

# Daniel Onofrei

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**Visa Status:** Dual citizenship, Romanian and US

**Education:**

- Ph.D. in Mathematical Sciences, Worcester Polytechnic Institute, 2007
  - Thesis: "New Results in the Multi-scale Analysis on Perforated Domains and Applications", advisor Bogdan Vernescu
  
- B.Sc. in Mathematics, University Al. I. Cuza, Iasi, Romania, 2001
  - Thesis: "Periodic solutions for the Caginalp model in phase transitions", advisor Viorel Barbu

**Professional Experience:**

- Professor, Department of Mathematics, University of Houston 2024
- Associate Professor, Department of Mathematics, University of Houston 2017-2024
  
- Joint appointment in Electrical & Computer Engineering Department, University of Houston since 2016
  
- Assistant Professor, Department of Mathematics, University of Houston 2011-2017
- Scott Assistant Professor, Department of Mathematics, University of Utah 2008 - 2011
- Postdoctoral Fellow, Department of Mathematics, Rutgers University 2007 - 2008
- Teaching Assistant, Mathematics, Worcester Polytechnic Institute 2005 - 2007
- Summer Internship, United Technologies Research Center 2002
- Research assistant, Mathematics, Worcester Polytechnic Institute 2002 – 2005
- Teaching Assistant, Stefan Cel Mare University, Suceava, Romania 2001 -2002

### Research Interests:

**Applied analysis and partial differential equations:** Inverse problems in acoustics and electromagnetism, optimization, control of wave phenomena, antenna design and multiscale analysis of metamaterials.

### Current and pending External Research funding:

- Daniel Onofrei co-PI (PI - David Jackson (UH-ECE)), Spectrum Management with Adaptive and Reconfigurable Technology (SMART) Hub – a Department of Defense Spectrum Innovation Center, sponsor **ARL (Army Research Lab)**, total award \$5,000,000 for 2024-2025, my part of award \$85,000, 2024-2025.
- Daniel Onofrei, co-PI (PI- Aaron Becker, UH ECE, co-PI- Julien Leclerc, UH, ECE, co-PI David Jackson – UH, ECE), FA split 25%, UH sub-award, FREEDOM “Cognitive Distributed Sensing in Congested Radio Frequency Environments”, Main Awardee: KRI at Northeastern University, LLC (Main Sponsor **ARL (Army Research Lab)**), \$1,700,000 (My part: \$ 425,000) awarded, March 15, 2023- March 15, 2026.

### Education Enhancement Grants and proposals:

- **External:**

- Daniel Onofrei, key-personnel, (PI: Daniel Hauptvogel, co-PI: Donna Stokes, Donna Pattison) “*Monitoring Development and Engagement of Diverse STEM students at a Large, Public Urban University*”, **NSF**, \$ 1,453,646, 2022-2027.

In charge with managing 8 fellowships for underrepresented students with financial need together with career advancement seminars and group meetings for the awardees.

- **Internal:**

- **DUSEM** (Dean’s Undergraduate Student Engagement Mini-grants), PI, (co-PIs, Andrew Torok and William Ott), UH NSM Dean’s office, \$5,000, 2022-2023.
- **MENTOR** (Undergraduate research enhancement program), PI, (co-PI, Andrew Torok and William Ott), UH Mathematics Department and NSM Dean’s office, \$32,000, 2016-2019.
- Daniel Onofrei PI, (co PI’s: M. Tomforde, W. Ott, Z. Kilpatrick, V. Climenhaga), **Research Experience for Undergraduates Pilot Site**, UH Mathematics Department, June – July, 2014, \$12,000.

### Past Research Grants:

- **External:**

- Daniel Onofrei PI, no co-PI, “*Field control through active submanifold manipulation in CED*”, **Army Research Office (ARO)**, \$455,000, 2017-2020.

- Daniel Onofrei PI, no co-PI's, "*Active inverse source problems in acoustics and applications*", **Office of Naval Research (ONR)**, \$185,000, 2015-2018.
  - Daniel Onofrei PI, (no co-PI's), **YIP early career award, Air Force Office of Sponsored research (AFOSR)**, "*Control of electromagnetic fields*", \$360,000, 2013-2016.
  - Daniel Onofrei PI, (no co-PI's), **Simons foundation collaborative grants**, "*Control of electromagnetic fields*", Sole PI, \$7,000, 2012-2013.
- **Internal:**
    - **UH GEAR and other UH local support**, PI, (co-PI - David Jackson UH ECE), "*Active Electromagnetic Control of Surfaces in the Time and Frequency Domains*", \$50,762, 2016-2017.
    - **4 UH Summer Undergraduate Research Fellowship**, 2012, 2014, 2019, 2020.
    - **4 UH Provost Undergraduate Research Fellowship**, 2013, 2015, 2020, 2021.

#### Research Awards:

- **CNRS Researcher**, University of Rouen, France, September – December, 2018.
- **US STRIDE research professor**, University of Philippines, Los Banos, July 9-July 28, 2017.
- **Visiting Research Professor**, IMA, Annual program on Mathematics and Optics, September – December 2016.
- **Research fellowship**, Fields Institute, Thematic year on Inverse problems, July – August, 2012.
- **Outstanding Postdoc Award**, Mathematics Department, University of Utah, 2011.
- **MSRI research membership**, "Inverse problems and applications" program, October 2010.
- **J. Tinsley Oden faculty research fellowship**, ICES, UT Austin, August 15-September 5, 2010.
- **AMS fellowship**, Mathematics Research Communities' Conference on Inverse Problems, Snowbird, Utah, June 20 - 26, 2009.
- **SIAM Student Travel Award**, for the conference SIAM Conference on Analysis of Partial Differential Equations, Phoenix, Arizona, December, 2007.
- **Research Fellowship**, University Paris VI, Paris, July - August, 2005.
- **SIAM Student Travel Award**, for the conference SIAM Conference on Analysis of Partial Differential Equations, Huston, December, 2004.
- **NSF Research Assistantship**, Worcester Polytechnic Institute, 2004 – 2005.
- **Research Fellowship, University Paris VI**, Paris, June - July, 2004.
- **Research Fellowship, Fields Institute**, PDE thematic year, Toronto, April - May, 2004.
- **Worcester Polytechnic Institute Fellowship**, Department of Mathematics, MA, 2003 – 2004.
- **SIAM Student Travel Award**, for the conference SIAM Math in Industry, Challenges and Frontiers, Toronto, Canada, October, 2003.
- **Sloan Foundation Assistantship**, Mathematical Sciences Department, Worcester Polytechnic Institute, Worcester, MA, 2002 – 2003.

