# Fernando Guevara Vasquez

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## Work and Research Experience

- **July 2023 – to date**, Mathematics Dept., University of Utah, Salt Lake City, UT.

  Professor of Mathematics.

- **July 2016 – July 2023**, 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

- **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

- **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.

## Current research topics

- Active cloaking and mimicking for the wave, heat equations and related phenomena.

- Network based inversion methods for elliptic equations (electrical impedance tomography, aquifer imaging, elasticity, Schrödinger equation, . . .).

- Optics, hyperspectral imaging.

- Manipulation of small particles using acoustic fields.

- Imaging with waves: interferometric methods and electromagnetic waves.

## Manuscripts in review

[1] E. Cherkaev, F. Guevara Vasquez, and C. Mauck. "Design and control of quasiperiodic patterns of particles with standing acoustic waves" (2024). arXiv: 2409.12905 [math.AP]. Submitted to SIAM Journal on Applied Mathematics.

[2] M. Corbett, F. Guevara Vasquez, A. Royzman, and G. Yang. "Discrete inverse problems with internal functionals" (2024). arXiv: 2407.13955 [math.AP]. Submitted to Inverse Problems.

## Manuscripts in preparation

[1] T. DeGiovanni and F. Guevara Vasquez. "Cloaking for random walks using a discrete potential theory" (2024). arXiv: 2405.07961 [math.NA]. In preparation.

[2] F. Guevara Vasquez and J. Schwendimann. "A lens apodization maximizing information transfer" (2024). In preparation.

[3] A. Majumder, M. Meem, F. González del Cueto, F. Guevara Vasquez, S. N. Qadri, F. Santiago, and R. Menon. "HD snapshot diffractive spectral imaging and inferencing" (2024). arXiv: 2406.17302 [math.NA]. In preparation.

## Publications

[1] T. DeGiovanni, F. Guevara Vasquez, and C. Mauck. "Imaging with thermal noise induced currents". *SIAM Journal on Imaging Sciences* 17.2 (May 2024), pp. 984–1006. DOI: 10.1137/23M1571630. arXiv: 2305.05069 [math.NA].

[2] S. Noparast, F. Guevara Vasquez, M. Francoeur, and B. Raeymaekers. "Calculating the acoustic radiation force on spherical particles in a standing ultrasound wavefield considering single and multiple scattering". *Applied Physics Letters* 124.19 (May 2024), p. 192204. ISSN: 0003-6951. DOI: 10.1063/5.0207695.

[3]  S. Noparast, F. Guevara Vasquez, and B. Raeymaekers. "Measuring and simulating the transient packing density during ultrasound directed self-assembly and vat polymerization manufacturing of engineered materials". *Advanced Materials Technologies* n/a.n/a (Apr. 2024), p. 2301950. DOI: 10.1002/admt.20230 1950.

[4]  C. T. Presley, F. Guevara Vasquez, and B. Raeymaekers. "Multi-frequency ultrasound directed self-assembly". *Advanced Functional Materials* n/a.n/a (Apr. 2024), p. 2400193. DOI: 10.1002/adfm.202400193.

[5]  S. Noparast, F. Guevara Vasquez, M. Francoeur, and B. Raeymaekers. "Measuring and simulating the local packing density resulting from ultrasound directed self-assembly of spherical microparticles into specific patterns". *Phys. Rev. Appl.* 19 (6 June 2023), p. 064087. DOI: 10.1103/PhysRevApplied.19.064 087.

[6]  M. Cassier, T. DeGiovanni, S. Guenneau, and F. Guevara Vasquez. "Active exterior cloaking for the 2D Helmholtz equation with complex wavenumbers and application to thermal cloaking". *Philosophical Transactions of the Royal Society A* 380.2237 (2022), p. 20220073. DOI: 10.1098/rsta.2022.0073. arXiv: 2203.02075 [math.AP].

[7]  S. Noparast, F. Guevara Vasquez, and B. Raeymaekers. "The effect of medium viscosity and particle volume fraction on ultrasound directed self-assembly of spherical microparticles". *Journal of Applied Physics* 131.13 (2022), p. 134901. DOI: 10.1063/5.0087303. Editor's Pick.

[8]  M. Cassier, T. DeGiovanni, S. Guenneau, and F. Guevara Vasquez. "Active Thermal Cloaking and Mimicking". *Proceedings of the Royal Society A* 477.2249 (2021), p. 20200941. DOI: 10.1098/rspa.2020.0941. arXiv: 2011.13069 [math.AP].

[9]  E. Cherkaev, F. Guevara Vasquez, C. Mauck, M. Prisbrey, and B. Raeymaekers. "Wave-driven assembly of quasiperiodic patterns of particles". *Physical Review Letters* 126 (14 Apr. 2021), p. 145501. DOI: 10.1103 /PhysRevLett.126.145501. arXiv: 2011.12383 [math-ph].

[10]  T. G. Draper, F. Guevara Vasquez, J. C.-L. Tse, T. E. Wallengren, and K. Zheng. "Matrix valued network inverse problems on graphs with application to mass-spring-damper systems". *Networks and Heterogeneous Media* 15 (1 2020), pp. 1–28. ISSN: 1556-1801. DOI: 10.3934/nhm.2020001. arXiv: 1806.07046 [math.CO].

