

Fernando Guevara Vasquez

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WORK AND RESEARCH EXPERIENCE

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| July 2010 - to date | Mathematics Dept., U. of Utah | Salt Lake City, UT |
| Assistant Professor of Mathematics. | | |
| Aug 2010 - Dec 2010 | Math. Sciences Research Institute | Berkeley, CA |
| Postdoctoral fellow in the Inverse Problems and Applications program. | | |
| Aug 2007 - June 2010 | Mathematics Dept., U. of Utah | Salt Lake City, UT |
| Scott Wylie Assistant professor. Classes taught: vector calculus, introductory partial differential equations, 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

- F. Guevara Vasquez, G. Milton, D. Onofrei, *Exterior cloaking with active sources in two dimensional acoustics*, submitted to Wave Motion. ArXiv: 1009.2038 [math-ph].
- L. Borcea, F. Guevara Vasquez, G. Papanicolaou, *Imaging edges in random media*, in preparation.
- L. Borcea, V. Druskin, A. V. Mamonov, F. Guevara Vasquez, *Uncertainty quantification in resistor network inversion*, in preparation.
- L. Borcea, V. Druskin, A. V. Mamonov, F. Guevara Vasquez, *Pyramidal resistor networks for electrical impedance tomography with partial boundary measurements*, Inverse Problems, 26 105009 (2010). doi:10.1088/0266-5611/26/10/105009.
- 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*, accepted in Journal of Elasticity. doi:10.1007/s10659-010-9260-y.
- F. Guevara Vasquez, G. W. Milton, D. Onofrei, *Active exterior cloaking for the 2D Laplace and Helmholtz Equations*, Physical Review Letters, 103 (2009), 073901. doi:10.1103/PhysRevLett.103.073901.
- F. Guevara Vasquez, G. W. Milton, D. Onofrei, *Broadband exterior cloaking*, Optics Express, 17 (2009), 14800–14805. doi:10.1364/OE.17.014800.
- J. Wilson, N. Patwari, F. Guevara Vasquez, *Regularization Methods for Radio Tomographic Imaging*, in Proc. of the 2009 Virginia Tech Wireless Symposium, Blacksburg, VA, June 2009. (Conference Paper)
- 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. doi:10.1137/07069290X.
- L. Borcea, V. Druskin, F. Guevara Vasquez, *Electrical Impedance Tomography with Resistor Networks*, Inverse Problems, 24 (2008), issue 4, 035013. doi:10.1088/0266-5611/24/3/035013. (on the Inverse Problems Editorial Board Highlights for 2008)
- 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. doi:10.1002/nla.324.
- 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. doi:10.1002/nla.237. (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

- Metamaterials and Cloaking.
Proposed minisymposium for the SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 23-26 2010. G. W. Milton and D. Onofrei are co-organizers.
- 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 (electrical impedance tomography, aquifer imaging, elasticity, ...).
- Imaging extended reflectors with waves in random media.
- Cloaking and invisibility.

PRESENTATIONS

- Broadband active exterior cloaking
May 2010 SIAM Mathematical aspects of materials science conference, Philadelphia, PA
- Edge illumination and imaging of extended reflectors
Oct 2010 MSRI Postdoc and Graduate student seminar, Berkeley, CA.
Aug 2010 Mathematical and Statistical Methods for Imaging, 2010 NIMS Thematic Program, Incheon, S Korea. (Invited talk)
July 2008, SIAM Imaging Sciences 2008 conference, San Diego, CA
Jan 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 (Invited talk).
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 (Invited talk).
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 (Invited talk)
- 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”. Three 30min workshops for high-school students coming to the University of Utah for the “Science Day at the U” event.
- **April 2010:** “How to become invisible without a cloak”. Talk given as part of an “Insider tour” for University of Utah Emeriti Professors.
- **June 2010:** “Cloaking”. Invited talk at the “Summer Mathematics Program for High School Students” at the University of Utah.

REFEREEING

- Referee for different journals: BIT Numerical Mathematics, IEEE Transactions in Medical Imaging, Inverse Problems (IOP publishing), Journal of Electromagnetic Waves and Applications, Mathematics of Computation, Physical Review A, Physiological Measurement, SIAM Journal on Applied Mathematics, SIAM Journal on Imaging Sciences, Wave Motion.
- Panelist for the National Science Foundation.

OTHER INFORMATION

Academic activities:

- Organizer of the Applied Mathematics Seminar at the University of Utah (Sep 2007 - May 2010).

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.

French/Spanish: bilingual.

REFERENCES

Prof. Liliana Borcea
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