#### Community Awards:

- **Prize for outstanding contribution to Romania's image in the world**, awarded by media outlet Occidentul Romanesc, 25-27 May, 2018, Calpe, Spain.

#### Visiting Positions:

- **Visiting Professor**, Université Joseph Fourier, Laboratoire Jean Kuntzmann, Grenoble, France, May – July, 2018.
- **Visiting Professor**, University of Rouen, Laboratoire Raphael Salem, Rouen, France, June 2016.

## Book Chapters:

- F. Guevara-Vasquez, G. W. Milton, D. Onofrei, P. Seppacher, “*Transformation elastodynamics and active exterior acoustic cloaking*”, chapter for the volume "Acoustic metamaterials: Negative refraction, imaging, lensing and cloaking", Craster and Guenneau ed., Springer, 2011.

## Journal Publications (reprints available at <http://www.math.uh.edu/~onofrei>):

1. Chaoxian Qi, Shubin Zheng, N. Egarguin, Daniel Onofrei, Jiefu Chen, “*Active Control of Electromagnetic Fields in Layered Media*”, Journal of Electromagnetic Waves and Applications, Vol 38, Iss 1, 2024.
2. Lander Besabe, Daniel Onofrei, “*Active control of scalar Helmholtz fields in the presence of known impenetrable obstacles*”, AMS Contemporary Mathematics, Vol 784, Advances in Inverse Problems for Partial Differential Equations, 2023.
3. Chaoxian Qi, Neil Jerome A. Egarguin, Shubin Zeng, Daniel Onofrei, Jiefu Chen, “*Sensitivity analysis for active electromagnetic field manipulation in free space*”, Applied Mathematics in Science and Engineering, Vol 30, iss. 1, 2022.
4. N. Egarguin, L. Guan, D. Onofrei, “*Defect Characterization in a 1D Spring Mass System using the Laplace and Z- transforms*”, Journal of Vibration Engineering & Technologies, vol. 10, pp. 1121-1134, 2022.
5. Vani Vellanki, David R. Jackson, Daniel Onofrei, “*Radar Cross Section Reduction of an Arbitrary Object Using a Resistor-Loaded Patch*”, USRI Radio science letters, vol 3, id. 50, 2021.
6. Chaoxian Qi, Neil Jerome A. Egarguin, Daniel Onofrei, Jiefu Chen “*Feasibility Analysis for the Problem of Active Near Field/Far Field Acoustic Pattern Synthesis in Free Space and Shallow Water Environments*”, Acta Acoustica, Vol5, Iss. 39, 2021.
7. N Egarguin, D. Onofrei, C Qi, J. Chen, “*Active manipulation of Helmholtz scalar fields in an ocean of two homogeneous layers of constant depth*”, Inv. Prob. Science and Engineering, vol.29, Iss. 13, 2021.
8. Patrizia Donato, Editha C. Jose, D. Onofrei, “*On the Approximate Controllability of Parabolic Problems with Non-smooth Coefficients*”, Asymptotic Analysis, vol.122, no. 3-4, pp. 395-402, 2021.
9. Neil Jerome A. Egarguin, D. Onofrei, Chaoxian Qi and Jiefu Chen “*Active manipulation of Helmholtz scalar fields: Near field synthesis with directional far field control*”, Inverse Problems, vol 36, Iss. 9, 2020.
10. Sohini Sengupta, Henry Council, David Jackson, D. Onofrei, “*Active Radar Cross Section Reduction of an Object Using Microstrip Antennas*”, Radio Science, Vol. 55, Iss. 2, March, 2020.
11. Neil Jerome A. Egarguin, Shubin Zeng, D. Onofrei and Jiefu Chen, “*Active Control of Helmholtz Fields in 3D using an Array of Sources*”, Wave Motion, Volume 94, February 2020.
12. D. Onofrei, Eric Platt and Neil Jerome A. Egarguin, “*Active manipulation of exterior electromagnetic fields by using surface sources*”, Quarterly of Appl. Math, January 22, 2020, <https://doi.org/10.1090/qam/1567>
13. D. Onofrei, E. Platt, N. Egarguin, “*Sensitivity analysis for the active control of the Helmholtz equation in 3D*”, Inv. Prob. in Sci. and Eng., vol. 28, Iss. 3, 2020.
14. N. Egarguin, T. Meklachi, D. Onofrei, N. Harari, “*Vibration Suppression and Defect Detection Schemes in 1D Linear Spring-Mass Systems*”, Journal of Vibration Eng. & Tech., vol. 8, pp. 489-503, 2020.