[11]  M. Prisbrey, F. Guevara Vasquez, and B. Raeymaekers. "Arranging Ellipsoidal Particles in Three-Dimensional User-Specified Orientations with Ultrasound-Directed Self-Assembly". *Physical Review Applied* 14 (2 Aug. 2020), p. 024026. DOI: 10.1103/PhysRevApplied.14.024026.

[12]  M. Prisbrey, F. Guevara Vasquez, and B. Raeymaekers. "3D ultrasound directed self-assembly of high aspect ratio particles: On the relationship between the number of transducers and their spatial arrangement". *Applied Physics Letters* 117 (Sept. 2020), p. 111904. DOI: 10.1063/5.0025367.

[13]  S. Banerji, M. Meem, A. Majumder, F. Guevara Vasquez, B. Sensale-Rodriguez, and R. Menon. "Imaging with flat optics: metalenses or diffractive lenses?" *Optica* 6.6 (2019), pp. 805–810. DOI: 10.1364/OPTIC A.6.000805.

[14]  S. Banerji, M. Meem, A. Majumder, F. Guevara Vasquez, B. Sensale-Rodriguez, and R. Menon. "Ultra-thin near infrared camera enabled by a flat multi-level diffractive lens". *Optics Letters* 44.22 (Nov. 2019), pp. 5450–5452. DOI: 10.1364/OL.44.005450.

[15]  F. Guevara Vasquez and C. Mauck. "Periodic particle arrangements with standing acoustic waves". *Proceedings of the Royal Society A* 475.2232 (2019), p. 20190574. DOI: 10.1098/rspa.2019.0574. arXiv: 1908.08664 [math.NA].

[16]  M. Meem, S. Banerji, A. Majumder, F. Guevara Vasquez, B. Sensale-Rodriguez, and R. Menon. "Broadband lightweight flat lenses for longwave-infrared imaging". *Proceedings of the National Academy of Sciences* 116.43 (2019), pp. 21375–21378. ISSN: 0027-8424. DOI: 10.1073/pnas.1908447116. arXiv: 1904.0901 1 [physics.optics].

[17]  P. Bardsley, M. Cassier, and F. Guevara Vasquez. "Imaging small polarizable scatterers with polarization data". *Inverse Problems* 34.10 (2018), p. 104002. DOI: 10.1088/1361-6420/aad342. arXiv: 1803.11443 [math.NA].

[18]  F. Guevara Vasquez and C. Mauck. "Approximation with Herglotz wave functions". *SIAM Journal on Applied Mathematics* 78 (3 2018), pp. 1283–1299. DOI: 10.1137/17M1144234. arXiv: 1708.05764 [math.NA].

[19]  L. Borcea, F. Guevara Vasquez, and A. V. Mamonov. "A discrete Liouville identity for numerical reconstruction of Schrödinger potentials". *Inverse Problems and imaging* 11 (4 2017), pp. 623–641. DOI: 10.3934/ipi.2017029. arXiv: 1601.07603 [math.NA].

[20]  M. Cassier and F. Guevara Vasquez. "Imaging polarizable dipoles". *SIAM Journal on Imaging Sciences* 10.3 (2017), pp. 1381–1415. ISSN: 1936-4954. DOI: 10.1137/17M112066X. arXiv: 1703.03544 [math.NA].

[21]  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". *Journal of Applied Physics* 121, 014302 (1 2017). DOI: 10.1063/1.4973190.

[22]  P. Bardsley and F. Guevara Vasquez. "Imaging with power controlled source pairs". *SIAM Journal on Imaging Sciences* 9.1 (2016), pp. 185–211. ISSN: 1936-4954. DOI: 10.1137/15M1023191. arXiv: 1507.00619 [math-ph].

[23]  P. Bardsley and F. Guevara Vasquez. "Kirchhoff migration without phases". *Inverse Problems* 32.10 (2016), p. 105006. DOI: 10.1088/0266-5611/32/10/105006. arXiv: 1601.02667 [math.NA].

[24]  J. Boyer, J. J. Garzella, and F. Guevara Vasquez. "On the solvability of the discrete conductivity and Schrödinger inverse problems". *SIAM Journal on Applied Mathematics* 76.3 (2016), pp. 1053–1075. DOI: 10.1137/15M1043479. arXiv: 1510.02848 [math.CO].

[25]  J. Greenhall, F. Guevara Vasquez, and B. Raeymaekers. "Ultrasound directed self-assembly of user-specified patterns of nanoparticles dispersed in a fluid medium". *Applied Physics Letters* 108.10, 103103 (2016). DOI: 10.1063/1.4943634.

[26]  F. Guevara Vasquez and B. Z. Webb. "Pseudospectra of isospectrally reduced matrices". *Numerical Linear Algebra with Applications* 22 (2015), pp. 145–174. DOI: 10.1002/nla.1943. arXiv: 1210.4949 [math.SP].

[27]  S. J. Lee, B. J. McPherson, and F. Guevara Vasquez. "Leakage pathway estimation using iTOUGH2 in a multiphase flow system for geologic $CO_2$ storage". *Environmental Earth Sciences* (2015), pp. 1–18. ISSN: 1866-6280. DOI: 10.1007/s12665-015-4523-3.

