

Magdalena Czubak — Curriculum Vitae

Department of Mathematics
University of Colorado Boulder
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Research Interests

Partial Differential Equations, Differential Geometry, Harmonic Analysis,
Mathematical Physics, Gauge Theory, Probability;

Education

Ph.D. Mathematics, The University of Texas at Austin, 2008
Advisor: Karen Uhlenbeck

B.S. Mathematics, Binghamton University, 2001

B.S. Computer Science, Binghamton University, 2001

Positions

Assistant Professor, University of Colorado Boulder, Fall 2016-present

Assistant Professor, Binghamton University, Fall 2011-Spring 2016

Research Member, Mathematical Sciences Research Institute, Fall 2015

Postdoctoral Fellow, University of Toronto, Fall 2008-Spring 2011

Grants

Simons Foundation Collaboration Grant, 09/01/2018 - 08/31/2023
“Fluid Flows on Manifolds”
PI: Magdalena Czubak

Simons Foundation Collaboration Grant, 09/01/2012 - 08/31/2018
“Topics in Geometric PDE”
PI: Magdalena Czubak

Vanderbilt International Research Grant, 06/2015 - 06/2016
“The Navier-Stokes equations in curved backgrounds”
Co-PI: Chi Hin Chan, National Chiao Tung University, Taiwan
Co-PI: Magdalena Czubak, Binghamton University, USA
Co-PI: Marcelo Disconzi, Vanderbilt University, USA

Publications & Preprints

1. *Hodge decomposition of the Sobolev space H^1 on a space form of nonpositive curvature*, (with Chi Hin Chan, Carlos Pinilla Suarez). arXiv:1812.11764.
2. *Almost sure boundedness of iterates for derivative nonlinear wave equations*, (with Sagun Chanillo, Dana Mendelson, Andrea Nahmod, and Gigliola Staffilani). arXiv:1710.09346.
3. *Antithesis of the Stokes paradox on the hyperbolic plane*, (with Chi Hin Chan). arXiv:1708.05134.
4. *Asymptotic behavior of the steady Navier-Stokes equation on the hyperbolic plane*, (with Chi Hin Chan and Che-Kai Chen). Dynamics of Partial Differential Equations, Vol. 14, No. 3 (2017), pp. 239-270.
5. *The formulation of the Navier-Stokes equations on Riemannian manifolds*, (with Chi Hin Chan and Marcelo Disconzi). Journal of Geometry and Physics 121C (2017) pp. 335-346.

6. *Liouville theorem for the stationary Navier-Stokes equation on a hyperbolic space*, (with Chi Hin Chan). J. Math. Anal. Appl. 460 (2018), no. 1, 216–231.
7. *On the well-posedness of relativistic viscous fluids with non-zero vorticity*, (with Marcelo M. Disconzi). J. Math. Phys. 57 (2016), no. 4, 042501, 21 pp.
8. *Blowing up solutions to the Zakharov system for Langmuir waves*, (with Yuri Cher and Catherine Sulem) in Laser Filamentation: Mathematical Methods and Models (CRM Series in Mathematical Physics) 2016; Springer;
9. *Remarks on the weak formulation of the Navier-Stokes equations on the 2D hyperbolic space*, (with Chi Hin Chan). Ann. Inst. H. Poincaré Anal. Non Linéaire 33 (2016), no. 3, 655–698.
10. *Topological defects in the abelian Higgs model*, (with Robert L. Jerrard). Discrete Contin. Dyn. Syst., Vol. 27 (2015), No. 5, 1933–1968.
11. *An ODE for boundary layer separation on a sphere and a hyperbolic space*, (with Chi Hin Chan and Tsuyoshi Yoneda). Phys. D 282 (2014), 34–38.
12. *Low regularity well-posedness for the 2D Maxwell-Klein-Gordon equation in the Coulomb gauge*, (with Nina Pikula). Commun. Pure Appl. Anal. 13 (2014), no. 4, 1669–1683.
13. *Interaction Morawetz estimate for the magnetic Schrödinger equation and applications*, (with James Colliander and Jeonghun Lee). Adv. Differential Equations Vol. 19 (2014), no. 9/10, 805–832.
14. *Lower bound for the rate of blow-up of singular solutions of the Zakharov system in \mathbb{R}^3* , (with James Colliander and Catherine Sulem). J. Hyperbolic Differential Equations, Vol. 10 (2013), no. 3, 523–536.
15. *Non-uniqueness of the Leray-Hopf solutions in the hyperbolic setting*, (with Chi Hin Chan). Dynamics of Partial Differential Equations 10 (2013), no.1, 43–77.
16. *Stability and Unconditional Uniqueness of Solutions for Energy Critical Wave Equations in High Dimensions*, (with Aynur Bulut, Dong Li, Nataša Pavlović, Xiaoyi Zhang). Comm. Partial Differential Equations, Vol. 38 (2013), no. 4, 575–607.
17. *Eventual regularization of the slightly supercritical fractional Burgers equation*, (with Chi Hin Chan, Luis Silvestre). Discrete Contin. Dyn. Syst., Vol. 27 (2010), no. 2, 847–861. A special issue Trends and Developments in DE/Dynamics Part I.
18. *Regularity of solutions for the critical N -dimensional Burgers’ equation*, (with Chi Hin Chan). Ann. Inst. H. Poincaré Anal. Non Linéaire, Vol. 27 (2010), no. 2, 471–501.
19. *Local well-posedness for the $2 + 1$ dimensional Monopole Equation*. Analysis & PDE, Vol. 3, (2010), no. 2, 151–174.

