

MARIAN GIDEA

Contact Information

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Department of Mathematics
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New York, NY 10036
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Education

1993-1997 Doctoral Program in Mathematics at University at Buffalo.

Administrative
Experience

4. "Melnikov method for non-conservative perturbations of the three-body problem" (with R. de la Llave, and M. Musser { graduate student}), *Celestial Mechanics and Dynamical Astronomy*, 2021.
5. "Surface gravity of rotating dumbbell shapes" (with Wai-Ting Lam { graduate student }, and Fredy R. Zypman), *Astrophysics and Space Science* , 366, 2021.
6. "Arnold Di usion, Quantitative Estimates and Stochastic Behavior in the Three-Body Problem", (with M. Capinski), *Communications on Pure and Applied Mathematics*, 2021.
7. "Global e ect of non-conservative perturbations on homoclinic orbits" (with R. de la Llave, and M. Musser { graduate student}), *Qualitative Theory of Dynamical Systems*, 20, 2021.
8. "Magnetic eld perturbation of the motion of a charge near a circular wire", (with D. Lazarev { graduate student}), submitted.
9. "A general mechanism of instability in Hamiltonian systems: Skipping along a normally hyperbolic invariant manifold", (with R. de la Llave and T.M. Seara), *Discrete and Continuous Dynamical Systems*, 40, 2020.
10. "Hill four-body problem with oblate tertiary: an application to the Sun-Jupiter-Hektor - Skamandrios system", (with J. Burgos-Garcia, A. Celletti, C. Gales, W-T. Lam { graduate student}), *Journal of Nonlinear Science*, 30, 2020.
11. "A General Mechanism of Di usion in Hamiltonian Systems: Qualitative Results", (with R. de la Llave and T. Seara), *Communications on Pure and Applied Mathematics*, 73, 2020.
12. "Topological recognition of critical transitions in time series of cryptocurrencies", (with Y. Katz, P. Roldan, D. Goldsmith { graduate student, Yo. Shmalo { graduate student}), *Physica A*, 548, 2020.
13. "Energy Drift and Di usion Process in the Three-Body Problem", *Oberwolfach Reports*, 31, 2019.
14. "Global Melnikov Theory in Hamiltonian Systems with General Time-Dependent Perturbations", (with R. de la Llave), *Journal of Nonlinear Science*, 28 (5), 1657, 2018.
15. "Combinatorial approach to detection of fixed points, periodic orbits, and symbolic dynamics" (with Yt. Shmalo { graduate student}), *Discrete and Continuous Dynamical Systems { A*, 38, 2018.
16. "Topological Data Analysis of Financial Time Series: Landscapes of Crashes" (with Y. Katz), *Physica-A*, 491, 2018.
17. "Construction of di using orbits in Hamiltonian systems", *Oberwolfach Reports*, 32, 2017.
18. "Topological data analysis of critical transitions in nancial networks", *E. Shmueli et al. (eds.), 3rd International Winter School and Conference on Network Science*, Springer Proceedings in Complexity, DOI 10.1007/978-3-319-55471-6_ 5.
19. "Perturbations of geodesic flows by recurrent dynamics", (with R. de la Llave), *Journal of the European Mathematical Society*, 19, 2017.
20. "Arnold di usion in the planar elliptic restricted three-body problem: mechanism and numerical veri cation" (with M. Capinski and R. de la Llave), *Nonlinearity*, 30, Number 1, 2016.
21. "Arnold's mechanism of di usion in the spatial circular restricted three-body problem: A semi-analytical argument" (with A. Delshams, and P Roldan), *Physica D: Nonlinear Phenomena*, 334, 2016.
22. "Stability interchanges in a curved Sitnikov problem" (with L. Franco-Perez, M. Levi and E. Perez-Chavela), *Nonlinearity*, 29, 2016.
23. "Hill's approximation in a restricted four-body problem" (with J. Burgos-Garcia - postdoctoral fellow), *Celestial Mechanics and Dynamical Astronomy*, 122, 2015.
24. "Global di usion on a tight three-sphere", *Qualitative Theory of Dynamical Systems*, 14, 2015.