15. G.W. Milton, D. Onofrei, "Exact relations for Green's functions in linear PDE and boundary field equalities: a generalization of conservation laws", *Research in the Mathematical Sciences*, vol. 6, Article number 19, 2019.
16. P. Donato, E. Jose, D. Onofrei, "Asymptotic analysis of a multiscale parabolic problem with a rough fast oscillating interface", *Archive of Applied Mechanics*, vol.89, pp 437-465, 2019.
17. D. Onofrei, E Platt, "On the synthesis of acoustic sources with controllable near fields", *Wave Motion*, 77, pp 12-27, 2017.
18. K.A. Lurie, D. Onofrei, W.C. Sanguinet, S.L. Weekes, V.V. Yakovlev, "Energy Accumulation in a Functionally Graded Spatial-Temporal Chekerboard", *IEEE Antennas and Wireless Propagation Letters*, Vol. 16, Iss1, January, 2017.
19. R. Albanese D. Onofrei, "On the active manipulation of EM fields in open waveguides", *Wave Motion*, Vol. 69, 91–107, 2017.
20. D. Onofrei, A. Thaler, "Anomalous Localized Resonance Phenomena in the Nonmagnetic, Finite-Frequency Regime," *Advances in Mathematical Physics*, vol. 2016, ID 4156072, 28 pages, 2016.
21. M. Hubenthal, D. Onofrei, "Sensitivity analysis for the active control of the Helmholtz equation", *Applied Numerical Mathematics*, vol. 106, pp. 1-23, 2016.
22. T. Meklachi , G. W. Milton, D. Onofrei, A. Thaler, G. Funchess, "Sensitivity of anomalous localized resonance phenomena with respect to dissipation", online since 2015, *Quart. Appl. Math.* 74, 201-234, 2016.
23. D.Onofrei, "Active manipulation of fields modeled by the Helmholtz equation", *Journal of Integral Equations and Applications*, Vol. 26, Iss. 4, 2014.
24. L.P.Liu, D. Onofrei, "Engineering anisotropy to amplify a long wavelength field without a limit", *Proc. R. Soc. A*, vol. 469, 2013.
25. D. Onofrei, "On the active manipulation of fields and applications. The quasistatic case", *Inverse Problems*, vol. 28, Is. 10, 2012.
26. D. Onofrei, B. Vernescu, "Asymptotic analysis of second-order boundary layer correctors", *Applicable Analysis*, Vol. 91, Iss. 6, 2012.
27. F. Guevara-Vasquez, G.W. Milton, D. Onofrei, "Mathematical analysis of the active exterior cloak for 2D quasistatic electromagnetics", *Analysis and Mathematical Physics*, Vol. 2, Is. 3, 2012.
28. F. Guevara-Vasquez, G.W. Milton, D. Onofrei, "Exterior cloaking with active sources in two dimensional acoustics", *Wave Motion* Vol. 48, Iss. 6, pp. 515-524, 2011.
29. F. Guevara-Vasquez, G.W. Milton, D. Onofrei, "Complete characterization and synthesis of the response function of elastodynamic networks", *Journal of Elasticity*, Vol. 102, Is. 1, 31-54, 2011.
30. R. V. Kohn, D. Onofrei, M. Vogelius, M. Weinstein, "Cloaking via change of variables for Helmholtz equation in the case of fixed frequency", *CPAM*, Vol. 63, Is. 8, 973 – 1016, 2010.
31. K. Lurie, D. Onofrei, S. Weekes, "Mathematical analysis of the energy concentration phenomena in waves travelling through a rectangular material structure in space - time", *J. Math. Anal. Appl.*, Vol. 355, Is. 1, 180-194, 2009.
32. F. Guevara-Vasquez, G.W. Milton, D. Onofrei, "Broadband exterior cloaking", *Optics Express*, Vol. 17, Is. 17, 14800-14805, 2009.
33. F. Guevara-Vasquez, G. W. Milton, D. Onofrei, "Active exterior cloaking", *Phys. Rev. Lett.*, 103, 073901, 2009.
34. D. Cioranescu, A. Damlamian, G. Griso, D. Onofrei, "The Periodic Unfolding Method for elliptic problems with variable coefficients and variable domains", *Jour. Math. Pures et Appl.*, 89, 248-277, 2008.
35. D. Onofrei, B. Vernescu, "Error estimates for periodic homogenization with non-smooth coefficients", *Asymptotic Analysis*, 54, 103-123, 2007.
36. D. Onofrei, "The Unfolding operator near a hyperplane and its application to the Neumann sieve model", *Adv. in Math. Sciences and Appl.*, Vol. 16, Is. 1, 239-258, 2006.
37. I.R. Ionescu, D. Onofrei, B.Vernescu, "Gamma-convergence for a fault model with slip weakening friction law and periodic barriers", *Quarterly of Appl. Math.*, vol. LXII, 4, 747-778, 2005.
38. D. Onofrei, B. Vernescu, "Asymptotic analysis of a spectral problem associated with the Neumann sieve", *J. of Anal. and Appl.*, Vol. 1, 69-87, 2005.

39. D. Onofrei, B. Vernescu, "G-convergence results for some spectral problems associated to the Neumann sieve and their applications", GAKUTO Int. Series, Math. Sci. Appl., Vol. 24, 249-260, 2005.

#### Peer Reviewed Conference proceedings:

1. Neil Egarguin, D. Jackson, D. Onofrei, Pratik Deb, "Adaptive Beamforming with a Double-Cross Array of Dipoles on a Drone", IEEE Texas Symposium on Wireless and Microwave Circuits and Systems (WMCS), 2024.
2. Vani Vellanki, David R. Jackson, Daniel Onofrei, Sohini Sengupta, "RCS Reduction for a Monostatic Signal with Arbitrary Polarization Using Microstrip Antennas", National Radio Science Meeting in Boulder, CO, 2022.
3. Chaoxian Qi, Jiefu Chen, Neil Jerome Egarguin, Daniel Onofrei, "Feasibility Analysis for Active Manipulation of Electromagnetic Fields in Free Space", IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (APS/URSI), 2021.
4. Chaoxian Qi, Chenpei Huang, Neil J. A. Egarguin, Daniel Onofrei, Miao Pan, Jiefu Chen. "Enhanced Underwater Acoustic Communication via Active Field Control", Fifteenth International Conference on Underwater Networks and Systems (WUWNet) 2021.
5. Egarguin, Neil Jerome A., Jackson, David R., Onofrei, Daniel, Leclerc Julien and Becker, Aaron. "Beam Focusing by using Scattering from Drones", IEEE Xplore: 2021 IEEE 19th International Symposium on Antenna Technology and Applied Electromagnetics (ANTEM), Winnipeg, MB, Canada, 2021, DOI: 10.1109/ANTEM51107.2021.9518835.
6. Egarguin, Neil Jerome A., Jackson, David R., Onofrei, Daniel, Leclerc Julien and Becker, Aaron. "Beam Focusing by Scattering from an Array of Scatterers on a Drone", IEEE Xplore: 2021 United States National Committee of URSI National Radio Science Meeting (USNC-URSI NRSM), Boulder, CO, USA, 2021, pp. 140-141, DOI: 10.23919/USNC-URSINRSM51531.2021.9336436.
7. Sohini Sengupta, Henry Council, David Jackson, D. Onofrei, Vani Vellanki, "Active Scattering Cancellation Using a Microstrip Antenna Element", IEEE Xplore, URSI GASS 2020, 28 Aug.-4 Sept. 2021, Rome Italy.
8. Egarguin, Neil Jerome A., Jackson, David R., Onofrei, Daniel, Leclerc, Julien, and Becker, Aaron. "Adaptive Beamforming Using Scattering from a Drone Swarm", IEEE Xplore: 2020 IEEE Texas Symposium on Wireless and Microwave Circuits and Systems (WMCS), 2020. DOI: <https://doi.org/10.1109/WMCS49442.2020.9172335>
9. Zeng, Shubin, Egarguin, Neil Jerome A., Onofrei, Daniel, and Chen, Jiefu. "Active Control of Electromagnetic Waves in Layered Media Using a Current Source". IEEE Xplore: 2020 IEEE Texas Symposium on Wireless and Microwave Circuits and Systems (WMCS), 2020. DOI: <https://doi.org/10.1109/WMCS49442.2020.9172412>
10. S. Sengupta, D. Jackson, D. Onofrei, H. Council, "Reduction of radar cross section using active microstrip antenna elements", IEEE Xplore, 19 October, 2017.

