

Fernando Guevara Vasquez

Department of Mathematics, University of Utah, 155 South 1400 East, Salt Lake City, UT 84112-0090.
Office: 801-581-7467, Home: 713-942-7304, E-mail: fguevara@math.utah.edu

WORK AND RESEARCH EXPERIENCE

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|---|--------------------------------|--------------------|
| Aug 2007 - to date | Mathematics Dept., U. of Utah | Salt Lake City, UT |
| Scott Wylie Assistant professor. Classes taught: vector calculus, introductory partial differential equations, graduate level optimization, numerical analysis. | | |
| Aug 2006 - Aug 2007 | Mathematics Dept., Stanford U. | Stanford, CA |
| Postdoctoral research fellowship on imaging with waves. | | |
| Jan 2006 - May 2006 | CAAM Dept., Rice University | Houston, TX |
| Instructor for introductory level partial differential equations class. | | |
| May 2005 - Aug 2005 | Schlumberger-Doll Research | Cambridge, MA |
| Research internship. | | |
| Aug 2002 - Dec 2002 | CAAM Dept., Rice University | Houston, TX |
| Teaching assistant for an undergraduate level linear algebra class. | | |
| Aug 2000 - July 2001 | CERFACS | Toulouse, France |
| Full time developer for the MPI based PALM data assimilation library. | | |
| Sep 1999 - July 2000 | CERFACS | Toulouse, France |
| Research internship on domain decomposition for the solution of partial differential equations. | | |

EDUCATION AND QUALIFICATIONS

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| Aug 2001 - July 2006 | CAAM Dept., Rice University | Houston, Texas |
| Ph.D. in Computational and Applied Mathematics.
Thesis subject: Optimal parametrization of ill-posed inverse problems arising from elliptic partial differential equations. MA degree conferred: May 2005. PhD degree conferred: July 2006. | | |
| Sep 1997 - June 2000 | ENSEEIHT | Toulouse, France |
| (National Polytechnic Institute of Engineering in Electrotechnology, Electronics, Computer Science, Hydraulics and Telecommunications)
Engineering degree in Computer Science and Applied Mathematics, with honors. | | |
| Oct 1999 - June 2000 | ENSEEIHT | Toulouse, France |
| Preparatory courses in Systems Programming for research (DEA - Programmation et Systèmes). | | |
| Sep 1995 - June 1997 | CPP | Toulouse, France |
| Cycle Préparatoire Polytechnique: Preparatory classes for Entrance Examination to French National Engineering Schools (Grandes Ecoles). | | |
| June 1995 | French School of San Salvador | San Salvador, El Salvador |
| High School Diploma in Natural Sciences (Baccalauréat S), with honors (mention très bien). | | |

PUBLICATIONS AND OTHER CONTRIBUTIONS

- L. Borcea, F. Guevara Vasquez, G. Papanicolaou, *Imaging edges in random media*, in preparation.
- L. Borcea, V. Druskin, A. V. Mamonov, F. Guevara Vasquez, *Pyramidal resistor networks for electrical impedance tomography with partial boundary measurements*, in preparation.
- F. Guevara Vasquez, G. W. Milton, D. Onofrei, *Analysis of an active exterior cloak for the conductivity problem*, in preparation.
- F. Guevara Vasquez, G. W. Milton, D. Onofrei, *Complete characterization and synthesis of the response function of elastodynamic networks*, submitted to Journal of Elasticity.
- F. Guevara Vasquez, G. W. Milton, D. Onofrei, *Active exterior cloaking for the 2D Laplace and Helmholtz Equations*, Physical Review Letters, 103 (2009), 073901.
- F. Guevara Vasquez, G. W. Milton, D. Onofrei, *Broadband exterior cloaking*, Optics Express, 17 (2009), 14800–14805.
- L. Borcea, F. Guevara Vasquez, G. Papanicolaou, *Edge illumination and imaging of extended reflectors*, SIAM Journal on Imaging Sciences, 1 (2008), no. 1, 75–114.
- L. Borcea, V. Druskin, F. Guevara Vasquez, *Electrical Impedance Tomography with Resistor Networks*, Inverse Problems, 24 (2008), issue 4, 035013.
(on the Inverse Problems Editorial Board Highlights for 2008)
- L. Borcea, V. Druskin, F. Guevara Vasquez, *Inverse Sturm-Liouville problems on spectrally matched grids*, in preparation.
- L. Giraud, F. Guevara Vasquez, R. Tuminaro, *Grid transfer operators for highly variable coefficient problems in two-level non-overlapping domain decomposition methods*, Numerical Linear Algebra with Applications, 10 (2003), no. 5-6, 467–484.
- L.M. Carvalho, L. Giraud, G. Meurant, *Local preconditioners for two-level non-overlapping domain decomposition methods*, Numerical Linear Algebra with Applications, 8 (2001), no.4, 207–227.
(collaborated in performing the numerical experiments)

RESEARCH GRANTS

- NSF DMS-0934664 (09/01/2009 – 08/30/2012)
Title of project: Collaborative Mathematics and Geophysics grant on “Subsurface imaging and uncertainty quantification” (PI. L. Borcea, P. K. Kitanidis and W. Barrash Co-PI’s)

TUTORIALS AND SUMMER COURSES

- **July 2009**, Discrete models for electrical impedance tomography, Inverse Problems Summer Graduate Workshop, MSRI, Berkeley, CA (2 computer lab lectures).

