

# Fernando Guevara Vasquez

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## Work and Research Experience

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- **July 2016 – to date**, Mathematics Dept., University of Utah, Salt Lake City, UT.  
Associate Professor of Mathematics.
- **July 2010 – June 2016**, Mathematics Dept., University of Utah, Salt Lake City, UT.  
Assistant Professor of Mathematics.
- **August 2010 – December 2010**, Mathematical Sciences Research Institute, Berkeley, CA.  
Postdoctoral fellow in the Inverse Problems and Applications program.
- **August 2007 – June 2010**, Mathematics Dept., University of Utah, Salt Lake City, UT.  
Scott Wylie Assistant professor.
- **August 2006 – August 2007**, Mathematics Dept., Stanford University, Stanford, CA.  
Postdoctoral research fellowship on imaging with waves.
- **May 2005 – August 2005**, Schlumberger-Doll Research, Cambridge, MA.  
Research internship.
- **August 2000 – July 2001**, CERFACS, Toulouse, France.  
Full time developer for the MPI based PALM data assimilation library.
- **September 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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- **August 2001 – July 2006**, CAAM Dept., Rice University, Houston, TX.  
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.
- **September 1997 – June 2000**, ENSEEIHT (National Polytechnic Institute of Engineering in Electrotechnology, Electronics, Computer Science, Hydraulics and Telecommunications), Toulouse, France.  
Engineering degree in Computer Science and Applied Mathematics, with honors.

## Visiting positions

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- **July 2017 – July 2018**, Laboratoire Jean Kuntzmann, Université de Grenoble Alpes, France.  
Visiting Professor.
- **September 25 – October 13 2017**, ICERM, Brown University, Providence, RI.  
Research Fellow.

## Publications

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- [1] F. Guevara Vasquez and C. Mauck. “Approximation with Herglotz wave functions”. In: (2018). arXiv: 1708.05764 [math.NA]. Accepted in SIAM Journal on Applied Mathematics.
- [2] L. Borcea, F. Guevara Vasquez, and A. V. Mamonov. “A discrete Liouville identity for numerical reconstruction of Schrödinger potentials”. In: *Inverse Probl. Imaging* 11 (4 Aug. 2017). DOI: 10.3934/ipi.2017029. arXiv: 1601.07603 [math.NA].
- [3] M. Cassier and F. Guevara Vasquez. “Imaging polarizable dipoles”. In: *SIAM Journal on Imaging Sciences* 10.3 (2017), pp. 1381–1415. ISSN: 1936-4954. DOI: 10.1137/17M112066X. arXiv: 1703.03544 [math.NA].
- [4] M. Prisbrey, J. Greenhall, F. Guevara Vasquez, and B. Raeymaekers. “Ultrasound directed self-assembly of three-dimensional user-specified patterns of particles in a fluid medium”. In: *Journal of Applied Physics* 121, 014302 (1 2017). DOI: 10.1063/1.4973190.
- [5] P. Bardsley and F. Guevara Vasquez. “Imaging with power controlled source pairs”. In: *SIAM J. Imaging Sci.* 9.1 (2016), pp. 185–211. ISSN: 1936-4954. DOI: 10.1137/15M1023191. arXiv: 1507.00619 [math-ph].
- [6] P. Bardsley and F. Guevara Vasquez. “Kirchhoff migration without phases”. In: *Inverse Problems* 32.10 (2016), p. 105006. DOI: 10.1088/0266-5611/32/10/105006. arXiv: 1601.02667 [math.NA].
- [7] J. Boyer, J. J. Garzella, and F. Guevara Vasquez. “On the solvability of the discrete conductivity and Schrödinger inverse problems”. In: *SIAM J. Applied Math.* 76.3 (2016), pp. 1053–1075. DOI: 10.1137/15M1043479. arXiv: 1510.02848 [math.CO].
- [8] J. Greenhall, F. Guevara Vasquez, and B. Raeymaekers. “Ultrasound directed self-assembly of user-specified patterns of nanoparticles dispersed in a fluid medium”. In: *Applied Physics Letters* 108.10, 103103 (2016). DOI: 10.1063/1.4943634.
- [9] F. Guevara Vasquez and B. Z. Webb. “Pseudospectra of isospectrally reduced matrices”. In: *Numerical Linear Algebra with Applications* 22 (2015), pp. 145–174. DOI: 10.1002/nla.1943. arXiv: 1210.4949 [math.SP].
- [10] S. J. Lee, B. J. McPherson, and F. Guevara Vasquez. “Leakage pathway estimation using iTOUGH2 in a multiphase flow system for geologic CO<sub>2</sub> storage”. In: *Environmental Earth Sciences* (2015), pp. 1–18. ISSN: 1866-6280. DOI: 10.1007/s12665-015-4523-3.
- [11] P. Bardsley and F. Guevara Vasquez. “Restarted inverse Born series for the Schrödinger problem with discrete internal measurements”. In: *Inverse Problems* 30 (2014), p. 045014. DOI: 10.1088/0266-5611/30/4/045014. arXiv: 1309.7384.
- [12] A. Gondolo and F. Guevara Vasquez. “Characterization and Synthesis of Rayleigh Damped Elastodynamic Networks”. In: *Networks and Heterogeneous Media* 9.2 (2014), pp. 299–314. DOI: 10.3934/nhm.2014.9.299. arXiv: 1305.4961.
- [13] J. Greenhall, F. Guevara Vasquez, and B. Raeymaekers. “Dynamic behavior of microscale particles controlled by standing bulk acoustic waves”. In: *Applied Physics Letters* 105.14, 144105 (2014). DOI: 10.1063/1.4898012.

