Bogdan G. Nita
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Associate Professor
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EDUCATION

Ph.D.	Applied Mathematics	Univ. of Texas at Dallas Richardson, TX	Dec 2001
M.S.	Applied Mathematics	Univ. of Texas at Dallas Richardson, TX	Aug 1998
B.S.	Mathematical Sciences	University of Bucharest Bucharest, Romania	Aug 1997

PROFESSIONAL EXPERIENCE

Associate Professor — September 2010 – present
Montclair State University
Department of Mathematical Sciences

Assistant Professor — September 2005 – 2010
Montclair State University
Department of Mathematical Sciences

Visiting/Research Assistant Professor — September 2001 – August 2005
University of Houston
Department of Physics

TEACHING EXPERIENCE

Advanced Calculus I	MATH 425	SP10, SP11
Introduction to applied mathematics	MATH 460	F10
Intermediate Analysis	MATH 515	SP10, SP11
Calculus III	MATH 222	SP10, SP12
Real Variables I	MATH 521	F09, F11
Numerical Analysis	MATH 560	F08
Linear Algebra	MATH 335	F08, S09, F09, SP12
Calculus I	MATH 122	SU08, SU09, F10, SP10, SU11, F11

Modern Algebra	MATH 431	SP08
Partial Differential Equations	MATH 566	SP07
Intermediate Algebra	MATH 100	F06, S08
Calculus II	MATH 221	F06
Partial Differential Equation	MATH 421	F06
Vector Calculus	MATH 398	SP06, F07, SP09
Calculus II	MATH 211	SP06
Pre-calculus	MATH 112	F05, F07
Applied Pre-calculus	MATH 111	SP11
Introductory General Physics	PHYS 1301	SP05
Stellar and Galactic Astronomy	PHYS 1306	F03, F04
University Physics I	PHYS 1321	F01
University Physics II	PHYS 1321	SP02
Gravitation and Cosmology	PHYS 7309	F02

STUDENT RESEARCH

- **Graduate Research Projects**

  Andrew Huth, Extension to multi-D of an inverse scattering imaging algorithm (2011).

  Ashley Ciesla, An inverse scattering algorithm for seismic imaging and inversion (2009-2010)

  Gina Louise Santamaria, Contribution of the inverse scattering amplitude terms to imaging an unknown medium (2009-2010)

- **Undergraduate Research Projects**

  Kristin Soriano and Theerapan Oonlamom, Seismic imaging using inverse scattering methods (REU - 2011)

  Chris Smith, Noise tolerance of an inverse scattering imaging algorithm (REU - 2010)

  Neil Chatterjee, The hanging cable problem for practical applications (2009-2010)

  Amir Golnabi, Numerical methods for solving partial differential equations using MATLAB (2006-2007)

  Trisha Dunn, Power flux conservation in horizontally layered media (2004-2005)

- **Graduate Committees**

  Jeff Schwarz, MS student, Department of Mathematical Sciences, Montclair State University (2012)

  Ashley Ciesla, MS student, Department of Mathematical Sciences, Montclair State University (2010)

  Fang Liu, PhD student, Physics Department, University of Houston (2006)

  Chengliang Fan, PhD 2005, Geophysics Department, Indiana University.