Talks

1. Special Session on Analysis and Geometry of Nonlinear Evolution Equations, Joint Mathematics Meetings, Baltimore, January 17th, 2019
2. Nonlinear phenomena in Stockholm: Kinetic Meets Dispersive Conference, KTH Royal Institute of Technology, Stockholm, Sweden, November 20, 2018
3. Nonlinear Waves Seminar, Applied Mathematics Department, University of Colorado Boulder, November 14, 2017
4. Geometrical and Statistical Fluid Dynamics workshop, Simons Center for Geometry and Physics, Stony Brook, October 17, 2017
5. Special Session on Nonlinear Dispersive PDE, AMS Fall Southeastern Sectional Meeting, University of Central Florida, Orlando, September 24, 2017
6. Special Session on Nonlinear and Stochastic Partial Differential Equations, Mathematical Congress of the Americas 2017, Montreal, July 28, 2017
7. Special Session on Nonlinear Dispersive PDE, Mathematical Congress of the Americas 2017, Montreal, July 26, 2017
8. Special Session on Qualitative and Quantitative Properties of Solutions to Partial Differential Equations, AMS Spring Eastern Sectional Meeting, May 7, 2017

9. Shanks Workshop on Mathematical Aspects of Fluid Dynamics, Vanderbilt University, April 9, 2017
10. Special Session on Recent progress on nonlinear dispersive and wave equations, Joint Mathematics Meetings, Atlanta, January 6, 2017
11. Special Session on Women in Analysis and Partial Differential Equations, AMS Fall Central Sectional Meeting, University of St. Thomas, October 30, 2016
12. AMS Special Session on Nonlinear and Stochastic Partial Differential Equations, University of Denver, October 9th, 2016
13. Colloquium, UC Santa Cruz, February 9, 2016
14. Colloquium, University of Colorado Boulder, January 14, 2016
15. PDE and Applied Math Seminar, UC Davis, January 12, 2016
16. SIAM PDE 2015, Scottsdale, Minisymposium on Nonlinear Parabolic Equations and Applications, December 10, 2015
17. SIAM PDE 2015, Scottsdale, Minisymposium on Analytical Methods in Fluid Mechanics, December 8, 2015
18. MSRI Workshop, Connections for Women: Dispersive and Stochastic PDE, August 19, 2015
19. Lecture series in DC Grad Summer School in PDE, George Washington University, July 26-July 30, 2015
20. Central Spring Sectional Meeting, AMS Special Session on Harmonic Analysis and Partial Differential Equations, March 14, 2015
21. Analysis and Geometry Seminar, University of Colorado, Boulder, October 28, 2014
22. PDE/Applied Math Seminar, Drexel University, May 22, 2014
23. Mathematical Finance, Probability, and PDEs Seminar, Rutgers University, April 8, 2014
24. Applied Math Seminar, University of Toronto, Canada, February 28, 2014
25. AMS Special Session on Dispersive and Geometric Partial Differential Equations, Joint Mathematics Meetings, Baltimore, January 18, 2014
26. SIAM PDE 2013, Orlando, Minisymposium on Water Waves, December 8, 2013
27. SIAM PDE 2013, Orlando, Minisymposium on Recent Advances in Nonlinear Dispersive Partial Differential Equations, December 7, 2013
28. PDE/Analysis Seminar, MIT, November 19, 2013
29. PDE Seminar, Vanderbilt University, November 15, 2013
30. Applied Analysis Seminar, Penn State University, April 8, 2013
31. AWM Research Symposium 2013, Santa Clara University, Special Session on Analysis of PDE in Newtonian and Non-Newtonian Fluid Mechanics, March 16, 2013
32. Geometry Seminar, Purdue University, November 5, 2012
33. Fall Eastern Sectional Meeting, Rochester Institute of Technology, AMS Special Session on Microlocal Analysis and Nonlinear Evolution Equations, September 23, 2012