#### Articles submitted or in preparation:

- N. Egarguin, D. Onofrei, "On the active Helmholtz control for personalized sound", to be submitted, 2024.

- Egarguin, Neil Jerome A., Jackson, David R., Onofrei, Daniel, “*An Optimization Strategy for Adaptive Beamforming and Dynamic Null Creation using Scatterers on a Drones*”, in preparation.
- N. Egarguin, D. Onofrei, “*Numerical simulation of active electromagnetic surfaces for scattering cancellation, decoys and null placements*”, in preparation.

#### Industry Technical reports:

- D. Onofrei, “*Characterization of Electromagnetic fields generated by a dipole exterior to a dielectric sphere*”, ADED LLC & Leidos, 2016.
- A. Khibnik, D. Onofrei, “*A New Method to update the probability density function for crack size in a crack growth process*”, summer 2002, United Technologies Research Center, 2002.

#### Key-note lectures:

- Short course and Workshop on “*Deterministic Methods and Theoretical Tools for Data-Enabled Sciences*”, University of Philippines Los Banos (6 one-hour lectures and 1 one-hour research presentation), November 2023.
- Summer school on Multi-scale Analysis and Theory of Homogenization, (4 lectures), ICTS – Tata Institute of Fundamental Research, Bangaluru, India, 26 August – 6 September, 2019.
- Normand meeting on the theoretical and numerical aspects of PDE’s (6 one-hour lectures), Rouen France, November 5-8, 2018.
- Workshop on Localization, Control and Inversion of Waves I, July 5, Grenoble, 2018.
- Workshop on Inverse Problems and PDE Control Theory, 3-rd Congress of Pacific RIM Mathematical Association (PRIMA), Oaxaca, Mexico, August 2017.
- Summer School, “*Multiscale analysis techniques and applications*”, University of Philippines, Los Banos, July 10-July 22, 2017.
- Workshop on Emerging Topics in Optics”, IMA, April 24 - 28, 2017.
- Symposium, “*Bridging scales: homogenization and related topics in solid mechanics and crystal plasticity*”, International Symposium on Plasticity in Puerto Vallarta (Mexico), January 3-9, 2017.
- Workshop on “*Partial Differential Equations: General Theory and Variational Problems*”, Cebu, Philippine, January 2016.
- NSF CBMS Conference on “*Mathematical Foundation of Transformation Optics*”, Howard University, Washington DC, June 2014.
- Frontiers in Applied and Computational Mathematics 2013, (FACM 13), May 2013.
- Oregon State University, Workshop on, “*Modeling Analysis and Simulation of Multi-scale Nonlinear systems*”, Oregon, July 25-29, 2007.

#### Conference talks and colloquia:

- 7-th SIAM TX-LA annual meeting, Minisymposium on “*Data- and model-driven approaches for inverse problems*”, October, 2024.
- SIAM Annual Meeting, Spokane, WA, July 2024.
- Colloquium talk, Mathematics Department, University of North Carolina Charlotte, Charlotte, NC, February, 2023.
- SIAM TX-LA 5-th annual meeting, Minisymposium on “*Recent advances in large-scale inverse problems: Numerics, theory, and applications*”, Nov 4-6, 2022.
- Texas Differential Equations 2022, October 2022.
- SIAM Annual Meeting 2022, Contributed session on Scattering and Inverse Problems, July 2022

- SIAM TX-LA 4-th annual meeting, Minisymposium on “Advances in theory and applications of composite materials”, South Padre Island, TX, November 4-7, 2021.
- AMS spring Southeastern Virtual Sectional Meeting, Special Session on Recent Developments on Analysis and Computation for Inverse Problems for PDEs, II, March, 2021
- The 178th meeting of the Acoustical Society of America will be held in San Diego CA from 2 to 6 December 2019.
- The V AMMCS International Conference, Mini-symposium on “Numerical and Analytical Techniques with Applications in Wave Propagation”, Waterloo, August, 2019.
- UNC Charlotte, Department colloquium, April 3, 2018.
- Recent Advances in Mathematical and Computational Aspects of Wave Propagation, IV AMMCS International Conference, Waterloo, Canada, August 2017.
- University of Rouen, Colloquium, Laboratoire de Mathématiques Raphaël Salem, June 2017.
- IMA, Seminar talk, Annual Program on Mathematics and Optics, October 2016.
- University of Minnesota, PDE seminar, Mathematics Department, October, 2016.
- Institute for Mathematics and Physics UP Los Banos, Philippines, May 4, 2016.
- Electromagnetic Contractors Meeting, Arlington, VA, January, 2016.
- SIAM SEAS, Mini-symposium on “Inverse problems and Imaging”, Birmingham, AL, March 2015.
- AMS JMM, Special session on “Inverse problems and applications”, San Antonio, January 2015.
- Colloquium, Florida Institute of Technology, Mathematics Department, Florida, January 2015.
- Colloquium, University of Waterloo, Mathematics Department, Ontario, January 2015.
- Electromagnetic Contractors Meeting, Arlington, VA, January, 2015.
- Colloquium in Applied Mathematics, NCSU Raleigh, Mathematics Department, September 2014.
- ECE Department seminar, University of Houston, May 2014.
- Geophysical society of Houston, Data Processing & Acquisition SIG, Houston, TX, March 2014.
- Electromagnetics seminar, Schlumberger, Sugar Land, TX, January 2014.
- Electromagnetic Contractors Meeting, Arlington, VA, January, 2014.
- Seminar on Inverse problems and analysis, University of Delaware, Mathematics Department, September 2013.
- AMS International Meeting, Special Session on “Mathematical Models in Materials Science and Engineering”, Alba Iulia, Romania, June 2013.
- SIAM Mini-symposium on “Theoretical Modeling and Applications of Metamaterials”, SIAM conference on Material Aspects, June 9-12 Philadelphia, 2013.
- Applied Analysis seminar, Louisiana State University Mathematics Department, April 2013.
- Applied Mathematics Seminar, University of Utah Mathematics Department, October 1, 2012.
- The 9th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Mini-symposium on “Analysis of PDEs and Particle Systems: From Life Sciences, Economics and Materials Science”, July 2012.
- PDE Seminar, Loyola University, February, 2012.
- Electromagnetics Seminar, ECE Department, University of Houston, November 4, 2011.
- AMS Special Session on, “Electromagnetic Wave Propagation in Complex and Random Environments”, Salt Lake City, Utah, October, 2011.
- AMS Special Session on, “*Applied Analysis*”, Salt Lake City, Utah October, 2011.
- ICIAM, Mini-symposium on “Cloaking and Metamaterials”, Vancouver, Canada, July 2011.
- Applied Inverse Problems conference, Mini-symposium on “Cloaking and Invisibility”, College Station, TX, May 2011.
- Colloquium, Mathematics Department, Colorado State University, February 2011.