[28]  P. Bardsley and F. Guevara Vasquez. "Restarted inverse Born series for the Schrödinger problem with discrete internal measurements". *Inverse Problems* 30 (2014), p. 045014. DOI: 10.1088/0266-5611/30/4/045014. arXiv: 1309.7384.

[29]  A. Gondolo and F. Guevara Vasquez. "Characterization and Synthesis of Rayleigh Damped Elastodynamic Networks". *Networks and Heterogeneous Media* 9.2 (2014), pp. 299–314. DOI: 10.3934/nhm.2014.9.299. arXiv: 1305.4961 [math-ph].

[30]  J. Greenhall, F. Guevara Vasquez, and B. Raeymaekers. "Dynamic behavior of microscale particles controlled by standing bulk acoustic waves". *Applied Physics Letters* 105.14, 144105 (2014). DOI: 10.1063/1.4898012.

[31]  L. Borcea, F. Guevara Vasquez, and A. V. Mamonov. "Study of noise effects in electrical impedance tomography with resistor networks". *Inverse Problems and Imaging* 7.2 (2013), pp. 417–443. ISSN: 1930-8337. DOI: 10.3934/ipi.2013.7.417. arXiv: 1105.1183 [math-ph].

[32]  J. Greenhall, F. Guevara Vasquez, and B. Raeymaekers. "Continuous and unconstrained manipulation of micro-particles using phase-control of bulk acoustic waves". *Applied Physics Letters* 103.7, 074103 (2013). DOI: 10.1063/1.4819031.

[33] 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". *Physical Biology* 10.4 (2013), p. 046007. DOI: 10.1088/1478-3975/10/4/046007.

[34] F. Guevara Vasquez, G. W. Milton, and D. Onofrei. "Mathematical analysis of the two dimensional active exterior cloaking in the quasistatic regime". English. *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].

[35] F. Guevara Vasquez, G. W. Milton, and D. Onofrei. "Complete characterization and synthesis of the response function of elastodynamic networks". *Journal of Elasticity* 102.1 (2011), pp. 31–54. ISSN: 0374-3535. DOI: 10.1007/s10659-010-9260-y. arXiv: 0911.1501 [math-ph].

[36] F. Guevara Vasquez, G. W. Milton, and D. Onofrei. "Exterior cloaking with active sources in two dimensional acoustics". *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].

[37] L. Borcea, V. Druskin, A. V. Mamonov, and F. Guevara Vasquez. "Pyramidal resistor networks for electrical impedance tomography with partial boundary measurements". *Inverse Problems* 26.10 (2010), pp. 105009, 36. ISSN: 0266-5611. DOI: 10.1088/0266-5611/26/10/105009.

[38] F. Guevara Vasquez, G. W. Milton, and D. Onofrei. "Active exterior cloaking for the 2D Laplace and Helmholtz equations". *Phys. Rev. Lett.* 103 (2009), p. 073901. DOI: 10.1103/PhysRevLett.103.073901. arXiv: 0906.1544 [math-ph].

[39] F. Guevara Vasquez, G. W. Milton, and D. Onofrei. "Broadband Exterior Cloaking". *Optics Express* 17 (2009), pp. 14800–14805. DOI: 10.1364/OE.17.014800. arXiv: 0907.0263 [math-ph].

[40] L. Borcea, V. Druskin, and F. Guevara Vasquez. "Electrical impedance tomography with resistor networks". *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.

[41] L. Borcea, G. Papanicolaou, and F. Guevara Vasquez. "Edge illumination and imaging of extended reflectors". *SIAM Journal on Imaging Sciences* 1.1 (2008), pp. 75–114. ISSN: 1936-4954. DOI: 10.1137/07069290X.

[42] 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". *Numer. Linear Algebra Appl.* 10.5-6 (2003). Preconditioning, 2001 (Tahoe City, CA), pp. 467–484. ISSN: 1070-5325. DOI: 10.1002/nla.324.

## Book chapters

[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]. URL: http://library.msri.org/books/Book60/files/20borcea.pdf.

## Code

[1] M. Corbett, F. Guevara Vasquez, A. Royzman, and G. Yang. *Code to generate figures in "Discrete inverse problems with internal functionals".* https://github.com/fguevaravas/dhp_code. 2024.

[2] T. DeGiovanni and F. Guevara Vasquez. *Code to generate figures in "Cloaking for random walks using a discrete potential theory".* https://github.com/fguevaravas/crwdpt. 2024.

[3]  M. Cassier, T. DeGiovanni, S. Guenneau, and F. Guevara Vasquez. *Code accompanying the paper "Active exterior cloaking for the 2D Helmholtz equation with complex wavenumbers and application to thermal cloaking"*. `https://github.com/fguevaravas/code_AEC`. 2022.

[4]  M. Cassier, T. DeGiovanni, S. Guenneau, and F. Guevara Vasquez. *Code accompanying the paper "Active Thermal Cloaking and Mimicking"*. `https://github.com/fguevaravas/atc`. 2021.

[5]  F. Guevara Vasquez and C. Mauck. *Code accompanying the paper "Periodic particle arrangements using standing acoustic waves"*. `https://github.com/fguevaravas/crystals`. 2019.