25. "Low-Fuel Spacecraft Trajectories to the Moon", in *Mathematics of Planet Earth: Mathematicians Reflect on How to Discover, Organize, and Protect Our Planet*, (Eds. H. Kaper and C. Rousseau), SIAM, 2015.
26. "Critical transitions in a model of a genetic regulatory system" (with Jesse Berwald), *Mathematical Biology and Engineering*, 11, 2014.
27. "Automatic Recognition and Tagging of Topologically Different Regimes in Dynamical Systems" (with J. Berwald and M. Vejdemo-Johansson), *Discontinuity, Nonlinearity and Complexity*, 4, 2014.
28. "A Latent Class Analysis of Cancer Risk Behaviors among US College Students", (with Kang

45. "Geometry of homoclinic connections in a planar circular restricted three-body problem" (with J. Masdemont), *International Journal of Bifurcation and Chaos*, 17, 2007.
46. "Chaotic orbits in a restricted three-body problem: numerical experiments and heuristics" (with F. Deppe { graduate student}), *Communications in Nonlinear Science and Numerical Simulation*, 11, 2006.
47. "Topological methods in the large gap problem" (with R. de la Llave), *Discrete and Continuous Dynamical Systems*, 14, 2006.
48. "On Wesner's method of searching for chaos on low frequency" (with D. Quaid { graduate student}), *Economics Bulletin*, 2005.
49. "Covering relations for multidimensional dynamical systems" (with P. Zgliczynski), *Journal of Differential Equations*, 202, 2004.
50. "Covering relations for multidimensional dynamical systems { II" (with P. Zgliczynski), *Journal of Differential Equations*, 202, 2004.
51. "Symbolic Dynamics and Transition Tori-II" (with C. Robinson), in *New Advances in Celestial Mechanics and Hamiltonian Systems* (Eds. J. Delgado, E.A. Lacomba, J. Llibre and E. Perez Chavela), Kluwer Academic/Plenum Publishers, 2004.
52. "Topologically Crossing Heteroclinic Connections to Invariant Tori" (with C. Robinson), *Journal of Differential Equations*, 193, 2003.
53. "Chaotic Orbits in Three- and Four-Body Systems" (with M. Burgos { undergraduate student}), *Physica A*, 328, 2003.
54. "Chaotic Julia Sets: A Conley Index Approach", *Topology and its Applications*, 125, 2001.
55. "Non-smooth Dynamical Systems that Exhibit Hyperbolic Behavior", *Revue Roumaine de Mathematiques Pures et Appliques*, 45, 2000.
56. "Leray Functor and Orbital Conley Index for Non-Invariant sets", *Discrete and Continuous Dynamical Systems*, 5, 1999.
57. "The Conley Index for Countable Decompositions of Invariant Sets", in *Conley Index Theory*, *Banach Center Publications*, 47, Polish Academy of Sciences, 1999.
58. "A Discrete Conley Index for Non-Invariant Sets", *Universitatis Jagellonicae Acta Mathematica*, in *Proceedings of the Topological Methods in Differential Equations and Dynamical Systems Conference*, Krakow, Poland, July 17-20, 1996, XXXVI, 1998.
59. "Markov partitions for non-hyperbolic systems", *Dynamic Systems and Applications*, 5, 1996.
60. "Stability of the Topological Entropy for a Class of Iterations of Rational Functions with Perturbations", *Mathematical Reports*, 32, 1995.

Conference Presentations

- Conference H2020 in Hamiltonian dynamics, Venice, Italy, July 25-29, 2022.
- Conference From Exponentially Small Phenomena to Instability (GLADS 22), Barcelona, Spain, July 5-9, 2022.
- BIRS-CMO Workshop Geometric and Variational Methods in Celestial Mechanics, Oaxaca, Mexico, June 19 - June 24, 2022.
- Conference DinAmicI VII, Varese, June 6-9, 2022.
- NSF-DMS Colloquium, March 10, 2022.
- Society of Industrial and Applied Mathematics (SIAM DS21), Virtual Conference, May 23-27, 2021.
- Dynamics, Equations and Applications (DEA 2019), Krakow, Poland, September 16-20, 2019.
- Dynamische Systeme, Mathematisches Forschungsinstitut Oberwolfach, July 2019, Oberwolfach, Germany.