- Colloquium, Mathematics Department, University of Alabama Birmingham, January 2011.
- Colloquium, Mathematics Department, University of Houston, October, 2010.
- MSRI, Postdoctoral Seminar, program on Inverse Problems, Berkeley, October, 2010.
- Institute of mathematics Romanian academy, "Diaspora in the scientific research and Romanian academia", Romania, September 21-24, 2010.
- Isaac Newton Institute, "Analysis on Graphs and Applications" follow-up meeting, Cambridge, UK, July 26-31, 2010.
- Colloquium, Department of Mathematics, North Dakota State University, Fargo, April 26, 2010.
- Colloquium, Department of Mathematics, US Naval Academy, Annapolis, MD, February 2010.
- ICES seminar, UT Austin, Austin, TX, February 2010.
- SIAM, Mini-symposium on "Meta-materials and Cloaking", Mathematical aspects of Material Science meeting, PA, May, 2010.
- AMS Special Session on, "Inverse problems: Analysis and Computations", Joint Mathematical meetings San Francisco, January 13-16, 2010.
- SIAM, mini-symposium on, "Resonance, Scattering, and Design in Electromagnetism", Annual Meeting Denver, July 6-10, 2009.
- SIAM, Mini-symposium on, "Cloaking and Invisibility", Annual Meeting, Denver, July 6-10, 2009.
- Center for Scientific Computation and Mathematical Modeling, University of Maryland, Workshop on, "Electromagnetic Materials and Their Approximations: Practical and Theoretical Aspects", Maryland, September 22-25, 2008.
- SIAM PDE Meeting, Mini-symposium on, "Microstructures, Spectral Properties and Homogenization", Arizona, December 10-12, 2007.
- PDE seminar, Department of Mathematics, Iowa State University, Iowa City, April, 2007.
- Colloquium, Department of Mathematics, University of Idaho, March, 2007.
- AMS Special Session on, "Calculus of Variations and Nonlinear PDE's", Joint Mathematical Meetings, New Orleans, January 5-8, 2007.
- AMS Special Session on, "Non-convex Variational Problems: Recent Advances and Applications", Salt Lake City, University of Utah, October, 7-8, 2006.
- AMS Special Session on, "Imaging, Homogenization and Shape Optimization", Miami, Florida International University, April 1-2, 2006.
- University of Savoie, Chambéry, France, July 11, 2005.
- Laboratoire J.L. Lions, University Paris VI, Paris, June 27, 2005.
- SIAM Conference on Analysis of Partial Differential Equations, Mini-symposium on, "Free and Moving Boundaries and Optimal Transport", Houston, December 2004.
- SIAM Conference on Mathematics in Industry, Toronto, Canada, October 2003.

#### **Journal Editorship:**

- Associate Editor, Frontiers in Applied Mathematics and Statistics, section Optimization, 2016.
- Associate Editor, Journal of Acoustics (<https://joa.hapres.com/>), 2018.

#### **Postdoctoral Mentoring activity:**

- Dr. Eric Platt, "Active Field control through surface sources in CED", 2018-2020.
- Dr. Sohini Sengupta (co-mentoring with Professor David Jackson), "Optimization, design and simulation for active arrays for scattering cancelation", 2016-2017.
- Dr. Mark Hubenthal, "Inverse source problems in acoustics and electromagnetism", 2013-2015.

### Graduate Mentoring Activity:

- Daniil Shaposhnikov, working on “Active manipulation of low frequency electromagnetic fields”, expected graduation date, June 2026.
- Neil Egarguin, working on “Active control of acoustic and electromagnetic fields”, graduated, June 2021, – First position: Assistant professor, University Of Philippines Los Banos, Philippines.
- Eric Platt, PhD thesis, “*Active Manipulation of fields and applications*”, University of Houston, graduated December 2017 – First position: Postdoctoral Fellow sponsored by the Army Research Office, Department of Mathematics, University of Houston, TX.
- Taoufik Meklachi, PhD Thesis, “*Anomalous localized resonance phenomena in electromagnetism*”, graduated, May 2014 – First position: Visiting Assistant professor, mathematics department Drexel University, PA.