- [14] L. Borcea, F. Guevara Vasquez, and A. V. Mamonov. “Study of noise effects in electrical impedance tomography with resistor networks”. In: *Inverse Probl. Imaging* 7.2 (2013), pp. 417–443. ISSN: 1930-8337. DOI: 10.3934/ipi.2013.7.417. arXiv: 1105.1183 [math-ph].
- [15] J. Greenhall, F. Guevara Vasquez, and B. Raeymaekers. “Continuous and unconstrained manipulation of micro-particles using phase-control of bulk acoustic waves”. In: *Applied Physics Letters* 103.7, 074103 (2013). DOI: 10.1063/1.4819031.
- [16] G. A. M. Hunter, F. Guevara Vasquez, and J. P. Keener. “A mathematical model and quantitative comparison of the small RNA circuit in the *Vibrio harveyi* and *Vibrio cholerae* quorum sensing systems”. In: *Physical Biology* 10.4 (2013), p. 046007. DOI: 10.1088/1478-3975/10/4/046007.
- [17] F. Guevara Vasquez, G. W. Milton, and D. Onofrei. “Mathematical analysis of the two dimensional active exterior cloaking in the quasistatic regime”. English. In: *Analysis and Mathematical Physics* 2.3 (2012), pp. 231–246. ISSN: 1664-2368. DOI: 10.1007/s13324-012-0031-8. arXiv: 1109.3526 [math-ph].
- [18] F. Guevara Vasquez, G. W. Milton, and D. Onofrei. “Complete characterization and synthesis of the response function of elastodynamic networks”. In: *J. Elasticity* 102.1 (2011), pp. 31–54. ISSN: 0374-3535. DOI: 10.1007/s10659-010-9260-y. arXiv: 0911.1501 [math-ph].
- [19] F. Guevara Vasquez, G. W. Milton, and D. Onofrei. “Exterior cloaking with active sources in two dimensional acoustics”. In: *Wave Motion* 48.6 (2011). Special Issue on Cloaking of Wave Motion, pp. 515–524. ISSN: 0165-2125. DOI: 10.1016/j.wavemoti.2011.03.005. arXiv: 1009.2038 [math-ph].
- [20] L. Borcea, V. Druskin, A. V. Mamonov, and F. Guevara Vasquez. “Pyramidal resistor networks for electrical impedance tomography with partial boundary measurements”. In: *Inverse Problems* 26.10 (2010), pp. 105009, 36. ISSN: 0266-5611. DOI: 10.1088/0266-5611/26/10/105009.
- [21] F. Guevara Vasquez, G. W. Milton, and D. Onofrei. “Active exterior cloaking for the 2D Laplace and Helmholtz equations”. In: *Phys. Rev. Lett.* 103 (2009), p. 073901. DOI: 10.1103/PhysRevLett.103.073901. arXiv: 0906.1544.
- [22] F. Guevara Vasquez, G. W. Milton, and D. Onofrei. “Broadband Exterior Cloaking”. In: *Opt. Express* 17 (2009), pp. 14800–14805. DOI: 10.1364/OE.17.014800. arXiv: 0907.0263.
- [23] L. Borcea, V. Druskin, and F. Guevara Vasquez. “Electrical impedance tomography with resistor networks”. In: *Inverse Problems* 24.3 (2008), pp. 035013, 31. ISSN: 0266-5611. DOI: 10.1088/0266-5611/24/3/035013. On the Inverse Problems Editorial Board Highlights for 2008.
- [24] L. Borcea, G. Papanicolaou, and F. Guevara Vasquez. “Edge illumination and imaging of extended reflectors”. In: *SIAM J. Imaging Sci.* 1.1 (2008), pp. 75–114. ISSN: 1936-4954. DOI: 10.1137/07069290X.
- [25] L. Giraud, F. Guevara Vasquez, and R. S. Tuminaro. “Grid transfer operators for highly variable coefficient problems in two-level non-overlapping domain decomposition methods”. In: *Numer. Linear Algebra Appl.* 10.5-6 (2003). Preconditioning, 2001 (Tahoe City, CA), pp. 467–484. ISSN: 1070-5325. DOI: 10.1002/nla.324.