RESEARCH

PUBLICATIONS AND PRESENTATIONS

- **REFEREED PUBLICATIONS**

1. Chatterjee, N. and Nita B.G.: The hanging cable problem for practical applications. Atlantic Electronic Journal of Mathematics, Volume 4, Number 1, Winter (2010).
2. Nita B.G.: An algorithm for imaging and amplitude correction derived from scattering theory. International Journal of Tomography and Statistics, Volume 11, Issue No. FA9, pp. 3-18 (2009).
3. Nita B.G. and Weglein A.B.: Pseudo-depth/intercept-time monotonicity requirements in the inverse scattering algorithm for predicting internal multiple reflections. Communications in Computational Physics, Vol. 5, No. 1, pp. 163-182 (2009).
4. Korlie M. S., Mukherjee A., Nita B. N., Stevens J. G., Trubatch A. D. and Yecko P.: Analysis of flows of ferrofluids under simple shear Magnetohydrodynamics 44, No. 1, pp. 51-60 (2008).
5. Korlie M. S., Mukherjee A., Nita B. N., Stevens J. G., Trubatch A. D. and Yecko P.: Modeling bubbles and droplets in magnetic fluids. J. Phys.: Condens. Matter, 20 pp. 204143 (2008).
6. INVITED Nita B.G.: Forward scattering series and Padé approximants for acoustic wavefield propagation in a vertically varying medium. Communications in Computational Physics special issue on Computational Geophysics, Vol. 3, No. 1, pp. 180-202 (2007).
7. Nita B.G. and Weglein A.B.: Inverse scattering internal multiple attenuation algorithm: an analysis of the pseudo-depth and time monotonicity requirements. Society of Exploration Geophysicists Expanded Abstracts, No 26, pp. 2461-2465.
8. Liu F., Weglein A.B., Innanen K.A., Nita B.G., and Zhang J.: A comprehensive strategy for removing multiples and depth imaging without subsurface information: direct horizontal common image gathers without the velocity or \ironing". Society of Exploration Geophysicists Expanded Abstracts, No 26, pp. 2210-2214.
9. Weglein A.B., Amundsen L., Liu F., Innanen K.A., Nita B.G., Zhang J., Ramirez A.C. and Otnes E.: Inverse scattering sub-series direct removal of multiples and depth imaging and inversion of primaries without subsurface information: strategy and recent advances. Society of Exploration Geophysicists Expanded Abstracts, No 26, pp. 2456-2460 (2007).
10. Nita B.G.: Analytic continuation of perturbative solutions of acoustic 1D wave equation by means of Padé approximants, Journal of Applicable Analysis, 86, No 1, pp. 41-58 (2007).
11. Nita B.G.: A comparison of the imaging conditions and principles in depth migration algorithms. International Journal of Tomography and Statistics, 4, No. FO6, pp. 5-16 (2006).

12. Liu F., Weglein A.B., Innanen K. and Nita B.G.: Multi-dimensional seismic imaging using the inverse scattering series. Society of Exploration Geophysicists Expanded Abstracts, No 25, pp. 3026-3030 (2006).
13. INVITED Weglein A.B., Nita B.G., Innanen K.A, Otnes E., Shaw S.A., Liu F., Zhang H., Fan C. and Pavlis G: An inverse scattering method for constructing the wavefield at depth and the transmission response from reflection data. Geophysics, vol.71, No. 4, pp. SI125-SI137 (2006).
14. INVITED Fan C., Pavlis G.L., Weglein A.B., Nita B.G.: Exploiting the free surface effect separate forward and back scattered teleseismic wavefields. Geophysics, vol.71, No. 4, pp. SI71-SI78 (2006).
15. Nita B.G., MacAlevey P., Downes P.T.: Pure gravitational radiation with twisting rays in the linear approximation, *Journal of Mathematical Physics*, Vol. 46, 12501, (2005).
16. Liu F, Weglein A.B., Innanen K.A. and Nita B.G.: Extension of the non-linear depth imaging capability of the inverse scattering series to multidimensional media: strategies and numerical results, *SBGf (Sociedade Brasileira de Geofísica) Expanded Abstracts*.
17. Nita B.G. and Weglein A.B.: Imaging with $\tau = 0$ versus $t = 0$: implications for the inverse scattering internal multiple attenuation algorithm (2004), *SEG Expanded Abstracts*, 74th Annual Meeting of the Society of Exploration Geophysicists, Denver, Colorado.
18. Nita B.G., Matson K.H., and Weglein A.B.: Forward scattering series and seismic events: far field approximations, critical and post-critical events (2004), *SIAM Journal on Applied Mathematics*, Vol. 64, No. 6, pp. 2167-2185.
19. Robinson I, Downes P., MacAlevey P., Nita B.G.: Approximate Solutions of types (3,1) and (4) (2002), *International Journal of Modern Physics A*, Vol. 17, No. 20, pp. 2733-2734.
20. Nita B.G.: Note on Invariants of the Weyl tensor (2003), *General Relativity and Gravitation*, Vol. 35, No. 10, pp. 1865-1868.
21. Nita B.G. and Robinson I.: An Invariant of null spinor fields, *Classical and Quantum Gravity*, Vol. 17 (2000) 2149-2152.

