Camille CARVALHO

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CURRENT POSITION

Visiting Assistant Professor at University of California Merced, CA **08/2016-**

Research on boundary integral methods to compute near electromagnetic fields in plasmonic structures.
Lecturer for Vector calculus at University of California Merced.

EDUCATION

Post-doc at CMAP École Polytechnique, team DEFI, France **02/16-06/16**

Numerical investigation of interior transmission eigenvalues.

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.

Engineer School ENSTA ParisTech, France **2009-2012**

Engineer diploma with mathematical engineering education.

WORKING EXPERIENCE

Lecturer at University of California Merced **08/2016-**

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] C. Carvalho, S. Khatri, A.D. Kim, «Nearly singular integrals: subtraction technique for close evaluation near boundaries », **in preparation**.

Refereed conference proceedings

[6]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**.
[7] 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**.
[8] 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**.
[9] A.-S. Bonnet-Ben Dhia, C. Carvalho, P. Ciarlet Jr., «Plasmonic waveguides: T-coercivity approach for Maxwell's equations», WAVES, Karlsruhe, Germany, **2015**.
[10] 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

[11] C. Carvalho, «Etude mathématique et numérique de structures platoniques 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, Sueden, **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**.
- «Fredholm theory and T-coercivity», ENSTA, Palaiseau, **2014**.