## Current research topics

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- Network based inversion methods for elliptic equations (electrical impedance tomography, aquifer imaging, elasticity, Schrödinger equation, . . .).
- Optics.
- Ultrasound directed self-assembly of microparticles.
- Imaging with waves: interferometric methods and electromagnetic waves.

## Manuscripts in review

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- [1] P. Bardsley, M. Cassier, and F. Guevara Vasquez. “Imaging small polarizable scatterers with polarization data”. In: (2018). arXiv: 1803.11443. Submitted to Inverse Problems.

## Manuscripts in preparation

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- [1] F. Guevara Vasquez, T. G. Draper, J. C.-L. Tse, T. E. Wallengren, and K. Zheng. “Matrix valued network inverse problems with application to inverse problems on elastodynamic networks”. In preparation.

## Book chapters

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- [1] F. Guevara Vasquez, G. W. Milton, D. Onofrei, and P. Seppecher. “Transformation elastodynamics and active exterior cloaking”. In: *Acoustic metamaterials: Negative refraction, imaging, lensing and cloaking*. Ed. by R. V. Craster and S. Guenneau. Springer, 2013. DOI: 10.1007/978-94-007-4813-2\_12. arXiv: 1105.1221 [math-ph].
- [2] L. Borcea, V. Druskin, F. Guevara Vasquez, and A. V. Mamonov. “Resistor network approaches to electrical impedance tomography”. In: *Inside Out II*. Ed. by G. Uhlmann. Vol. 60. MSRI Publications, 2012. arXiv: 1107.0343 [math-ph].

## Other contributions

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- [1] J. Wilson, N. Patwari, and F. Guevara Vasquez. “Regularization methods for radio tomographic imaging”. In: *2009 Virginia Tech Symposium on Wireless Personal Communications*. 2009. Conference paper.
- [2] L. M. Carvalho, L. Giraud, and G. Meurant. “Local preconditioners for two-level non-overlapping domain decomposition methods”. In: *Numer. Linear Algebra Appl.* 8.4 (2001), pp. 207–227. ISSN: 1070-5325. DOI: 10.1002/nla.237. Collaborated in performing the numerical experiments.