Workshop on Dynamical Systems and Related Topics, University of Maryland, 2013.

The First International Conference on Dynamics of Differential Equations, Georgia Institute of Technology, 2013.

The IX Americas Conference in Differential Equations, Trujillo, Peru, 2012.

SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, 2003.

XIII Conference on Nonequilibrium Statistical Mechanics and Nonlinear Physics, Colonia del Sacramento, Uruguay, 2002.

International Conference on Dynamical Methods for Differential Equations, Valladolid, Spain, 2002.

The Fourth International Conference on Dynamical Systems and Differential Equations, University of North Carolina at Wilmington, 2002.

Midwest Dynamical Systems Conference, University of North Carolina at Asheville, 2002.

Second Workshop on the Conley Index and Related Topics, University of Sherbrooke, Canada, 2001.

Nonlinear Dynamics and Chaos: where should we go from here?, University of Bristol, United Kingdom, 2001.

The IV International Symposium on Hamiltonian Systems and Celestial Mechanics (HAMSYS-2001), CIMAT, Guanajuato City, Mexico, 2001.

Conference Board of Mathematical Sciences, Mercer University, Macon, Georgia, 2000.

Northwest Dynamical Systems Conference, University of Florida, Gainesville, Florida, 2000.

International Congress of Mathematicians, Berlin.

AMS Regional Meeting, Chicago, 1998.

- 2010 Universitat de Barcelona { Universitat Politecnica de Catalunya (Barcelona, Spain); De Paul University; Northwestern University.
- 2009 Illinois Institute of Technology (Chicago); UAM-Iztapalapa (Mexico City, Mexico)
- 2008 University of Zaragoza (Spain); Georgia Institute of Technology.
- 2008 University of Illinois at Urbana-Champaign; University of Bucharest (Romania).
- 2007 University of Texas at Austin.
- 2006 Institut de Mathematiques (Paris, France).
- 2006 University of Illinois at Chicago.
- 2005 University of Texas at Austin; Northwestern University; Illinois Institute of Technology.
- 2002 University of Texas at Austin; Universitat de Barcelona { Universitat Politecnica de Catalunya (Barcelona, Spain).
- 2000 Loyola University of Chicago.
- 1998 Northwestern University; University of Illinois at Chicago.
- 1997 Loyola University of Chicago.

Conference Organizer

- Co-organizer, Special Session on "Hamiltonian Systems from real world models", the 13th AIMS Conference on Dynamical Systems, Differential Equations, and Applications, Atlanta, USA, June 5 - 9, 2020.
- Co-organizer, Workshop on "Arnold Discontinuity for Non-Convex Hamiltonians", American Institute of Mathematics, San Jose, August 24-28, 2020.
- Organizer, "Emerging Interactions of Geometric and Variational Methods", Institute for Advanced Study, Princeton, April 9-13, 2018.
- Organizer, "Introduction to Dynamical Systems Methods for Space Mission Design", Georgia Institute of Technology - January 16-19, 2018.
- Organizer, CIMPA Research School *Dynamical Systems and Applications: Geometrical, Topological, and Numerical Aspects*, to be held at the African Center of Excellence in Mathematical Sciences and Applications (ACE-SMA), Dangbo, Benin, 2018.
- Member of Organizing Committee, *A Broad Perspective on Finite and Infinite Dimensional Dynamical Systems (FIDDS-17)*, Barcelona, 2017.
- Co-organizer of *Special Session on Dynamical Systems*, Spring Eastern Sectional Meeting of the AMS, Hunter College, New York City, 2017.
- Organizer, NYC Dynamics Seminar at CUNY & Yeshiva University (with P. Hooper, A. Katok, R. Treviño), New York, 2016-present.
- Member of the Global Organizing Committee, *The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications Madrid, Spain*, Madrid, 2014.
- Organizer of Special Session on Celestial Mechanics, *The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications Madrid, Spain*, Madrid, 2014.
- Member of the International Program Committee, *5th Conference on Nonlinear Science and Complexity*, Xi'an, China, 2014.
- Member of the Organizing Committee, *Workshop on Advances in Tipping Point Theory with Applications to Environmental Science*, International Centre for Mathematical Sciences (ICMS), Edinburgh UK, 2013.