34. Workshop on Evolution equations of physics, fluids, and geometry: asymptotics and singularities, Banff International Research Station, Canada, September 13, 2012
35. Workshop on Nonlinear Evolution Problems, Mathematisches Forschungsinstitut Oberwolfach, Germany, May 16, 2012
36. Spring Eastern Sectional Meeting, George Washington University, AMS Special Session on Nonlinear Dispersive Equations, March 17, 2012
37. Joint Mathematics Meetings, Boston, AMS Special Session on Stability Analysis for Infinite Dimensional Hamiltonian Systems, January 4, 2012
38. CMS Winter Meeting, Nonlinear PDE and Applications Session, Toronto, Canada, December 11, 2011

39. SIAM PDE11, Analysis of PDE arising in Fluid Dynamics Mini-Symposium, San Diego, November 16, 2011
40. Fall Southeastern Section Meeting, Wake Forest University, Special Session on Nonlinear Dispersive Equations, September 24, 2011
41. Analysis Seminar, University of North Carolina, Chapel Hill, September 23, 2011
42. 40 Years and Counting: AWM's Celebration of Women in Mathematics, Brown University Special Session on Nonlinear Wave Phenomena, September 17, 2011
43. Binghamton University, Colloquium, March 2011
44. Rutgers University-Camden, Colloquium, February 2011
45. Stony Brook University, Colloquium, February 2011
46. Southern California Analysis & PDE meeting, UCLA, November 2010
47. Thematic Program on Asymptotic Geometric Analysis, Fields Institute, Canada, October 2010
48. Applied Math Seminar, University of Toronto, Canada, October 2010
49. SIAM conference on Nonlinear Waves and Coherent Structures, Modulation of Nonlinear Solutions in Dispersive Partial Differential Equations, Philadelphia, August 2010
50. Nonlocal operators and partial differential equations, Będlewo, Poland, June 2010
51. Dispersive PDE Seminar, University of Toronto, Canada, June 2
52. Connections in Geometry and Physics, Perimeter Institute, May 2010
53. Analysis Seminar, University of Rochester, November 2009
54. AMS Special Session on Harmonic Analysis and PDE, Baylor University, October 2009
55. Dispersive PDE Seminar, University of Toronto, October 2009
56. Analysis Seminar, UT Austin, March 2009
57. Applied Math Seminar, University of Toronto, Canada, September 2008
58. AMS Special Session on Harmonic Analysis Applied to PDE, University of New Mexico, October 2007

Conferences & Workshops organized

Co-organizer for Geometry & Analysis Day, Department of Mathematics, University of Colorado Boulder, October 16th, 2018

Co-organizer for a minisymposium on PDEs in Fluid Dynamics: Analysis and Computation at the 3rd Annual Meeting of SIAM Central States Section, Colorado State University, Fort Collins, CO, September 29 - October 1, 2017

Co-organizer for AMS Special Session on Recent progress on nonlinear dispersive and wave equations, JMM Atlanta, GA, January 12-January 14, 2017

Co-organizer for Recent Advances in Hydrodynamics, Banff International Research Station, Canada, June 5-June 10, 2016;

Co-organizer for Minisymposium on Nonlinear Partial Differential Equations at SIAM Analysis of PDE 2015, Scottsdale, Arizona, December 7-December 10, 2015

Contact organizer for the Special Session on Hamiltonian PDE at the Fall Western Section Meeting, San Francisco State University, October 25-26, 2014;

Mentoring

PhD students

Pearce Washabaugh, PhD May 2017, University of Colorado Boulder, supervised jointly with Stephen Preston.