## Presentations since Jan 1 2013

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1. *Imaging with Stokes parameters*, Inverse Problems in the Alps II, Mar 21 2018, Obergurgl, Austria. (Invited talk)
2. *Standing acoustic wave manipulation of particles in a fluid*, Institut Fresnel, Jan 12 2018, Marseille, France. (Invited talk)
3. *Imaging with Stokes parameters*, Problèmes inverses Plasmoniques – Opérateur de Neumann-Poincaré, LJK/Institut Fourier, Nov 29 2017, Grenoble, France. (Invited talk)
4. *Imaging with Stokes parameters*, Recent Advances in Seismic Modeling and Inversion: From Analysis to Applications, ICERM, Nov 9 2017, Providence, RI. (Invited talk)
5. *Standing acoustic manipulation of particles in a fluid*, Waves and imaging in random media Workshop, ICERM, Sep 29 2017, Providence, RI. (Invited talk)
6. *Kirchhoff imaging of small sources and scatterers in electromagnetics*, Applied Inverse Problems Conference, Jun 1 2017, Hangzhou, China.
7. *Kirchhoff imaging of small sources and scatterers in electromagnetics*, Workshop on Computational Inverse Problems for Partial Differential Equations, May 18 2017, Oberwolfach, Germany.

8. *Wave manipulation of small particles*, Applied Math seminar, Stanford University, Feb 22 2017, Stanford, CA. (Invited talk)
9. *Wave manipulation of small particles*, ICES Numerical Analysis Seminar, UT Austin, Feb 3 2017, Austin, TX. (Invited talk)
10. *Kirchhoff imaging without phases*, Joint Math Meeting, Jan 4 2017, Atlanta, GA.
11. *Discrete conductivity and Schrödinger inverse problems*, Scientific Computing Seminar, Oct 11 2016, University of Houston, Houston, TX. (Invited talk)
12. *Discrete conductivity and Schrödinger inverse problems*, SIAM Annual meeting, Jul 13 2016, Boston, MA.
13. *Discrete conductivity and Schrödinger inverse problems*, AIMS conference on Dynamical Systems, Differential Equations and Applications, Jul 5 2016, Orlando, FL.
14. *Discrete conductivity and Schrödinger inverse problems*, SIAM Conference on Imaging Science, May 24 2016, Albuquerque, NM.
15. *Discrete conductivity and Schrödinger inverse problems*, SIAM Conference on Mathematical Aspects of Materials Science, May 11 2016, Philadelphia, PA.
16. *Discrete conductivity and Schrödinger inverse problems*, Applied Math Seminar, Oct 9 2015, University of Utah, Salt Lake City, UT.
17. *Active directional cloaking*, AMS Western Section Spring meeting, Apr 18 2015, Las Vegas, NV.
18. *A network based inversion method for the Schrödinger equation*, Discrete Inverse Problems Workshop, Mar 18 2015, University of Michigan, Ann Arbor, MI.
19. *Network based inversion*, Mathematics Department Colloquium, Sep 9 2014, Brigham Young University, Provo, UT. (Invited talk)
20. *A network based inversion method for the Schrödinger equation*, Continuous Models and Discrete Systems 13, Jul 24 2014, University of Utah, Salt Lake City, UT.
21. *Inverse Born series for an inverse Schrödinger problem with sparse measurements*, International Conference on Novel Directions in Inverse Scattering, in honor of David Colton 70th Birthday, Jul 30 2013, University of Delaware, Newark, DE.
22. *Inverse Born series for an inverse Schrödinger problem with sparse measurements*, Applied Analysis for the Material Sciences in honor Michael Vogelius 60th Birthday, May 27 2013, CIRM, Marseille, France.
23. *Active exterior cloaking*, Mathematics & Statistics / Physics seminar, May 5 2013, Grinnell College, Grinnell, IA. (Invited talk)

## Organized Minisymposia and Workshops

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1. Recent Developments in Computational Inverse Problems and Imaging.  
SIAM minisymposium at the Joint Math Meeting, Atlanta, GA, January 4–7 2017.  
Co-organizers: Alexander V. Mamonov, Kui Ren.