[6]  J. Boyer, J. J. Garzella, and F. Guevara Vasquez. *Code accompanying the paper "On the solvability of the discrete conductivity and Schrödinger inverse problems"*. `https://www.math.utah.edu/~fguevara/recov/`. 2015.

## Other contributions

[1]  M. Cassier and F. Guevara Vasquez. "Imaging small scatterers with electromagnetic waves". *Computational Inverse Problems for Partial Differential Equations, Workshop ID: 1720* (Oberwolfach, Germany). URL: `https://publications.mfo.de/handle/mfo/3588`. Oberwolfach Workshop Report.

[2]  M. Cassier and F. Guevara Vasquez. "Imaging polarizable dipoles". *WAVES 2017* (Minneapolis, Minnesota). 2017. URL: `http://www.cce.umn.edu/documents/CPE-Conferences/WAVES2017BookofAbstracts.pdf`. Conference paper.

[3]  J. Wilson, N. Patwari, and F. Guevara Vasquez. "Regularization methods for radio tomographic imaging". *2009 Virginia Tech Symposium on Wireless Personal Communications*. 2009. Conference paper.

[4]  L. M. Carvalho, L. Giraud, and G. Meurant. "Local preconditioners for two-level non-overlapping domain decomposition methods". *Numerical Linear Algebra with Applications* 8.4 (2001), pp. 207–227. ISSN: 1070-5325. DOI: `10.1002/nla.237`. Collaborated in performing the numerical experiments.

## Press

- September 21 2021: Our work on thermal cloaking was featured in a communication for the INSIS (Institute for Engineering and Systems Sciences, a division of the CNRS, which is the French analogue of the NSF).

- June 3 2021: Our work on thermal cloaking appeared in the NSF Research News.

- May 10 2021: Our work on thermal cloaking was the object of a University of Utah press release "How to thermally cloak an object".

- April 14 2021: Our work on quasiperiodic particle arrangements using ultrasound was the object of a University of Utah press release "Using sound waves to make patterns that never repeat".

- October 8 2019: Our work on "Broadband lightweight flat lenses for long-wave infrared imaging" was the subject of a University of Utah press release "Thin to Win".

- March 25 2011: Our work on active exterior cloaking was the subject of a University of Utah press release: "A New Cloaking Method".

## Presentations since Jan 1 2014

1. *A spectral approach to lens design*, SIAM Conference on Imaging Science, May 29 2024, Atlanta, GA.

2. *A spectral approach to lens design*, SIAM Conference on Materials Science, May 20 2024, Pittsburgh, PA.

3. *Conductivity imaging using thermal noise*, The 13th AIMS conference on Dynamical Systems, Differential Equations and Applications, May 31 2023, University of North Carolina at Wilmington, Wilmington, NC.

4. *Finding the Conductivity on a Graph from Internal Power Measurements*, SIAM CSE, Mar 1 2023, Amsterdam, Netherlands.

5. *Invisibility, Cloaking and Mimicking*, Applied Analysis Seminar, Feb 9 2023, Brigham Young University, Provo, UT. (Invited talk)

6. *Discrete hybrid inverse problems with internal functionals*, Workshop on New Ideas in Computational Inverse Problems, Oct 25 2022, BIRS, Banff, Canada.

7. *A discrete hybrid inverse problem*, AMS Fall Western Sectional meeting, Oct 22 2022, University of Utah, Salt Lake City, UT.

8. *Invisibility, Cloaking and Mimicking*, SIAM Wasatch Student Chapters Conference, Sep 10 2022, Salt Lake City, UT. (Invited talk)

9. *Active Exterior Cloaking for the Heat Equation*, ETOPIM: 12th International Conference on Elastic, Electrical, Transport, and Optical Properties of Inhomogeneous Media, Jul 4 2022, Besançon, France.

10. *Quasiperiodic arrangement of particles using standing acoustic waves*, Arctic Quasiperiodic Workshop, Jun 20 2022, Luleå, Sweden.

11. *Active thermal cloaking and mimicking*, Inverse Problems Seminar, Nov 18 2021, University of California at Irvine, Irvine, CA. (Invited online seminar talk)

12. *Ultrasound self-assembly of small particle patterns in a fluid*, Meta Mechanical, Acoustic, Thermal, Jul 13 2021, London, UK. (Invited online seminar talk)

13. *Conductivity imaging using Johnson-Nyquist noise*, SIAM Conference on Computational Science and Engineering 2021, Mar 1 2021, Online. (Workshop talk)

14. *Conductivity imaging using Johnson-Nyquist noise*, Workshop on Herglotz-Nevanlinna Theory applied to passive, causal and active systems, Oct 8 2019, BIRS, Banff, Canada.

15. *Conductivity imaging using Johnson-Nyquist noise*, ICIAM 2019, Jul 19 2019, Valencia, Spain.

16. *Some discrete elasticity inverse problems*, ICIAM 2019, Jul 17 2019, Valencia, Spain.

17. *Conductivity imaging using Johnson-Nyquist noise*, Applied Inverse Problems, Jul 12 2019, Grenoble, France.

18. *Some discrete elasticity inverse problems*, Applied Inverse Problems, Jul 8 2019, Grenoble, France.

19. *Standing acoustic wave manipulation of particles in a fluid*, Applied Math Seminar, Apr 12 2019, Michigan State University, East Lansing, MI. (Invited talk)

20. *Standing acoustic wave manipulation of particles in a fluid*, Localization, Control and Inversion of Waves I, Jul 5 2018, IMAG, Grenoble, France.