### Undergraduate Mentoring Activity:

- Macy Mosier, **Army Research Lab, REU**, project on “On a perturbative method for beamforming using a double-cross array of dipoles on a drone”, 2024.
- Damon Spencer, **NSF Graduate Research Fellowship**, 2023.
- Damon Spencer, **UH Summer Undergraduate Research Fellowship**, project on “Shielding and Cloaking strategies for a 1D wave propagation”, summer 2020-2023.
- Jake Hill, UH Honors thesis course on “1D linear wave phenomena and their control”, 2022-2023.
- Maria Lozano, UH Honors thesis course on “Mathematical principles behind Electromagnetic induction and alternative energy sources”, 2022-2023.
- Larry Guan, **UH Summer Undergraduate Research Fellowship and UH Provost Undergraduate Fellowship** project on “*Detection strategies for static and dynamic defects in 1D spring – mass systems*”, summer 2019 spring 2020.
- Lance Fegan, University of Houston, REU 2019 under the **ARO award**, “*On several methods for the pattern synthesis by using a thin wire antenna*”, summer 2019.
- Charlene Woelfel, University of Houston, REU project on “*Scattering cancellation using dipole arrays*”, fall 2018.
- Noam Harari, University of Houston, Summer REU under the **ONR award**, working on “*Locating defects in spring-mass systems through Laplace domain and function limit analysis*”, summer 2017.
- Toni Chioreanu, University of Houston, Summer REU under the **ONR award**, working on “*Study of one dimensional discrete elastic network*”, summer 2016.
- Zachary Garvey, **UH Provost Undergraduate Research Fellowship**, project on “*Active thermal control*”, spring 2015.
- Zachary Garvey, **UH Summer Undergraduate Research Fellowship**, project on “*Active thermal control*”, summer 2014.
- Jessica Salazar, Renat Tatarin, Gregory Funchess, UH Mathematics department REU fellowships, projects on “*Active control of PDE’s*”, summer 2014.
- Zachary Garvey, University of Houston, working on “*Time-control of the 1D heat equation*”, fall 2013.
- Gregory Funches and Huy Dinh, University of Houston, working on “*Control of 1D and 2D discrete mass-spring coupled systems*”, fall 2013.
- Gregory Funches and Huy Dinh, sophomores University of Houston, REU under **AFOSR YIP award**, working on “*Control of the non-homogeneous 1D wave equation*”, summer 2013.

- Gregory Funchess – sophomore, University of Houston, REU and **UH Provost Undergraduate Research Fellowship** project on “*Study of anomalous localized resonance phenomena and applications*”, fall – 2012, spring 2013.
- Gregory Funchess – sophomore, University of Houston, **UH Summer Undergraduate Research Fellowship** project on “*Mathematical theory of electromagnetism*” summer 2012.
- Alonso Miranda – senior, University of Houston, REU project on “*Optimizing Heat flow in a composite material*”, summer - fall 2012.
- Andrew Thaler – University of Utah, Bachelor Honors Thesis, “*The analysis of the dissipative near cloak*”, April 2010.
- Andrew Thaler – senior, University of Utah, REU project on “*Acoustic Cloaking*”, fall 2009.
- Andrew Thaler – junior, University of Utah, REU project on “*Cloaking in the quasistatic case*”, summer 2009.
- Justin Boyer – sophomore, University of Utah, REU project on “*Mathematical Understanding of Geofam and Seismic Cloaking*”, spring 2009.

#### **Visitors Hosted at UH:**

- Dr. Mircea Ionescu, Schlumberger, Undergraduate Colloquium, 2019.
- Dr. Andrew Thaler, Mathworks, Undergraduate Colloquium, 2019.
- Dr. Mikhail Klivanov, UNC Charlotte, PDE Seminar, 2019.
- Dr. Stephen Shipman, LSU, PDE Seminar, 2017.
- Dr. Kurt Bryan, Rose Hulman Institute of Technology, PDE Seminar, 2017.
- Dr. Eduard Kirr, University of Illinois at Urbana Champaign, PDE Seminar, 2017.
- Dr. Editha Jose, University of Philippines, Los Banos, PDE Seminar, 2016.
- Dr. Erwin Goldberg, St. Mary University, TX, PDE seminar, 2016.
- Dr. Andrew Thaler, IMA and Mathworks, Undergraduate Colloquium, 2016.
- Professor, Alain Damlamian, Paris 12, PDE Seminar, 2016.
- Professor. Elena Cherkaev, University of Utah, PDE Seminar, 2015.
- Professor. Graeme Milton, University of Utah, Department Colloquium, 2015.
- Professor Shari Moskow, Drexel University, PDE Seminar, 2014.
- Professor Ting Zhou, Northeastern University, PDE seminar, 2014.
- Professor. Mihhail Berezovski, Worcester Polytechnic Institute, PDE seminar, 2014.
- Dr. Aaron Welters, MIT, Undergraduate colloquium and PDE seminar, 2013.
- Dr. Richard Albanese, ADED Co., Graduate seminar and PDE seminar 2013.
- Professor Andrew Norris, Rutgers University ME department, UH Colloquium, 2013.
- Professor Peijun Li, Purdue University Mathematics Department, UH PDE seminar 2013.
- Professor Semyon Tsynkov, NCSU Mathematics Department, UH-PDE Seminar 2012.
- Dr. Mandar Kulkarni, CGG Veritas, UH-PDE seminar 2012.
- Dr. Sandu Constantin, Chevron, UH-Graduate Student talk, 2012.
- Professor Linh Nguyen, University of Idaho mathematics Department, UH-PDE seminar, 2012.

#### **Symposium Organizer:**

- Co-organizer of the minisymposium on “Data- and model-driven approaches for inverse problems”, during the 7-th SIAM TX-LA annual meeting, October 11-13, 2024, (co-organizer Andreas Mang).
- Co-organizer of the minisymposium on “Data- and model-driven approaches for inverse problems”, during the 6-th SIAM TX-LA annual meeting, November 3-5, 2023, (co-organizers Andreas Mang and Alexander Mamonov).