ORGANIZED MINISYMPOSIA

- Topics in imaging with waves.
Minisymposium at the SIAM Conference on Imaging Sciences, San Diego, CA, July 7-9, 2008. L. Borcea and G. Papanicolaou are co-organizers.
- Model reduction based PDE discretization and inversion.
Minisymposium at the SIAM Conference on Analysis of Partial Differential Equations, Mesa, AZ, December 10-12, 2007. V. Druskin and A. Abubakar are co-organizers.

CURRENT RESEARCH TOPICS

- Network based inversion methods for elliptic equations.
- Aquifer imaging.
- Imaging extended reflectors with waves in random media.
- The frequency response of networks of springs and masses.
- Cloaking from acoustic waves.

PRESENTATIONS

- Edge illumination and imaging of extended reflectors
 - July 2008**, SIAM Imaging Sciences 2008 conference, San Diego, CA
 - January 2008**, Waves and Imaging workshop, SAMSI, NC (poster)
 - June 2007**, Applied Inverse Problems 2007, Vancouver, Canada
 - April 2007**, AMS Western Meeting, Tucson, AZ
- Electrical Impedance Tomography with resistor networks
 - Dec 2007**, SIAM PDE 2007 conference, Mesa, AZ.
 - Oct 2007**, Inverse Problems Seminar, Colorado State University, Ft Collins, CO.
 - Sept 2007**, Applied Math Seminar, University of Utah, Salt Lake City, UT.
 - July 2007**, ICIAM 2007, Zürich, Switzerland.
 - Feb 2007**, Schlumberger-Tufts Applied Mathematics Symposium, Cambridge, MA.
 - Jan 2007**, Inverse Problems Symposium honoring Alberto Calderón, Rio de Janeiro, Brazil.
 - Oct 2006**, Applied Mathematics Colloquium, Stanford, CA.
 - July 2006**, SIAM Annual Meeting, Boston, MA.
 - April 2006**, AMS Southeastern Meeting, Cambridge MA.
 - March 2006**, Progress in Electromagnetics Research Symposium (PIERS), Cambridge, MA.
 - Nov 2005**, Schlumberger, Sugarland, TX
- A consistent finite-differences method for an inverse spectral problem
 - July 2006**, SIAM Annual Meeting, Boston, MA.
 - May 2004**, SIAM Imaging Science Conference, Salt Lake City, UT.
 - March 2004**, CAAM Graduate seminar, Houston, TX.

COMPUTER SKILLS

Languages: Good working knowledge and experience in structured (C, Fortran, Matlab, ...) and object oriented (C++, JAVA, ...) programming.

Operating Systems: Advanced knowledge of UNIX systems.

Parallel Computing: Extensive experience with MPI on a variety of supercomputing platforms.

Software: LaTeX, MsOffice, HTML publishing, ...

OUTREACH

- **Nov 2009:** “How to become invisible without a cloak” workshop for high-school students coming to the University of Utah for the “Science Day at the U” event.

OTHER INFORMATION

French/Spanish: bilingual.

Academic activities:

- Organizer of the Applied Mathematics Seminar at the University of Utah (Sep 2007 - to date)
- Referee for different journals: Inverse Problems (IOP publishing), SIAM Journal on Imaging Sciences, BIT Numerical Mathematics, Mathematics of Computation, IEEE Transactions in Medical Imaging, Physiological Measurement.

Non-Academic activities:

- Founding vice-president of the Rice Univ. SIAM student chapter (Aug 2004 - May 2006).

Awards:

- **2004,2005:** Recipient of the Tietze Fellowship at Rice University.
- **2004:** Michael Pearlman award at Rice University, for service to fellow students in information technology.
- **1998,1999:** Best GPA out of 80 students in ENSEEIHT.
- **1995,1996:** Best GPA out of 36 students in CPP Toulouse.
- **1994,1995:** selected twice to represent El Salvador in the Latin American Mathematic Olympiads.

REFERENCES

Prof. Liliana Borcea

Noah G. Harding Professor
CAAM Dept. - Rice University
6100 Main St. - MS 134,
Houston TX 77005-1892
USA
email: borcea@caam.rice.edu
phone: +1-713-348-5723

Prof. Graeme W. Milton

Distinguished Professor
Dept. of Mathematics - U. of Utah
155 S 1400 E RM 233
Salt Lake City, Utah 84112
USA
email: milton@math.utah.edu
phone: +1-801-581-6495

Prof. George Papanicolaou

Robert Grimmet Professor in
Mathematics
Stanford Mathematics Dept.
Stanford, CA 94305
USA
email:
papanicolaou@stanford.edu
phone: +1-650-723-2081

Prof. Danny C. Sorensen

Noah G. Harding Professor
CAAM Dept. - Rice University
6100 Main St. - MS 134,
Houston TX 77005-1892
USA
email: sorensen@caam.rice.edu
phone: +1-713-348-5193

Prof. William W. Symes

Noah G. Harding Professor
CAAM Dept. - Rice University
6100 Main St. - MS 134,
Houston TX 77005-1892
USA
email: symes@caam.rice.edu
phone: +1-713-348-5997

Prof. Luc Giraud

Professor
ENSEEIH
2, rue Charles Camichel, BP 7122
F31071 Toulouse Cedex 7
France
email: giraud@enseeiht.fr
phone: +33.5.61.58.80.45