2. Model Reduction Approaches in Wavefield Simulations and Imaging. Parts I–II.  
Minisymposium at the SIAM Annual Meeting, Boston, MA, July 11–15, 2016.  
Co-organizers: Alexander V. Mamonov, Rob Remis, Mikhail Zaslavsky.
3. Inverse Problems in Materials Science.  
Minisymposium at the SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 8–12, 2016  
Co-organizers: Maxence Cassier and Andrew E. Thaler.
4. Hybrid methods in imaging.  
Workshop at the Banff International Research Station (Canada). Jun 14–19, 2015.  
Co-organizers: Guillaume Bal, Peter Kuchment, Leonid Kunyansky and Gunther Uhlmann.
5. Cloaking and Metamaterials.  
Special Session for the AMS Western Section Spring meeting, Las Vegas, NV, Apr 18-19, 2015.  
Co-organizer: Jichun Li.
6. Inverse Problems and Homogenization.  
Special Session for the AMS Western Section Fall meeting, Salt Lake City, UT, Oct 22–23 2011.  
Co-organizer: Elena Cherkaev.
7. Model reduction and applications to inverse problems.  
Minisymposium at the Applied Inverse Problems Conference, College Station, TX, May 23–27 2011.  
Co-organizers: Liliana Borcea and Alexander V. Mamonov.
8. Wave propagation and imaging in heterogeneous media.  
Minisymposium at the Applied Inverse Problems Conference, College Station, TX, May 23–27 2011.  
Co-organizer: Liliana Borcea.
9. Metamaterials and Cloaking.  
Minisymposium at the SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 23–26 2010.  
Co-organizers: Graeme W. Milton and Daniel Onofrei.
10. Topics in imaging with waves.  
Minisymposium at the SIAM Conference on Imaging Sciences, San Diego, CA, Jul 7–9, 2008.  
Co-organizers: Liliana Borcea and George Papanicolaou.
11. Model reduction based PDE discretization and inversion.  
Minisymposium at the SIAM Conference on Analysis of Partial Differential Equations, Mesa, AZ, Dec 10–12, 2007.  
Co-organizers: Vladimir Druskin and Aria Abubakar.

## **Workshops attended (no talk given)**

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1. Mathematical and Numerical Modeling in Optics. December 12-16 2016.  
IMA, Minneapolis, Minnesota.
2. Applied Analysis for the Material Sciences. May 27-31 2013.  
CIRM, Luminy, France.

3. Computational inverse problems. October 21-26 2012.  
Mathematisches Forschungsinstitut Oberwolfach, Germany.

## Funded research grants

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1. ARO 69462-MS (24mo \$265k + 12mo \$128k option, 08/10/2016-08/10/2018)  
Synthesis of multi-functional materials with tailored properties using scalable ultrasound directed self-assembly and additive manufacturing. (Co-PI. PI: B. Raeymaekers)
2. NSF DMS-1411577 (\$181k, 08/15/2014 – 07/31/2017)  
Title of project: “Inverse Problems: Discrete meets Continuum”. (PI)
3. NSF DMS-0934664 (\$99k, 09/01/2009 – 08/30/2012; extended to 08/30/2013)  
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)