- Co-organizer of the minisymposium on “Recent advances in large-scale inverse problems: Numerics, theory, and applications”, during the 5-th SIAM TX-LA annual meeting, November 4-6, 2022, (co-organizers Andreas Mang and Alexander Mamonov).
- Co-organizer of the TX-LA Mathematics Undergraduate Conference, annually since 2017.
- Co-organizer of the minisymposium on “Numerical and Analytical Techniques with Applications in Wave Propagation”, The V AMMCS International Conference, Waterloo, Canada, August, 2019 (co-organizers Nicolae Tarfulea and Eduard Kirr).
- Co-organizer of the 38-th Texas PDE conference, University of Houston, Mathematics Department, March 2015 (co-organizers Giles Auchmuty and David Wagner).
- Co-organizer of the AMS Special Session on “Calculus of Variations and Partial Differential Equations”, AMS International meetings, Alba Iulia, Romania, June, 2013 (co-organizers, Marian Bocea, Liviu Ignat, Mihai Mihailescu).
- Co-organizer of the minisymposium on “Multiscale Phenomena in Calculus of Variations and Inverse Problems”, ICIAM, Vancouver, Canada, July 2011, (co-organizer, Marian Bocea).
- Co-organizer of the minisymposium on “Metamaterials and Cloaking”, SIAM Mathematical aspects of Material Science meeting, PA, May, 2010, (co-organizers, G.W. Milton and F. Guevara-Vasquez).
- Co-organizer of the minisymposium on “Multi-scale aspects in material Sciences”, SIAM PDE meeting, Arizona, December 10-12, 2007, (co-organizer, Bogdan Vernescu).

#### **Olympiad Distinctions:**

- Fourth place at the International Olympiad for Undergraduate Students, Chisinau, Republic of Moldavia, 1999.
- Third and second prize at the National Romanian Olympiad (NRO) in mathematics for high school students, 1996, 1997 respectively.

#### **Courses Taught:**

Calculus I (Worcester Polytechnic Institute), Calculus II (Worcester Polytechnic Institute, Rutgers University), Calculus II- Honors students (Rutgers University), Calculus III (Worcester Polytechnic Institute), Differential equations and linear algebra (University of Utah), PDE for engineers (twice, University of Utah), REU class on Cloaking theory and metamaterials (University of Utah), Foundations of Analysis (University of Utah), Introduction to Linear Algebra (UH), Intermediate analysis (taught twice UH), Applied Inverse problems (graduate class UH), Engineering mathematics (UH), Introduction to Differential equations (4000 level class UH), Differential equations (3000 level, upcoming, UH), Introduction to PDE (4000 level class UH), Applicable Analysis (UH, graduate class), Transitions to advanced mathematics (3000 level class UH), ODE with MATLAB (3000 level class UH), Introduction to complex analysis (3000 level class, UH).

#### **Curricula enhancement:**

- Applicable Analysis, Graduate two semesters class, 2022, 2023.  
Redesigned the curricula for a more comprehensive coverage of important applied subjects and a better fit in the mathematics department PhD program.
- ODE with MATLAB, Undergraduate invited section course, spring 2019.

Designed the course syllabus and curricula, homework, *MATLAB tests* and *final individual projects* to supplement the existing course materials with a MATLAB component to permit the interested students to further enrich their understating of this important subject area.

- *Applied Inverse Problems*, Graduate special topics course, fall 2012, fall 2014.

Designed the course curricula, homework and *final individual projects* to be presented by each student on the final exam day. Invited four speakers, two from academia and two from industry to talk to the students about the applications of the material covered in class in their jobs.

- *Research Methods class*, Undergraduate class, 2015, 2016.

Proposed in collaboration with Andre Torok and William Ott, as a part of the MENTOR program for the enhancement of undergraduate research experience at UH.

### Scholastic Service Activities:

- Reviewer for:

Nature Communications, Applied Mathematics and Optimization, Journal of Control and Decision, Nature Materials, Inverse problems, Optics express, Communications in Mathematics and Physics, Quarterly Journal of Mechanics and Applied Mathematics, Science, Journal of Sound and Vibrations, Journal of Physics D: Applied Physics, Acta Acustica, Wave motion, Applicable Analysis, SIAM Journal of Analysis, Applied Numerical Mathematics, Multiscale Modelling and Simulation (SIAM), Journal of Integral equations and applications, Transactions of the AMS, IEEE Antenna and propagations, Applied Numerical Mathematics, Journal of Integral Equations, SIAM Journal of Applied Mathematics, Journal of Control and Decision, Studies in Applied Mathematics.

- UH Undergraduate Honors Thesis Mentoring:

- Damon Spencer, thesis on "Cloaking and illusion strategies in a linear 1D wave model", 2022-2023.
- Maria Lozano, reading course on "Mathematical study on alternative energy sources through electromagnetic induction", 2022-2023.
- Jake Hill, reading course on "Active control paradigms for the linear 1D wave model", 2022-2023.

- NSF Panelist: Spring 2018

- Romanian National Research Council (CNCS) expert evaluator and panelist, 2018 - present

- *Effort to recruit PhD mathematics students*

Started to devote a sustained effort to recruit good PhD student for the mathematics department from UP Los Banos, Philippines. Three students already graduated with a fourth one currently pursuing his PhD studies in our PhD program.

This recruitments were based on a formal visit to the Institute for Mathematics and Physics, at UP Los Banos in May 2016 partially supported by the math department, which included a presentation of our department research directions and fellowship possibilities

Another similar visit was realized in November 2023, where four presentations of our department research and fellowship possibilities were delivered to University of Philippines Los

Banos, De La Salle University, Manilla, Ateneo de Manilla University and University of Philippines Diliman with the goal of boosting recruitment of quality PhD students.

We also had an online roundtable meeting between various academic leaders and administrators in Philippine higher education system and myself and Bernhard Bodman representing our department. The purpose of the meeting was to identify potential mutually benefiting avenues for student and faculty exchange.

- Founder and Co-organizer of the MENTOR (Multiscience Enrichment for Networking, Training, and Opportunities in Research) program in the mathematics department at UH (together with Andrew Torok and William Ott)

MENTOR stands for *Multiscience Enrichment for Networking, Training, and Opportunities in Research* and it was initiated in the academic year 2016-2017 with the purpose of enhancing the research experience for the UH undergraduate students who are curious and interested in STEM-related careers. The program website is at (<https://www.math.uh.edu/mentor/>) and ideally it should feature:

- *Undergraduate Colloquium series* (previously organized (since 2012) together with Professor Andrew Torok),

The idea behind this initiative is to promote various areas of STEM related scientific research relevant for the undergraduate community through a series of general talks presented in an informal manner. The undergraduates have also the opportunity to learn more about the subject presented and about the various research extensions during the one-hour question and answers (Q&A) post lecture session with the speaker.