Carlos Pinilla Suarez, Fall 2016-present, University of Colorado Boulder

Braden Balentine, Spring 2017-present, University of Colorado Boulder

Albany Thompson, Fall 2017-present, University of Colorado Boulder

Undergraduate Research

Justin Richman, *Well-Posedness of the Damped Wave Equation with Nonlinear Source Terms*, Fall 2017-Spring 2018

Current Placement: Ph.D. Student, University of Illinois at Chicago

REU CU Boulder, *Local and global wellposedness of wave equations*, May 15-June 23, 2017

Undergraduate Students: Ram Ekstrom, Ian Gossett, Justin Richman, Gabriel Tauber;

Graduate Student: Andrew Stocker;

Nina Pikula, Binghamton University, 6/2012-8/2013

Low regularity well-posedness for the 2D Maxwell-Klein-Gordon equation in the Coulomb gauge, Commun. Pure Appl. Anal. 13 (2014), no. 4, 1669-1683.

Current Placement: Ph.D. Student, UC San Diego

Natham Aguirre, Binghamton University, 11/2011-1/2013

Well-posedness for energy critical magnetic Schrödinger equations.

Current Placement: Ph.D. Student, Pontifical Catholic University of Chile

Undergraduate Independent Studies

Dynamical Systems: Sam Serra, University of Colorado Boulder, Spring 2019

General Relativity: Rostislav Akhmetov, Nathaniel Lounsbury, Binghamton University, Spring 2015

Atmospheric and Oceanic Fluid Dynamics: Julien Sorci, Binghamton University, Spring 2015

PDE and Mathematical Biology: Navdep Kaur, Kristen Kochler, Binghamton University, Fall 2014, Spring 2015

Curves and Surfaces: Colin Guider, Nina Pikula, Binghamton University, Spring 2013

Yang Mills and Principal Bundles: Peter Pang, University of Toronto, Summer 2011

Teaching Experience

Instructor

Math 3430 Ordinary Differential Equations, University of Colorado Boulder, Spring 2019

Math 6240 Riemannian Geometry, University of Colorado Boulder, Fall 2018

Math 3430 Ordinary Differential Equations, University of Colorado Boulder, Fall 2018

Math 4470-5470 Partial Differential Equations, University of Colorado Boulder, Spring 2018

Math 4470-5470 Partial Differential Equations, University of Colorado Boulder, Fall 2017

Math 2400 Calculus 3, Instructor and Coordinator, University of Colorado Boulder, Spring 2017

Math 6240 Differential Geometry 2, University of Colorado Boulder, Fall 2016

Math 4470-5470 Partial Differential Equations, University of Colorado Boulder, Fall 2016

Math 472 PDE and Mathematical Analysis, Binghamton University, Spring 2016

Math 471 Partial Differential Equations, Binghamton University, Spring 2016

Math 479 Real Analysis II, Binghamton University, Spring 2015

Math 478 Real Analysis I (two sections), Binghamton University, Fall 2014

Math 479 Real Analysis II, Binghamton University, Spring 2014

Math 471 Partial Differential Equations, Binghamton University, Spring 2014

Math 590F Graduate course in Partial Differential Equations, Binghamton University, Spring 2013
Math 472 PDE & Mathematical Analysis, Binghamton University, Spring 2013
Math 371 Ordinary Differential Equations, Binghamton University, Fall 2012
Math 479 Real Analysis II, Binghamton University, Spring 2012
Math 478 Real Analysis I, Binghamton University, Fall 2011
Mat223S Linear Algebra I, University of Toronto, Spring 2011
APM346 Partial Differential Equations, University of Toronto, Fall 2010
Mat135Y Calculus, University of Toronto, full year course: Fall 2009-Spring 2010
Mat135Y Calculus, University of Toronto, full year course: Fall 2008-Spring 2009
M316K Foundations of Arithmetic, UT Austin, Fall 2007
M305G Precalculus, UT Austin, Fall 2006