## Submitted research proposals

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1. NSF CMMI (not funded; proposal submitted January 2017)  
DMREF: An integrated, multi-scale approach to designing, fabricating, and characterizing engineered materials. (Co-PI. PI: B. Raeymaekers. Co-PI: M. Francoeur)
2. DARPA-16-58-EXTREME-FP-005 (not funded; proposal submitted October 2016)  
Co-PI. PI: R. Menon (ECE, U. of Utah). Other Co-PI: Henry Smith (EECS, MIT). Industrial partners: Lumos Imaging and Simpetus.  
“Multi-functional computational camera enabled by a metamaterial filter”. Co-PI. PI: R. Menon (ECE, U. of Utah). Other Co-PI: Henry Smith (EECS, MIT). Industrial partners: Lumos Imaging and Simpetus.
3. Simons Foundation, Simons Fellow. (not funded; proposal submitted September 2016)  
“Inverse Problems”
4. NSF CMMI (not funded; proposal submitted January 2016)  
DMREF: An integrated, multi-scale approach to designing, fabricating, and characterizing engineered materials. (Co-PI. PI: B. Raeymaekers. Co-PI: M. Francoeur)
5. NSF DMS (not funded; proposal submitted Jul 2011)  
EMSW21-MCTP: Facilitating the transition to interdisciplinary graduate study: A collaborative approach to biological, medical and multiscale sciences.  
(Co-PI. PI: F. Adler. Co-PI's: C. Hohenegger, A. Borisyuk and A. Fogelson)

## Entrepreneurial Experience

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- Lumos Imaging Inc. A company building a diffraction-based computational optics camera for hyperspectral imaging. <http://www.lumosimaging.com>  
May 2016 - to date. Co-founder.

## Refereeing

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- Referee for 23 different journals: Applied Numerical Mathematics, BIT Numerical Mathematics, Communications in Mathematical Sciences, IEEE Transactions in Computational Imaging, IEEE Transactions in Medical Imaging, Inverse Problems (IOP publishing), Journal of Electromagnetic Waves and Applications, Journal of Integral Equations and Applications, Journal of Mathematical Analysis and Applications, Journal of Optics, Journal of Physics Communications, Mathematics of Computation, Physical Review A, Physical Review E, Physical Review Letters, Physiological Measurement, Quarterly Journal of Mechanics and Applied Mathematics, Scientific Reports, SIAM Journal on Applied Mathematics, SIAM Journal on Multiscale Modeling and Simulation, SIAM Journal on Imaging Sciences, SIAM Journal on Scientific Computing, Wave Motion.
- On the WAVES 2017 Scientific Committee. (13th International Conference on Mathematical and Numerical Aspects of Wave Propagation, University of Minnesota, Twin Cities campus, May 15-19 2017).
- Panelist for the National Science Foundation (3 times).

## Academic service

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- AMS Short course subcommittee (2014 – 2017). Chair (February 2016 – January 2017).
- Undergraduate Council College of Science representative (elected), University of Utah. (June 2016 – to date)
- Director of Undergraduate Studies at the Mathematics Department, University of Utah. Duties: REU coordinator, Honors Student Advisor, Undergrad Curriculum Committee organizer. Achievements: Overhaul of Honors Mathematics program. Redesign of REU website to index REUs by student, mentor or semester. (July 2012 – June 2015)
- Served in the University of Utah Teaching Committee. (Spring 2012)
- Organizer of the Mathematics Department Undergraduate Colloquium at the University of Utah. (Spring 2011 – Spring 2013)
- Organizer of the Applied Mathematics Seminar at the University of Utah. (Fall 2007 – Spring 2010, Fall 2011 – Spring 2013)



## Postdoctoral Mentoring

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1. Maxence Cassier, *Imaging polarizable dipoles and exploiting polarization for imaging with electromagnetic waves*.  
Mentored: Fall 2014 – Spring 2017.  
Current position: Institut Fresnel, Marseille, France.

## Graduate Mentoring

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1. China Mauck (PhD student). Research topic: Manipulation of small particles in a fluid subject to standing acoustic wave.  
Mentored: Fall 2016 – present.
2. Patrick Bardsley (PhD), thesis title: *Intensity-only imaging with waves, restarted inverse Born series and the analysis of coarsening in polycrystalline materials*.  
Mentored: Spring 2011 – Summer 2016.  
Committee members: E. Cherkaev, Y. Epshteyn (co-mentor), A. V. Mamonov, G. W. Milton.  
Oral Exam: Apr 17 2015. Defense date: Apr 15 2016. Current position: Cirrus Logic.
3. Justin Boyer (Master student), *Solvability of discrete inverse conductivity and Schrödinger problems*.  
Summer research project.  
Mentored: Summer 2015.