For the coming academic years, we plan to organize four talks each semester. The talks will be delivered by enthusiastic and experienced scientists, local faculty or visitors. Past colloquiums are posted on the colloquium webpage is:

[\(http://www.math.uh.edu/colloquium/undergraduate/\)](http://www.math.uh.edu/colloquium/undergraduate/).

- *Research methods seminar (discontinued due to lack of funding)*

This one year class, aims at introducing the participants to the research attitude necessary when facing nonstandard scientific questions. During the year, for two hours every week the students will meet with a MENTOR faculty from STEM related disciplines.

Through well-chosen scientific exercises and problems, we believe that the students can learn essential research habits such as: the importance of clearly understanding the hypothesis and the question, finding equivalent reformulations of the hypothesis and question, considering relevant particular examples, changing perspective when stuck, considering additional relevant assumptions which might help in an initial effort to answer the question, suitable use of numerical support to guide one's intuition, research of the relevant literature. The meetings are focused on open discussions and interactivity so that the students get to experience and practice in the class all the above research attitude attributes.

The second semester includes lectures and discussions about various possible research topics as well as lectures on how to write/read scientific papers and how to prepare a good oral presentation. The lectures will be delivered by the MENTOR faculty as well as other UH faculty

guest speakers. The interested students will be thus exposed to an array of possible research tools and possible projects.

- *Summer REU*

For the summer the students are encouraged to work on a STEM research project of their choice supervised by a faculty. The students can choose one of the MENTOR faculty as advisors or may decide to work with another colleague in the mathematics department or a colleague at UH (not necessarily in mathematics). The results of their summer research will be presented in front of their peers at a date to be decided during a UH MENTOR mini-conference in the fall semester. At the end of the program, the students who participated in all the activities and concluded with a research project and presentation are invited and sponsored to participate in the UH research day conference or TX-LA Mathematics Undergraduate conference. Depending on funding resources students may receive support during the summer.

- Co-organizer of the Putnam competition at UH and of the weekly training sessions for it (with Andrew Torok since 2011).

We organized weekly training sessions during the fall semester and prepared the test for the selection of the five students (team of three plus two alternates) to represent University of Houston at the Putnam competition. *In 2012-2013 competition the UH Putnam team ranked 87-th among 578 other teams while in 2014-2015 competition the UH Putnam team ranked 142-th among 500 other teams.*

- Committee Service on 6 mathematics and 5 engineering PhD defense committees in the Mathematics and respectively ECE departments at UH.
- Committee Service on the graduate sub-committee discussing the structure of Applicable Analysis and its role in our department PhD curricula.
- Committee Service on 2 undergraduate sub-committee discussing the reformatting of MATH3331 (Differential Equations) and respectively MATH3364 (Introduction to Complex Analysis).
- Co-organizer of an REU site in the Mathematics Department at UH, 2014, (together with Vaughn Climenhaga, Zachary Kilpatrick, William Ott, Mark Tomforde)

Together with my colleagues we decided to strengthen the undergraduate research experience in the mathematics department. One step towards a better undergraduate research community is to have a periodic REU site in the summer. In this regard we obtained some preliminary local funding from the department which together with existent REU funding will help us start a small pilot REU program in the summer of 2014. In the event that the idea is welcomed by the undergraduate community for next year we plan to apply to NSF for funding of a larger REU site at UH.

### Media coverage of Scientific Activity:

- **FREEDOM, COGNITIVE DISTRIBUTED SENSING IN CONGESTED RADIO FREQUENCY ENVIRONMENTS**

<https://www.egr.uh.edu/news/202306/beckers-research-could-unleash-power-intelligent-drone-swarms>

- **SMART-Hub, (HUB FOR SPECTRUM MANAGEMENT WITH ADAPTIVE AND RECONFIGURABLE TECHNOLOGY)**

<https://www.uh.edu/news-events/stories/2024/january/01192024-uh-joins-smart-hub-baylor-dod.php>

- **Army Research Office Grant**

<https://ssl.uh.edu/nsm/news-events/stories/2017/1010-onofrei-grant.php>

- **UH Moment, Active Cloaking, Houston Public Radio,**

<http://www.houstonpublicmedia.org/articles/shows/2013/05/22/43743/uh-moment-active-cloaking/>

- **University of Houston, College of Natural Science and Mathematics - Air Force Awards Young Investigator Program Grant to UH Mathematics Professor**

[http://www.uh.edu/nsm/math/news-events/stories/2013\\_2014/0408\\_onofrei.php](http://www.uh.edu/nsm/math/news-events/stories/2013_2014/0408_onofrei.php)

- **EurekAlert! –Science News, AAAS, A new cloaking method,**

[https://www.eurekalert.org/pub\\_releases/2009-08/uou-anc081409.php](https://www.eurekalert.org/pub_releases/2009-08/uou-anc081409.php)

- **AMS Math in the Media**

<http://www.ams.org/news/math-in-the-media/mmarc-10-2009-media>

### Media coverage of outreach activities:

- **Coverage in OCCIDENTUL ROMANESC, a newspaper representing Romanian diaspora**

<http://occidentul-romanesc.com/cred-in-eradicarea-cauzelor-coruptiei-si-aceasta-nu-se-poate-face-decat-prin-educatie-inca-de-pe-bancile-scolilor-primare/>

- **Romanian media coverage in local newspaper MONITORUL de SUCEAVA (in Romanian)**

<https://www.monitorulsv.ro/Reportaj/2017-12-23/Profesor-de-matematica-sucevean-cu-o-cariera-stralucita-in-cercetare-si-educatie-pe-continentul-american>



- **UH Hosts TX-LA Undergraduate Mathematics Conference**  
*<http://www.uh.edu/nsm/news-events/stories/2017/0817-mathematics-conference.php>*
- **Radio Trinitas Interview, Romania, Practical Side of Mathematics (in Romanian), 2016**  
*<https://soundcloud.com/radio-trinitas/lumina-cunostintei-12-05-2017-latura-practica-a-matematicii-prof-univ-daniel-onofrei>*
- **IMSP-UPLB int'l summer school eyes interdisciplinary collaboration**  
*<http://uplb.edu.ph/component/k2/793-imsp-uplb-int-l-summer-school-eyes-interdisciplinary-collaboration>*