Service to the profession

Referee for: Advances in Partial Differential Equations, Analysis & PDE, Communications in Mathematical Physics, Discrete and Continuous Dynamical Systems-Series A, Journal of Geometric Analysis, Mathematische Annalen, New York Journal of Mathematics, Nonlinearity, Proceedings of the AMS, SIAM Journal on Mathematical Analysis;

Service at University of Colorado Boulder

Math 5905 Teacher Training panelist, Department of Mathematics, January 30, 2019
Graduate School Fair, Department of Mathematics representative, Joint Mathematics Meetings, Baltimore, January 18, 2019
Math Club co-organizer, Department of Mathematics, Fall 2018-present
Honors Council representative, Department of Mathematics, Fall 2016-present
Geometry & Analysis Seminar co-organizer, Department of Mathematics, Fall 2016-present
Master's Committee member, Department of Mathematics, Fall 2018
Analysis Preliminary Exam proctor, Department of Mathematics, August 20, 2018
Undergraduate Honors Committee member (two committees), Department of Mathematics, Spring 2018
Master's Committee member, Department of Mathematics, Spring 2018
Graduate Committee member, Department of Mathematics, Fall 2017-Spring 2018
Analysis Preliminary Exam Committee member, Department of Mathematics, Summer 2017
Hiring Committee member, Department of Mathematics, Fall 2016-Spring 2017
Math 2400-Calculus 3 coordinator, Department of Mathematics, Spring 2017
Outside Honors Thesis Committee member for Department of Physics, Spring 2017
Master's Committee member, Department of Mathematics, Spring 2017
Ph.D. Committee member, Department of Mathematics, Fall 2016

Service at Binghamton University

Undergraduate Committee member, Fall 2011-Spring 2013, Spring 2016
Faculty Senate member, Fall 2012-Spring 2015, Spring 2016
Undergraduate Math Academic Advisor, Fall 2011-Spring 2015
Curriculum Development Committee member, April 2014-Spring 2015
MA Exam Committee member: December 15, 2014, April 30, 2015
Freshman Orientation Session, Faculty Advisor for Dept. of Math Sciences, July 29, August 1, 2014
Graduate Committee member, Fall 2013-Spring 2014
Transfer Students Orientation Session, Faculty Advisor for Dept. of Math Sciences, June 2013
Organizer for Analysis Seminar, Fall 2012-Spring 2013
Dean's Speaker Series for Dept. of Math. Sciences Co-organizer, Fall 2012-Spring 2013
Undergraduate Advising Committee member, Fall 2011-Spring 2013
Admissions Open House, Dept. of Math Sciences representative, October 2012
MA Exam Committee member, May 10, 2012
Visiting Panelist, Graduate school information panel, Colgate University, Fall 2011

Previous Service

Co-organizer for Dispersive PDE Seminar, University of Toronto, Fall 2010
Hosted visits from local high school classes in calculus lecture, University of Toronto, Fall 2008
Co-started & Co-organized Junior PDE Seminar (now Junior Analysis)-UT Austin, Fall 2004-Spring 2006

Awards and Honors

Dean's Research Semester Award, Binghamton University, Fall 2013
Frederick V. Atkinson Teaching Award, University of Toronto, Spring 2011
Frank Gerth III Graduate Excellence Dissertation Award, UT Austin, Spring 2008
Professional Development Award, Office of Graduate Studies, UT Austin, Fall 2007
Frank Gerth III Teaching Excellence Award, UT Austin, 2003
Helen P. Beard Award for Excellence in Undergraduate Mathematics, Binghamton University, 2001
United Federation of Teachers Scholar, Binghamton University, 1996-2000

Professional Development Activities at University of Colorado Boulder

Undergraduate research opportunities and you, September 18, 2018
Flipping the class for the skeptic, February 23, 2018
Time Management, March 1, 2017
Addressing Challenging Situations in the Classroom, February 9, 2017