PROFESSIONAL PRESENTATIONS/ABSTRACTS

1. July 15, 2010 – Simultaneous Imaging and Inversion Using An Inverse Scattering Algorithm, SIAM Annual Meeting, Pittsburgh, PA.
2. July 12, 2010 – Numerical Tests of An Algorithm for Seismic Imaging and Inversion (with Ashley Ciesla), SIAM Annual Meeting, Pittsburgh, PA
3. Mar. 24, 2010 – Montclair, NJ: Seismic imaging using an inverse scattering algorithm, Montclair State University Chapter of SIAM Meeting.
4. Jan. 8, 2009 – Washington, DC: An algorithm for seismic imaging and amplitude correction derived from scattering theory, AMS/MAA Joint Meetings.
5. Jun. 6, 2008 – Montclair, NJ: Imaging with Earthquake Waves, Math and Science Day, Montclair State University.

6. May 9, 2008 – Montclair NJ: Adjoint problem for the multiscale analysis of the normal field instability in a ferrofluid, Ferrofluid Frontiers, Montclair State University.
7. Sept. 25, 2007 – San Antonio, Texas: Inverse scattering internal multiple attenuation algorithm: an analysis of the pseudo-depth and time monotonicity requirements, SEG 77th Annual Meeting.
8. Jun. 7, 2007 - Houston, TX: INVITED Imaging the wavefield at depth without the velocity: forward and inverse diagrams point the way, 2006 Mission-Oriented Seismic Research Program Annual Meeting, University of Houston.
9. Jan. 6, 2007 - New Orleans, LA: Imaging conditions in geophysical depth migration algorithms, AMS/MAA Joint Meetings.
10. Jan. 6, 2007 - New Orleans, LA: Analysis of a Simple sheared Ferrofluid (presented by Arup Mukherjee), Contributed Paper Session, AMS/MAA Joint Meetings.
11. Jan. 6, 2007 - New Orleans, LA: Numerical methods for solving partial differential equations using MATLAB (presented by Amir Golnabi), MAA Poster Competition, AMS/MAA Joint Meetings.
12. Jul. 14, 2006 - Boston, MA: Point-Scattering Description of Reflections and Headwaves in Acoustic Media, 2006 SIAM Annual Meeting.
13. May 11, 2006 - Houston, TX: INVITED Imaging conditions in depth migration algorithms, 2005 Mission-Oriented Seismic Research Program Annual Meeting, University of Houston.
14. Mar. 31, 2006 - Montclair, NJ: Scattering theory algorithms in seismic exploration, CSAM/SMUG Workshop, Montclair State University.
15. Jan. 13, 2006 – San Antonio, TX: Inverse scattering algorithms for attenuating artifacts produced by internal multiple reflections (reverberations), 2006 AMS Joint Meetings.
16. Nov. 2, 2005 – Montclair State University, Montclair, NJ: Differential equations applied to physical sciences, CSAM Meeting.
17. Oct. 8, 2005 – Bard College, Annandale-on-Hudson, NY: Analytic continuation of perturbative solutions of acoustic 1D wave equation by means of Padé approximants, 2005 AMS Eastern Section Meeting.
18. Apr. 21, 2005 – Houston, Texas: Acoustic reciprocity and the reconstruction of transmission data from recorded reflection response, 2005 M-OSRP annual meeting.
19. Apr. 20, 2005 – Houston, Texas: Internal multiples in complex media: pseudo-depth/vertical-time monotonicity and higher dimension analytic analysis, 2005 M-OSRP annual meeting.
20. Feb. 18, 2005 – Montclair State University: Scattering theory description of wave propagation, Department of Mathematical Sciences Seminar.
21. Feb. 10, 2005 – Louisiana Tech University: Scattering theory description of wave propagation, Department of Mathematics Seminar.
22. Jan. 7, 2005 – Atlanta, Georgia: Imaging and inverting for vertically and laterally varying media using an inverse scattering series method, 2005 Joint AMS/MAA Annual Meeting.