21. *Imaging small polarizable scatterers with polarization data*, Waves, Model reduction and Imaging, Jul 3 2018, TU Delft, Delft, Netherlands.

22. *Standing acoustic wave manipulation of particles in a fluid*, Inverse Problems, Control and Shape Optimization (PICOF), Jun 19 2018, American University of Beirut, Beirut, Lebanon.

23. *Standing acoustic wave manipulation of particles in a fluid*, POEMS Seminar, Jun 14 2018, ENSTA, Palaiseau, France. (Invited talk)

24. *Standing acoustic wave manipulation of particles in a fluid*, 9th International Conference "Inverse Problems: Modeling & Simulation", May 22 2018, Malta.

25. *Imaging with Stokes parameters*, Workshop on PDE's: Modelling & Theory, May 9 2018, Monastir, Tunisia. (Invited talk)

26. *Imaging with Stokes parameters*, Inverse Problems in the Alps II, Mar 21 2018, Obergurgl, Austria. (Invited talk)

27. *Standing acoustic wave manipulation of particles in a fluid*, Institut Fresnel, Jan 12 2018, Marseille, France. (Invited talk)

28. *Imaging with Stokes parameters*, Problèmes inverses Plasmoniques – Opérateur de Neumann-Poincaré, LJK/Institut Fourier, Nov 29 2017, Grenoble, France. (Invited talk)

29. *Imaging with Stokes parameters*, Recent Advances in Seismic Modeling and Inversion: From Analysis to Applications, ICERM, Nov 9 2017, Providence, RI. (Invited talk)

30. *Standing acoustic wave manipulation of particles in a fluid*, Waves and imaging in random media Workshop, ICERM, Sep 29 2017, Providence, RI. (Invited talk)

31. *Kirchhoff imaging of small sources and scatterers in electromagnetics*, Applied Inverse Problems Conference, Jun 1 2017, Hangzhou, China.

32. *Kirchhoff imaging of small sources and scatterers in electromagnetics*, Workshop on Computational Inverse Problems for Partial Differential Equations, May 18 2017, Oberwolfach, Germany.

33. *Wave manipulation of small particles*, Applied Math seminar, Stanford University, Feb 22 2017, Stanford, CA. (Invited talk)

34. *Wave manipulation of small particles*, ICES Numerical Analysis Seminar, UT Austin, Feb 3 2017, Austin, TX. (Invited talk)

35. *Kirchhoff imaging without phases*, Joint Math Meeting, Jan 4 2017, Atlanta, GA.

36. *Discrete conductivity and Schrödinger inverse problems*, Scientific Computing Seminar, Oct 11 2016, University of Houston, Houston, TX. (Invited talk)

37. *Discrete conductivity and Schrödinger inverse problems*, SIAM Annual meeting, Jul 13 2016, Boston, MA.

38. *Discrete conductivity and Schrödinger inverse problems*, AIMS conference on Dynamical Systems, Differential Equations and Applications, Jul 5 2016, Orlando, FL.

39. *Discrete conductivity and Schrödinger inverse problems*, SIAM Conference on Imaging Science, May 24 2016, Albuquerque, NM.

40. *Discrete conductivity and Schrödinger inverse problems*, SIAM Conference on Mathematical Aspects of Materials Science, May 11 2016, Philadelphia, PA.

41. *Discrete conductivity and Schrödinger inverse problems*, Applied Math Seminar, Oct 9 2015, University of Utah, Salt Lake City, UT.

42. *Active directional cloaking*, AMS Western Section Spring meeting, Apr 18 2015, Las Vegas, NV.

43. *A network based inversion method for the Schrödinger equation*, Discrete Inverse Problems Workshop, Mar 18 2015, University of Michigan, Ann Arbor, MI.

44. *Network based inversion*, Mathematics Department Colloquium, Sep 9 2014, Brigham Young University, Provo, UT. (Invited talk)

45. *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.

## Organized Minisymposia and Workshops

1. Recent Developments in Inverse Problems for PDEs and Applications.
   Fall Western Sectional Meeting, AMS, University of Utah, Salt Lake City, UT, October 22-23 2022.
   Co-organizers: Loc Nguyen, Dinh-Liem Nguyen.

2. Inverse Problems and Imaging: Theoretical and Computational Aspects.
   9th International Congress on Industrial and Applied Mathematics, Valencia, Spain, July 15–19 2019.
   Co-organizers: Kui Ren, Yang Yang.

3. Recent Developments in Hybrid Inverse Problems and Imaging.
   Applied Inverse Problems 2019, Grenoble, France, July 8–12 2019.
   Co-organizers: Kui Ren, Yang Yang.

4. 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.

5. 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.

6. 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.

7. 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.

8. Cloaking and Metamaterials.
   Special Session for the AMS Western Section Spring meeting, Las Vegas, NV, Apr 18-19, 2015.
   Co-organizer: Jichun Li.

9. 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.

10. 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.

11. 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.

12. 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.

13. 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.

14. 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)

1. Computational Inverse Problems for Partial Differential Equations. Dec 6-12 2020.
   Mathematisches Forschungsinstitut Oberwolfach, Germany.