Organizer of Featured Minisymposium "Advances in the Theory and Computation of Hamiltonian Systems", *SIAM Conference on Dynamical Systems 2013*, Snowbird, UT, May 19 { 23, 2013.

Member of Technical Program Committee, *4th Conference on Nonlinear Science and Complexity*, Budapest, Hungary, August 6 { 11, 2012.

Member of International Program Committee, *3rd Conference on Nonlinear Science and Complexity*, Ankara, Turkey, July 28 { 31, 2010.

Organizer of symposium "Celestial Mechanics and Dynamical Astronomy: Methods and Applications" (with J. Masdemont), *3rd Conference on Nonlinear Science and Complexity*, Ankara, Turkey, July 28 { 31, 2010.

Organizer of special session "Applied hyperbolic and elliptic dynamics" (with I. Ugarcovici), *8th AIMS International Conference on Dynamical Systems, Differential Equations and Applications*, Dresden, Germany, May 25 - 28, 2010.

Organizer of minisymposium "Applications of topological methods to dynamical systems" (with P. Roldan), Joint SIAM/RSME-SCM-SEMA Meeting Emerging Topics in Dynamical Systems and Partial Differential Equations DSPDEs'10, Barcelona, Spain, May 31 { June 4 , 2010.

Member of International Program Committee, *2nd Conference on Nonlinear Science and Complexity*, Porto, Portugal, July 28 { 31, 2008.

Organizer of symposium "Celestial Mechanics and Dynamical Astronomy: Methods and Applications" (with J. Masdemont), *2nd Conference on Nonlinear Science and Complexity*, Porto, Portugal, July 28 { 31, 2008.

Organizer of special session "Hamiltonian Systems and Applications" (with A. Delshams and R. de la Llave), *7th AIMS International Conference on Dynamical Systems, Differential Equations and Applications*, Arlington, Texas, May 18 { 21, 2008.

Organizer of special session "Smooth Dynamical Systems" (with I. Ugarcovici), *AMS Central Section Meeting*, Chicago, October 5{6, 2007.

Organizer of workshop "Applications of Measurable and Smooth Dynamical Systems to Number Theory" (with A. Sahin and I. Ugarcovici), DePaul University, Chicago, October 4, 2007.

Organizer of special session "Applications of Dynamical Systems: Celestial Mechanics and Beyond" (with J. Masdemont), *6th AIMS international conference on Dynamical Systems and Differential Equations*, Poitiers, France, June 23{28, 2006.

Organizer of special session "Topological and Analytical Shadowing Techniques" (with C. Robinson), *5th AIMS international conference on Dynamical Systems and Differential Equations*, June 16{19, 2004, Pomona, California.

Professional Service

International Advisory Editors Board member of *Communications in Nonlinear Science and Numerical Simulation*.

Associate editor of *Qualitative Theory of Dynamical Systems*.

Member of the Editorial Board of *Discrete and Continuous Dynamical Systems, Series S*.

Advisory Editorial Member of *Lecture Notes on Nonlinear Physical Science*, China Higher Education Publishing and Springer.

Member of the editorial board of *Transactions of Nonlinear Science and Complexity*, World Scientific.

Guest-editor of *Discrete and Continuous Dynamical Systems { A*.

Member of the Mathematics and Climate Research Network (MCRN).

Reviewer of grant proposals for National Science Foundation.

Reviewer for *Mathematical Reviews*.

Referee for *Annals of Mathematics*, *Publications Mathématiques de l'IHES*, *Journal of Modern Dynamics*, *Acta Mathematica*, *Memoirs of the American Mathematical Society*, *Transactions*

Euclidean Geometry

Linear Algebra

Calculus

College Algebra

Finite Mathematics