, Boundary integral methods, Asymptotics

PUBLICATIONS

Journal Publications

- [1] A.-S. Bonnet-Ben Dhia, C. Carvalho, L. Chesnel, P. Ciarlet Jr., «Plasmonic cavity modes: black-hole phenomena captured by Perfectly Matched Layers», PROCEEDING of PIERS 2013 in Stockholm, p. 638-642, **2013**.
- [2] A.-S. Bonnet-Ben Dhia, C. Carvalho, L. Chesnel, P. Ciarlet Jr., «On the use of Perfectly Matched Layers at corners for scattering problems with sign-changing coefficients», Journal of Computational Physics, vol. 322, 224-247, **2016**.
- [3] A.-S. Bonnet-Ben Dhia, C. Carvalho, P. Ciarlet Jr., «Mesh requirements for the finite element approximation of problems with sign-changing coefficients», **submitted**.
- [4] C. Carvalho, L. Chesnel, P. Ciarlet Jr., «Eigenvalue problems with sign-changing coefficient», **in preparation**.
- [5] A.-S. Bonnet-Ben Dhia, C. Carvalho, P. Ciarlet Jr., «T-coercivity for magnetic plasmonic waveguides», **in preparation**.
- [6] C. Carvalho, S. Khatri, A.D. Kim, «Local analysis for close evaluation for layer potentials», **in progress**.

Refereed conference proceedings

- [7] A.-S. Bonnet-Ben Dhia, C. Carvalho, L. Chesnel, P. Ciarlet Jr., X. Claeys, S.A. Nazarov, «Negative materials and corners in electromagnetism», Report No.3/2013 of Mathematisches Forschungsinstitut Oberwolfach" Computational Electromagnetism and Acoustics", Oberwolfach, **2013**.
- [8] A.-S. Bonnet-Ben Dhia, C. Carvalho, L. Chesnel, P. Ciarlet Jr., X. Claeys, «Plasmonic cavity modes with sign changing permittivity», WAVES, Tunis, Tunisia, **2013**.
- [9] A.-S. Bonnet-Ben Dhia, C. Carvalho, L. Chesnel, P. Ciarlet Jr., «Plasmonic cavity modes: black-hole phenomena captured by Perfectly Matched Layers», PIERS, Stockholm, Sweden, **2013**.
- [10] A.-S. Bonnet-Ben Dhia, C. Carvalho, P. Ciarlet Jr., «Plasmonic waveguides: T-coercivity approach for Maxwell's equations», WAVES, Karlsruhe, Germany, **2015**.
- [11] A.-S. Bonnet-Ben Dhia, C. Carvalho, C. Chambeyron, L. Chesnel, P. Ciarlet Jr., A. Nicolet, F. Zolla, «Curious energy losses at corners of metallic inclusions», WAVES, Karlsruhe, Germany, **2015**.

Other publications

- [12] C. Carvalho, «Etude mathématique et numérique de structures plasmoniques avec coins», Ph.D dissertation, Ecole Polytechnique, **2015**.

COMMUNICATIONS

International conferences

- «Plasmonic waveguides: T-coercivity approach for Maxwell's equations», WAVES, Karlsruhe, **2015**.
- «Leaky modes in a closed plasmonic waveguide», Leaky Days, Palaiseau, France, **2015**.
- «Leaky modes in a non dissipative plasmonic waveguide with a bounded cross section», OWTNM, Nice, France, **2014**.
- «Revealing guides modes in a plasmonic waveguide using Perfectly Matched Layers at the corners», KOZ-Waves, Newcastle, Australia, **2014**.
- «Plasmonic cavity modes: black-hole phenomena captured by Perfectly Matched Layers», PIERS, Stockholm, Sweden, **2013**.
- «Plasmonic cavity modes with sign changing permittivity», WAVES, Tunis, Tunisia, **2013**.

Invited talks

- «Mathematical and numerical study of plasmonic structures with corners», UC Merced, CA, **2016**.
- «Mesh requirements for transmission problems with sign-changing coefficients», University of Reims, **2015**.
- «Leaky modes in a closed plasmonic waveguide», Leaky Days, Palaiseau, France, **2015**.
- «Fredholm theory and T-coercivity», ENSTA, Palaiseau, **2014**.

MENTORING OF STUDENTS

Mentor for first-year students at ENSTA

2012-2015

Approximately 15 students each year.

SERVICES/ACTIVITIES

Volunteer for W-STEM at University of California of Merced

2016-

Organizer of the social events for the Applied Maths Unit of ENSTA

2012-2015

Volunteer for the Applied Maths Unit of ENSTA at the Science festival

2013-2014

President of the “Arts en Scène” association

2009-2010

Organization of the ParisTech artistic festival (over 600 participants).