Camille CARVALHO

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

ccarvalho3@ucmerced.edu

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

FUTURE AND CURRENT POSITION

Assistant Professor at University of California Merced, CA   07/18-
Visiting Assistant Professor at University of California Merced, CA   07/16-06/18

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   07/16-
Vector Calculus (second year), Numerical Analysis for Engineers (third year).

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, Modeling, 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] C. Carvalho, L. Chesnel, P. Ciarlet Jr., «Eigenvalue problems with sign-changing coefficients», Comptes Rendus Mathématiques, **(to appear) 2017.**

[4] A.-S. Bonnet-Ben Dhia, C. Carvalho, P. Ciarlet Jr.,«Mesh requirements for the finite element approximation of problems with sign-changing coefficients», **in revision**.

[5] C. Carvalho, S. Khatri, A.D. Kim, «Local analysis for close evaluation for layer potentials», **submitted**.

[6] C. Carvalho, «T-coercivity for Maxwell 2.5D problems: application to plasmonic waveguides», **in preparation**.

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., L. Demkowicz, «Numerical approximation of transmission problems with sign changing coefficients»,JSA, Rennes, **2013**.

[9] 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**.

[10] 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, Sueden, **2013**.

[11] A.-S. Bonnet-Ben Dhia, C. Carvalho, P. Ciarlet Jr., «Plasmonic waveguides: T-coercivity approach for Maxwell's equations», WAVES, Karlsruhe, Germany, **2015**.

[12] 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**.

[13] C. Carvalho, S. Khatri, A.D. Kim, «Local analysis of near fields in acoustic scattering», WAVES, Minneapolis, USA, **2017**.

Other publications

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

COMMUNICATIONS

International conferences

• «Mesh requirements for transmission problems with sign-changing coefficients», SIAM PD17, Baltimore, **2017**.
• «Local analysis of near fields in acoustic scattering», WAVES, Minneapolis, **2017**.
• «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, Sueden, **2013**.
- «Plasmonic cavity modes with sign changing permittivity», WAVES, Tunis, Tunisia, **2013**.

Invited talks
- «Multi-scale modeling to compute near-fields in plasmonic structures with corners», UC Merced, CA, **2017**.
- «Mathematical and numerical study of plasmonic structures with corners», Oregon State University, OR, **2017**.
- «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

Internship for a first-year student at UC Merced	06/17-07/17

Co-advising with Shilpa Khatri an student for a summer internship.

Mentor for first-year students at ENSTA	2012-2015

Approximately 15 students each year.

SERVICES/ACTIVITIES

Secretary Officer 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).

FUNDING

NSF Travel Support for Early Career Attendees	2017

Pending funding of 643$ to attend the SIAM Conference on Analysis of PDEs in Baltimore.

AWM-NSF Travel Grant	2017

Awarded 1930$ to attend the 13th International WAVES Conference in Minneapolis