2. Mathematical and Numerical Modeling in Optics. December 12-16 2016.
   IMA, Minneapolis, Minnesota.

3. Applied Analysis for the Material Sciences. May 27-31 2013.
   CIRM, Luminy, France.

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

## Funded research grants

1. NSF DMS-2136198 ($2,498,692, 07/01/2022 – 06/30/2027)
   "RTG: Optimization and Inversion for the 21st Century Workforce"
   Co-PI. PI: K. Golden. Co-PIs: E. Cherkaev, C. Hohenegger, A. Narayan (Mathematics, U. of Utah)

2. NSF DMS-2008610 ($262,001, 08/01/2020 – 07/31/2023)
   "Fluctuation, Dissipation and Inversion".
   PI.

3. 1U4U (U. of Utah intramural funding, 12mo $30k, February 2020 - February 2021)
   "Hyperspectral Endoscopic Microscopy for Optical Biopsies"
   Co-PI. PI R. Menon (ECE, U. of Utah), C. Reddy (Internal Medicine, U. of Utah).

4. ARO 69462-MS (24mo $265,475 + 12mo $128,761 option, 08/10/2016-08/10/2019)
   "Synthesis of multi-functional materials with tailored properties using scalable ultrasound directed self-assembly and additive manufacturing".
   Co-PI. PI: B. Raeymaekers (Mechanical E., U. of Utah)

5. NSF DMS-1411577 ($181,639, 08/15/2014 – 07/31/2017)
   "Inverse Problems: Discrete meets Continuum".
   PI.

6. NSF DMS-0934664 ($99k, 09/01/2009 – 08/30/2012; extended to 08/30/2013)
   Collaborative Mathematics and Geophysics grant on "Subsurface imaging and uncertainty quantification".
   PI. Other PIs: L. Borcea (CAAM, Rice U), P. K. Kitanidis (Civil and Environmental E., Stanford) and W. Barrash (Geosciences, Boise State)

## Unfunded research proposals

1. Simons Foundation Collaboration Grants for Mathematicians (not funded; proposal submitted 01/30/2020)
   "Fluctuation, Dissipation and Inversion"
   PI.

2. NSF DCNS (not funded; proposal submitted September 2019)
   "SCC-IRG Track 1: Sensing and Modeling a More Comprehensive Range of Greenhouse Gases and their Urban Impacts".
   Co-PI. PI: Glenn Ricart (US Ignite). Other Co-PI: Logan Mitchell (Atmospheric Sciences, U. of Utah), Rajesh Menon (ECE, U. of Utah).

3. 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 (Mechanical E, U. of Utah). Co-PI: M. Francoeur (Mechanical E., U. of Utah)

4. 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.

5. Simons Foundation, Simons Fellow. (not funded; proposal submitted September 2016)
   "Inverse Problems"
   PI.

6. 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 (Mechanical E., U. of Utah). Co-PI: M. Francoeur (Mechanical E., U. of Utah)

7. 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. All PIs in Mathematics, U. of Utah.

## Patents

- "Multi-modal computational imaging via metasurfaces". Inventors: Rajesh Menon, Apratim Majumder and Fernando Guevara Vasquez. U. S. Patent 12,052,518. Published: 07/30/2024.

## Entrepreneurial Experience

- 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 and Chief Science Officer.

  July 25 2022: **SBIR Phase I with NASA** awarded to Lumos ($148,411). The proposal title is "Optical detection of lightning with diffractography". My role here is to design a Diffractive Filter Array that is optimized to detect lightning from space. Proposal number 22-1- S11.04-2107

## Refereeing

- Referee for 36 different journals: ACS Nano, Applied Numerical Mathematics, BIT Numerical Mathematics, Biomedical Physics & Engineering Express, Communications in Mathematical Sciences, Digital Signal Processing, IEEE Transactions in Computational Imaging, IEEE Transactions in Medical Imaging, Inverse Problems (IOP publishing), Journal of Computational Physics, Journal of Electromagnetic Waves and Applications, Journal of Integral Equations and Applications, Journal of Mathematical Analysis and Applications, Journal of Mathematical Physics, Journal of Optics, Journal of Physics Communications, Journal of Scientific Computing, Materials & Design, Mathematics of Computation, Measurement Science and Technology, Optics Express, Proceedings of the Royal Society A, Progress in Electromagnetics Research, 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 Mathematical Analysis, SIAM Journal on Multiscale Modeling and Simulation, SIAM Journal on Imaging Sciences, SIAM Journal on Scientific Computing, SIAM/ASA Journal on Uncertainty Quantification, 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 (5 times).

## Academic service

- Director of Graduate Studies at the Mathematics Department, University of Utah
  (January 2021 – April 2023)

- Mathematics Department faculty representative at the 2020 Society for the Advancement of Chicanos / Hispanics and Native Americans in Science (SACNAS) Diversity in STEM conference, October 19 - 24 2020, (online).

- Mathematics Department faculty representative at the 2019 Society for the Advancement of Chicanos / Hispanics and Native Americans in Science (SACNAS) Diversity in STEM conference, October 31 - November 2 2019, Honolulu, Hawaii.