23. Jan. 7, 2005 – Atlanta, Georgia: Forward scattering series and Padé approximants for 1D wavefield propagation in an acoustic medium, 2005 Joint AMS/MAA Annual Meeting.

24. Nov. 16, 2004 – Houston, Texas: Multiple reflections in a complex multi-D medium: definition and an inverse scattering series attenuation algorithm, University of Houston, Department of Physics Weekly Seminar

25. Nov. 11, 2004 – Houston, Texas: Scattering theory description of wave propagation, Texas Southern University, Department of Mathematics Weekly Seminar.

26. Nov. 10, 2004 – Houston, Texas: Scattering theory description of wave propagation, University of Houston-Downtown, Department of Mathematics Colloquium.

27. Oct. 12, 2004 – Denver, Colorado: Internal multiples in a complex multi-D medium: multiples with headwaves subevents, 2004 SEG 74th Annual Meeting.

28. Jul. 15, 2004 – Portland, Oregon: Modeling seismic events using a forward scattering series approach, 2004 SIAM Annual Meeting.

29. Mar. 31, 2004 – Houston, Texas: Imaging with the vertical time versus the traveltime: towards including headwaves into imaging and internal multiple attenuation theory, 2004 M-OSRP annual meeting.

30. Mar. 19, 2004 – Houston, Texas: Including headwaves in imaging and internal multiple attenuation theory, Amerada Hess Seminar.

31. Feb. 17, 2003 – Houston, Texas: Forward scattering series and seismic events, *2003 M-OSRP annual meeting*.

32. Jan. 9, 2001 – Bucharest, Romania: Regular Approximate Type III Solutions of Einstein's Field Equations, invited talk for the annual *Gheorghe Vranceanu Seminar*.

33. Apr. 11, 2000 –Dallas, Texas: An invariant of null spinor fields, *University of Texas at Dallas, Department of Mathematics Weekly Seminar*.

34. May, 2005 – Joint Meetings American Geophysical Union Meeting and Society of Exploration Geophysicists: Addressing the Challenge of Seismic Depth Imaging Beneath a Complex Heterogeneous Medium: an Inverse Scattering Series Response, A.B. Weglein, S. Shaw, F. Liu, B.G. Nita, K. Innanen, presented by A.B. Weglein.

35. May, 2005 – Joint Meetings American Geophysical Union Meeting and Society of Exploration Geophysicists: Free Surface Effect and Separation of Teleseismic Waves: Transmission & Reflection, Primary vs. Multiple, C. Fan, G.L. Pavlis, B.G. Nita, A.B. Weglein, presented by C. Fan.

36. December, 2004 - Poster presentation, American Geophysical Union Meeting, San Francisco, California: Separation of forward and free surface backscattered teleseismic wavefields using the reciprocity theorem and the inverse scattering series, C. Fan, G.L. Pavlis, B.G. Nita, A.B. Weglein.

37. March, 2004 - Mission-Oriented Seismic Research Program Annual Meeting, Houston, TX, Coupling the imaging and inversion tasks: some simple insights into the theory and numerics of the inverse scattering series, K. Innanen, B.G. Nita, T.J. Ulrych, A.B. Weglein, presented by K. Innanen.

38. January, 2004 - Poster presentation, American Geophysical Union Meeting, Portland, Oregon: Multiparameter Non-linear Inversion of Forward Scattered Elastic Wavefield Using an Inverse Scattering Series Method, C. Fan, G.L. Pavlis, A.B. Weglein, H. Zhang, B.G. Nita.