## Undergraduate Mentoring

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1. Jack J. Garzella. *The inverse problem for elastic networks*.  
Mentored: Summer 2017.
2. J. Tse, K. Zheng. *Applications of matrix valued inverse problems on graphs*.  
Mentored: Spring 2017.
3. T. Draper, C. Kusmierczyk, J. Tse, T. Wallengren, K. Zheng. *Discrete Inverse Problems*.  
Introduction to research class. Funded by NSF DMS-1411577.  
Mentored: Spring 2016.
4. Jack J. Garzella, *Solvability of discrete inverse conductivity and Schrödinger problems..*  
Research experience for high school student.  
Mentored: Summer 2015.
5. Michael Primrose, *Imaging with waves*.  
REU.  
Mentored: Spring 2014 – Fall 2014.
6. Wenyi Wang, *Uncertainty quantification of acoustic wave propagation in plate material*.  
REU mentored jointly with Dongbin Xiu, Mathematics, and Thomas Henderson, School of Computing.  
Mentored: Spring 2014 – Fall 2014.

7. Joyce Naftzger, *Imaging in sparse systems with intensity measurements: a semidefinite programming problem.*  
Special Projects class.  
Mentored: Fall 2013.
8. Alessandro Gondolo, *Characterization and synthesis of elastodynamic networks with damping.*  
REU.  
Mentored: Fall 2012 – Spring 2013.
9. Kirk T. Smith, *Rational function interpolation.*  
Special Projects class.  
Mentored: Spring 2012.
10. Michael Bentley, *Active exterior cloaking for the Maxwell equations.*  
REU.  
Mentored: Summer 2011 – Spring 2012.
11. Alan Cannaday, *A Study of Numerical Methods for the Inverse Laplace Transform.*  
REU.  
Mentored: Fall 2009.

## PhD thesis committee service

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1. Jason Albright, *Numerical Methods based on Difference Potentials for Models with Material Interfaces.*  
Advisor: Yekaterina Epshteyn, Mathematics, University of Utah.  
Defense date: September 15 2016.
2. Sam Carroll, *Neural fields.*  
Advisor: Paul Bresloff, Mathematics, University of Utah.  
Defense expected: Spring 2018.
3. Sheila Edalatpour, *Thermal discrete dipole approximation for near field thermal radiation.*  
Advisor: Mathieu Francoeur, Mechanical Engineering, University of Utah.  
Defense date: May 13 2016.
4. John Greenhall, *Precise manipulation and self-assembly of micro- and nano-particles through control of acoustic radiation force.*  
Advisor: Bart Raeymaekers, Mechanical Engineering, University of Utah.  
Defense date: July 25 2017.
5. Barghav Karamched, *Delayed feedback model of axonal length sensing.*  
Advisor: Paul Bresloff, Mathematics, University of Utah.  
Defense date: February 27 2017.
6. Seong Jun Lee, *Detection of leakage pathways along abandoned wells in porous media using inverse analysis.*  
Advisor: Brian J. McPherson, Civil and Environmental Engineering, University of Utah.  
Defense date: Oct 29 2013.
7. Glen Mackey, *Heavy elements in soil carbonates: Applications of traditional and new analytical methods to determining the composition of soil carbonates in the Boulder Mountain region, Utah.*  
Advisor: Diego Fernandez, Geology and Geophysics, University of Utah.  
Defense expected: Spring 2018.

8. Chris Remien, *Biological Markers: Blurred in time and space*.  
Advisor: Fred Adler, Mathematics, University of Utah.  
Defense date: Aug 15 2012.
9. Lawrence Schlitt, *Title TBA*.  
Advisor: Priyank Kalla, Electrical and Computer Engineering, University of Utah.  
Defense expected: TBA.
10. Andrew Thaler, *Bounds on the volume of an inclusion in a body and cloaking due to anomalous localized resonance*.  
Advisor: Graeme Milton, Mathematics Department, University of Utah.  
Defense date: May 19 2014.