- College of Science Council (elected), University of Utah.
  (July 2018 – July 2020)

- Executive Committee (elected), Mathematics Department, University of Utah.
  (July 2018 – July 2020; July 2022 – July 2024)

- AMS Short course subcommittee (2014 – 2017). Chair (February 2016 – January 2017).

- Undergraduate Council College of Science representative (elected), University of Utah.
  (June 2016 – June 2017, August 2018 – April 2019)

- 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

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

1. 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.

2. Justin Boyer (Master), *Solvability of discrete inverse conductivity and Schrödinger problems.*
   Summer research project.
   Mentored: Summer 2015.

3. Trent DeGiovanni (PhD), *Active Thermal cloaking.*
   Mentored: Spring 2019 – Spring 2022
   Committee members: M. Cassier, E. Cherkaev, G. W. Milton, A. Narayan
   Oral Exam: 04/12/2021. Defense date: March 30 2023.
   Mathematics Department Outstanding Dissertation award.
   Current position: Postdoc at Dartmouth Mathematics Department.

4. Kristin DeSplinter (Master), *Approximation of boundary layer potentials for the Helmholtz equation with Laplace-Beltrami eigenfunctions.*
   Master project.
   Mentored: Spring 2019 – Spring 2020. Oral: March 30 2020.

5. China Mauck (PhD). *Manipulation of small particles in a fluid subject to standing acoustic waves.*
   Mentored: Fall 2016 – Summer 2021.
   Committee members: E. Cherkaev, G. W. Milton, B. Osting, B. Raeymaekers.
   Oral Exam: Nov 22 2019. Defense date: May 7 2021.
   Mathematics Department Outstanding Dissertation award.
   Current position: STV (an architecture, engineering, and construction management company).

6. Guang Yang (Master), *Two-dimensional gratings.*
   Mentored: Fall 2023 – Spring 2024
   Next position: Ph.D. student at NC state.

## Undergraduate Mentoring

1. Justin Schwendiman. *Optimal lens design.*
   Mentored: Spring 2023 – Spring 2024.

2. Marcus Corbett. *Numerical solution of an inverse problem on graphs from internal data.*
   Mentored: Summer 2021.

3. Alexander Royzman. *Uniqueness for an inverse problem on graphs from internal data.*
   Mentored: Summer 2021.

4. Guang Yang. *Uniqueness for an inverse problem for internal data.*
   Mentored: Summer 2021, Fall 2021, Spring 2022 – Spring 2023.

5. Sean Hurst. *Analytic Fresnel propagation.*
   Mentored: Spring 2021.

6. V. Bajji, B. Bettinson, M. Corbett, A. Hazelbaker, C. LaPrete, K. Metcalf, J. Olsen, A. Royzman, G. Yang, T. Yassmin, C. Zylstra. *Fluctuation, Dissipation and Inversion*
   Introduction to reasearch class. Funded by NSF DMS-2008610.
   Mentored: Spring 2021.

7. Eric Brown. *Reduced-order modeling of Helmholtz equation.*
   Mentored: Summer 2019, Spring 2020.

8. Jack J. Garzella. *The inverse problem for elastic networks.*
   Mentored: Summer 2017 – Summer 2018.

9. J. Tse, K. Zheng. *Applications of matrix valued inverse problems on graphs.*
   Mentored: Spring 2017.

10. 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.

11. Jack J. Garzella, *Solvability of discrete inverse conductivity and Schrödinger problems..*
    Research experience for high school student.
    Mentored: Summer 2015.

12. Michael Primrose, *Imaging with waves.*
    REU.
    Mentored: Spring 2014 – Fall 2014.

13. 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.

14. Joyce Naftzger, *Imaging in sparse systems with intensity measurements: a semidefinite programming problem.*
    Special Projects class.
    Mentored: Fall 2013.

15. Alessandro Gondolo, *Characterization and synthesis of elastodynamic networks with damping.*
    REU.
    Mentored: Fall 2012 – Spring 2013.

16. Kirk T. Smith, *Rational function interpolation.*
    Special Projects class.
    Mentored: Spring 2012.

17. Michael Bentley, *Active exterior cloaking for the Maxwell equations.*
    REU.
    Mentored: Summer 2011 – Spring 2012.

18. Alan Cannaday, *A Study of Numerical Methods for the Inverse Laplace Transform.*
    REU.
    Mentored: Fall 2009.

## PhD thesis committee service

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. Xuesong Bai, *Reconstruction of parameters in steady-state diffusion equations.*
   Advisor: Elena Cherkaev, Mathematics, University of Utah.
   Oral: March 15 2021
   Defense date: April 4 2022.

3. Justin Baker, *Multiscale, geometric and model reduction techniques in AI for Science.*
   Advisors: Elena Cherkaev and Bao Wang, Mathematics, University of Utah.
   Oral: May 2 2022
   Defense date: April 26 2024.

4. Sam Carroll, *Spatiotemporal dynamics of orientation-selective neural populations in the visual cortex.*
   Advisor: Paul Bresloff, Mathematics, University of Utah.
   Defense date: March 6 2018.

5. Sheila Edalatpour, *Thermal discrete dipole approximation for near field thermal radiation.*
   Advisor: Mathieu Francoeur, Mechanical Engineering, University of Utah.
   Defense date: May 13 2016.

6. 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.