GRANT AWARDS

1. NSF-REU Imagine at Montclair State University: 2010-2012 faculty advisor.
2. NSF MRI-R2: CSAM Acquisition of Scientific Computing Capacity (2010. Co-PI. Amount Awarded $129,000.
3. Mission-Oriented Seismic research Program (M-OSRP) Fellowship (Fall 2007): Imaging an unknown multidimensional medium using Inverse Scattering Theory. Collaborative Research with University of Houston. PI. Amount Awarded $15,000.
4. Mission-Oriented Seismic research Program (M-OSRP) Fellowship (Spring 2007): Imaging an unknown multidimensional medium using Inverse Scattering Theory. Collaborative Research with University of Houston. PI. Amount Awarded $14,700.
5. NSF - CMG (Sept. 1, 2005 Aug. 31, 2007): Collaborative Research CMG: Imaging Earth Structure with Elastic Waves by Application of the Inverse Scattering Series. PI. Collaborative project with University of Houston and Indiana University. Amount Awarded $28,080.
6. DOE Office of Basic Sciences (Sept. 2005 Aug. 2008): Seismic imaging and inversion beneath an unknown overburden: fundamental theory and realistic model development for testing and evaluation. PI. Collaborative project with University of Houston. Amount awarded: $14,500.
7. University of Houston Summer Undergraduate Research Fellowship (UH-SURF) (2005): Flux conservation in a 1D layered medium. PI. Amount awarded $3,200.
8. NSF - CMG (Jan. 1, 2004 Aug. 31, 2005): Collaborative Research, Indiana University and University of Houston: CMG: Imaging Earth Structure with Elastic Waves by Application of the Inverse Scattering Series. Co-PI. Amount Awarded $420,552.
9. TLC2 (Jan. 1, 2003 Aug. 31, 2003): Fundamental computational and conceptual issues in implementing and applying the inverse scattering imaging subseries for marine seismic data. Co-PI. Amount awarded: $50,000.

PROFESSIONAL SERVICE ACTIVITIES

Department service

2012: Undergraduate Committee
2010-2011: DPAC Committee
2010: Search Committee for an Applied Math tenure track position
2007 - 2009: Chair of the Pure and Applied Math SIG, Department of Mathematical Sciences, Montclair State University.

2005 - 2009: Organizer of the Department of Mathematical Sciences bi-weekly seminar.
2005 - 2009: PhD Committee.
2005 - 2007: Editor of the Departmental Newsletter.
2005 - 2007: Undergraduate Research Committee.
2006 - 2009: participated in activities related to the Assessment Committee.
2005 - Present: Academic Advisor to 10 undergraduate students, each semester at Montclair State University.

College service

Spring 2011: CSAM committee to the Distinguished Teacher Program
Fall 2010: Search Committee for the Director of Career Services for CSAM.
Mar. 2006: CSAM-SMUG Workshop entitled Inverse Scattering Algorithm for Seismic Processing.
Jan. 2006: Co-authored the Math Section problems for the 2006 Northern New Jersey Regional Science Olympiad.

University service

2007 - 2010: Faculty Advisor Montclair State University Chapter of SIAM.
Spring 2007: Judge in the World's Fair Exhibits at Montclair State University.
2005 - 2011: CSAM Doctoral Faculty, Montclair State University.
Spring 2006: Hiring Committee for the Assistant Director for International Office at Montclair State University.

Discipline-based

2009 - Present: Advisory and Review Board, International Journal of Academic Research (IJAR).
2007 - Present: Editor, International Journal of Imaging (IJI).
2006 - Present: Editor, International Journal of Tomography and Statistics (IJTS).
2005 - Present: Editorial Review Board Member, Scientific Journals International.
2005 - Present: Editor, International Journal of Applied Mathematics and Statistics (IJAMAS).
Jan. 2007: Judge for the Undergraduate Poster Competition at Joint AMS/MAA Meeting, New Orleans LA.
Jan. 2006: Judge for the Undergraduate Poster Competition at Joint AMS/MAA Meeting, San Antonio TX.
2007 - present: Invited reviewer for the Grant Competition at King Fahd University of Petroleum and Minerals.
2004 - 2005: Reviewer for NSF Collaborations in Mathematical Sciences and Geosciences (CMG) competition.
2003 – Present: A

ctive member of MathNerds.
Referee for Geophysics, Inverse Problems, Physica Scripta and Journal of Physics A: Mathematical and Theoretical,

Journal of Optics A: Pure and Applied Optics, Applied Mathematics E-Notes, Electronic Journal of Differential Equations, Communications in Computational Physics.
Reviewer for Mathematical Reviews and Zentralblatt MATH

PROFESSIONAL MEMBERSHIPS

Society of Industrial and Applied Mathematics
American Mathematical Society