## Master thesis committee service

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1. Patrick Bardsley, *Generating Cramér-Von-Mises statistics from eigenvalue summations*, Master of Statistics.  
Advisor: Lajos Horváth, Mathematics, University of Utah.  
Defense date: Dec 11 2015.
2. Nate Barnes, *Bookwonk: recommendation algorithms for Goodreads data*, Master in Statistics.  
Advisor: Davar Khoshnevisan, Mathematics, University of Utah.  
Defense date: Aug 2 2012.
3. Stephen Lucich, *Greenhouse gas emissions associated with a building's control schedule, and methods to reduce these emissions*, Master in Mechanical Engineering.  
Advisor: Amanda D. Smith, Mechanical Engineering, University of Utah.  
Defense date: Feb 24 2015.

## Teaching

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- **Fall 2007 – to date**, Mathematics Dept., University of Utah, Salt Lake City, UT  
Classes taught: calculus, vector calculus, introductory partial differential equations, optimization, introductory numerical analysis, introductory functional analysis (graduate level), introductory financial mathematics.
- **Spring 2006**, CAAM Dept., Rice University, Houston, TX  
Instructor for introductory level partial differential equations class.
- **Fall 2002**, CAAM Dept., Rice University, Houston, TX  
Teaching assistant for an undergraduate level linear algebra class.

## Tutorials and Summer courses

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

## Outreach

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- **Apr 2015:** Talk on “Inverse Problems” at the “What is Math?” event for high school students organized by the University of Utah chapter of the Association for Women in Mathematics.
- **Dec 2014:** Talk on “Inverse Problems” at the “Science at Breakfast” public educational event organized by the College of Science, University of Utah.
- **Jul 2013, 2014:** One week out of a Summer long bridge program for Minority, Women and Refugee Students (REFUGES), College of Science, University of Utah. Subjects: Imaging with waves (2013) and Cryptography (2014)
- **Jun 2011–2014:** One week out of a Summer long bridge course for Women in Science and Mathematics, College of Science, University of Utah (ACCESS). Subject: Cryptography
- **Mar 2012:** Talk on “How to Make Objects Invisible” at the “Science Night Live”, a public educational event organized by the College of Science, University of Utah.
- **Jan 2012:** Introductory talk on “The Fast Fourier Transform” at the Undergraduate Colloquium of the Mathematics Department, University of Utah.
- **Jan 2011, Aug 2011 and Sep 2012:** Talk on “How to make objects invisible” at the Undergraduate Colloquium of the Mathematics Department, University of Utah.
- **Jun 2010 and 2011:** “Cloaking”. Invited talk at the “Summer Mathematics Program for High School Students” at the University of Utah.
- **Apr 2010:** “How to become invisible without a cloak”. Talk given as part of an “Insider tour” for University of Utah Emeriti Professors.
- **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.

## Awards

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- **2014:** Faculty Undergraduate Teaching Award, Mathematics Dept., University of Utah
- **2010:** Travel award for attending SIAM Conference on Mathematical Aspects of Materials Science 2010 in Philadelphia, PA
- **2007:** Travel award for attending ICIAM 2007 in Zurich, Switzerland
- **2004, 2005:** Recipient of the Tietze Fellowship at Rice University
- **2004:** Michael Pearlman award from CAAM Department, Rice University, for service to fellow students in information technology.

## Other Information

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### Non-Academic activities:

- Faculty Advisor for the University of Utah SIAM student chapter (chapter created Jun 2014)
- Founding vice-president of the Rice University SIAM student chapter (Aug 2004 - May 2006).

**French/Spanish:** bilingual.

## Computer Skills

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**Languages:** Good working knowledge and experience in structured (C, Fortran, Matlab, Julia, . . .) and object oriented (C++, Java, Python, . . .) 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, . . .

## References

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Available upon request.