7. Abdelfatah Gtet, *Asymptotic analysis of plasmonic resonances of some metallic structures.*
   Advisor: Faouzi Triki, Laboratoire Jean Kuntzmann, Grenoble Alpes University.
   Defense date: December 19 2017. Role: Jury member.

8. Gia-Bao Ha, *Title TBA.*
   Advisor: Benjamin Sanchez-Terrones, Electrical and Computer Engineering, University of Utah.
   Oral date: TBA.
   Defense expected: TBA.

9. Barghav Karamched, *Delayed feedback model of axonal length sensing.*
   Advisor: Paul Bresloff, Mathematics, University of Utah.
   Defense date: February 27 2017.

10. 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.

11. Zexin Liu, *On the computation of recurrence coefficients for orthogonal polynomials with applications.*
    Advisor: Akil Narayan, Mathematics, University of Utah.
    Oral: November 11 2022
    Defense date: April 12 2022.

12. Glen Mackey, *Reconsidering some analytical problems in geochemistry with inverse theory.*
    Advisor: Diego Fernandez, Geology and Geophysics, University of Utah.
    Defense date: April 19 2019.

13. Monjurul Meem, *Multi-level Diffractive Optical Elements for Image Projection and Imaging.*
    Advisor: Rajesh Menon, Electrical and Computer Engineering, University of Utah.
    Oral: Dec 23 2020
    Defense date: May 3rd 2021.

14. Soheyl Noparast, *Experimental and numerical investigation of steady-state and transient ultrasound directed self-assembly of spherical particles in a viscous medium.*
    Advisor: Bart Raeymaekers, Mechanical Engineering, Virginia Tech.

Oral: Oct 23 2023.
Defense: May 3rd 2024.

15. Karl Niendorf, *Combining ultrasound directed self-assembly and additive manufacturing to fabricate composite materials with aligned microfibers.*
Advisor: Bart Raeymaekers, Mechanical Engineering, University of Utah.
Oral: April 15 2020.
Defense date: December 15 2021.

16. Milo Prisbrey, *Organizing user-specified patterns of particles in a fluid using ultrasound directed self-assembly.*
Advisor: Bart Raeymaekers, Mechanical Engineering, University of Utah.
Defense date: May 5 2020.

17. Chris Remien, *Biological Markers: Blurred in time and space.*
Advisor: Fred Adler, Mathematics, University of Utah.
Defense date: Aug 15 2012.

18. Tyler Schuessler, *Modern machine learning for blood pressure prediction and more.*
Advisor: Braxton Osting, Mathematics, University of Utah.
Oral: April 23 2024.
Defense expected: Spring 2026

19. Chee Han Tan, *Variational methods for sloshing dynamics with surface tension.*
Advisors: Christel Hohenegger and Braxton Osting.
Oral: May 1st 2019
Defense date: June 11 2021

20. 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.

21. Shih-Hsin Wang, *Graph neural networks, group equivariant and invariant methods; Arc space and jet schemes.*
Advisors: Tommaso de Fernex and Bao Wang, Mathematics Department, University of Utah.
Oral: April 2nd 2024.
Defense expected: Spring 2026

22. Nathan Willis, *Confinement and non-Newtonian effects for steady streaming flow and the ice fishing problem with surface tension.*
Advisor: Christel Hohenegger, Mathematics Department, University of Utah.
Oral: November 18 2018
Defense date: April 11 2022.

## Master thesis committee service

1. Han Ambrose, *Change point detection with application*, Master of Statistics.
Advisor: Lajos Horváth, Mathematics, University of Utah,
Defense date: Feb 19 2021.

2. 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.

3. Nate Barnes, *Bookwonk: recommendation algorithms for Goodreads data*, Master in Statistics.
   Advisor: Davar Khoshnevisan, Mathematics, University of Utah.
   Defense date: Aug 2 2012.

4. 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.

5. Mehrdad Pournaderi, *Change Detection in the Utah State COVID-19 Data*, Master of Statistics.
   Advisor: Lajos Horváth, Mathematics, University of Utah.
   Defense date: March 30 2022.

6. Christopher Tre Presley, *Multi-frequency ultrasound directed self-assembly*, Master of Science in Mechanical Engineering.
   Advisor: Bart Raeymaekers, Mechanical Engineering, Virginia Tech.
   Defense date: September 14 2023.

## Teaching

- **Fall 2007 – to date**, Mathematics Dept., University of Utah, Salt Lake City, UT

  Classes taught: calculus, vector calculus, differential equations and linear algebra for engineers, partial differential equations for engineers, optimization, introductory numerical analysis, introductory functional analysis (graduate level), introductory financial mathematics, inverse problems.

- **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

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

## Outreach

- **Aug 2021**: Our work on thermal cloaking was featured in the article "Invisibilité en vue!", by G. Gbur in *Pour la Science Hors Série* n° 112/Août-Septembre 2021 (article in French; in English: "Invisibility in sight!"). *Pour la Science* is the French edition of *Scientific American*.

- **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, Jan 2013 and Sept 2019**: 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

- **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

**Non-Academic activities:**

- Faculty Advisor for the University of Utah SIAM student chapter (June 2014 – June 2022)
- Founding vice-president of the Rice University SIAM student chapter (Aug 2004 – May 2006).

**French/Spanish:** bilingual.

## Computer Skills

**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

Available upon request.