

CV for Micah Warren

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Education

- **University of Washington,** Mathematics. M.S. June, 2006.
Seattle, WA Mathematics. Ph.D. June, 2008.
- **Pacific Lutheran University,** Mathematics. B.S. June, 2000.
Parkland, WA Physics. B.A. June, 2000.

Appointments

- Associate Professor of Mathematics, University of Oregon, Sept 2019 - Present
- Assistant Professor of Mathematics, University of Oregon, Sept 2013 - Sept 2019 .
- Assistant Professor of Mathematics, Princeton University, July 2011-Aug 2013.
- Instructor of Mathematics, Princeton University. 2008-2011.
- Predoctoral Teaching Assistant, University of Washington Mathematics Department. Autumn 2000 - Spring 2008.

Grant Support

- NSF Grant DMS-1438359 (DMS-1161498) Hessian Equations with Geometric Applications, 2012 - 2015, (extended until 2017.)
- NSF Grant DMS-0901644 Hessian and Special Lagrangian Equations, 2009-2012.
- Liftoff Fellow, Clay Institute Liftoff Program. Summer 2008.
- VIGRE Fellow, University of Washington Mathematics Department. Autumn 2006 - Summer 2007.

Preprints/In preparation

1. Jingyi Chen and Micah Warren. A flow towards Hamiltonian Stationary manifolds. Preprint. <https://pages.uoregon.edu/micahw/papers/hflow2.pdf> (29 pages)
2. Micah Warren. Minimal Lagrangian submanifolds of weighted Kim-McCann metrics. Preprint. <https://pages.uoregon.edu/micahw/papers/KM.pdf> (17 pages).
3. Micah Warren. Continuum Nash Bargaining Solutions. Arxiv: 1712.07202. (19 pages).

Accepted Papers

1. Jingyi Chen and Micah Warren. Compactification of the space of Hamiltonian stationary Lagrangian submanifolds with bounded total extrinsic curvature and volume Accepted to *J. Differential Geom.* (27 pages).

Published Papers

1. Arunima Bhattacharya Jingyi Chen and Micah Warren. Regularity of Hamiltonian Stationary Equations in Symplectic manifolds *Adv. Math.* **424** (2023) Paper No. 109059, 32 pp.
2. Antonio Ache and Micah Warren. Approximating coarse Ricci curvature on submanifolds of Euclidean space. *Adv. Geom.* **22** (2022), no. 2, 215–243
3. Arunima Bhattacharya and Micah Warren $C^{2,\alpha}$ estimates for solutions to almost linear elliptic equations. *Commun. Pure Appl. Anal.* **20** (2021), no. 4, 1363–1383.
4. Arunima Bhattacharya and Micah Warren Regularity Bootstrapping For Fourth Order Non Linear Elliptic Equations for nonlinear fourth order equations of double divergence type. *Int. Math. Res. Not.* IMRN 2021, no. 6, 4324–4348.
5. Arunima Bhattacharya and Micah Warren. Interior Schauder estimates for the fourth order Hamiltonian Stationary Lagrangian equation in dimension two. Arxiv: 1805.09556. *Proc. Amer. Math. Soc.* **147** (2019), no. 8, 3471–3477
6. Jingyi Chen and Micah Warren. On the regularity of Hamiltonian stationary Lagrangian submanifolds. *Adv. Math.* **343** (2019) 316–352.

7. Antonio Ache and Micah Warren. Coarse Ricci curvature and the manifold learning problem. *Adv. Math.* **342** (2019) 14–66.
8. Jingyi Chen and Micah Warren. Radial solutions of a fourth order Hamiltonian stationary equation. *J. Differ. Equ.* **265** (2018) 1576–1595.
9. Gregory Drugan, Weiyong He and Micah Warren. Legendrian curve shortening flow in \mathbb{R}^3 . *Comm. Anal. Geom.* **26** (4) (2018). 759-786
10. Antonio Ache and Micah Warren. Coarse Ricci curvature as a function on $M \times M$. *Results in Mathematics.* **72** (2017) 1823-1837.
11. Micah Warren. A Liouville property for gradient graphs and a Bernstein problem for Hamiltonian stationary equations. *Manuscripta Mathematica.* **150** (1) (2016) 151–157.
12. Micah Warren. A Bernstein result and counterexample for entire solutions to Donaldson’s equation. *Proc. Amer. Math. Soc.* **144** (7) (2016) 2953–2958.
13. Jeffrey Streets and Micah Warren. Evans-Krylov Estimates for a nonconvex Monge-Ampère equation. *Math. Ann.* **365** (1-2) (2016) 805–834.
14. Micah Warren. Non-polynomial entire solutions to σ_k equations. *Comm. Partial Differential Equations.* **41** (5) (2016) 848–853.
15. Micah Warren. On Solutions to Cournot-Nash Equilibria Equations on the Sphere. *Pac. J. Math.* **272** (2) (2014) 423–437.
16. Jun Kitagawa and Micah Warren. Regularity of optimal transport with Euclidean distance squared cost on the embedded sphere. *SIAM J. Math. Anal.* **44** (4) (2012), 2871–2887.
17. Robert McCann, Brendan Pass, and Micah Warren. Rectifiability of Optimal Transportation Plans. *Can. J. Math.* **64** (2012) 924–933.
18. Young-Heon Kim, Jeffrey Streets and Micah Warren. Parabolic optimal transport equations on manifolds. *Int. Math. Res. Notices* **19**, (2012). 4325–4350
19. Micah Warren. A McLean Theorem for the moduli space of Lie solutions to Riemannian transport equations. *Diff. Geom. Appl.* **29** (2011) 816–825.
20. Micah Warren. Regularity for a log-concave to log-concave mass transfer problem with near Euclidean cost. *Comm. Anal. Geom.* **19**, (1) (2011) 191–208.

21. Matthew Gursky, Jeffrey Streets and Micah Warren. Existence of Complete conformal metrics of negative Ricci curvature on manifolds with boundary. *Calc. Var. Partial Differential Equations.* **41** (1-2) (2011) 21-43.
22. Matthew Gursky, Jeffrey Streets and Micah Warren. Conformally bending three-manifolds with boundary. *Ann. Inst. Fourier (Grenoble).* **60** (6) (2010) 2421–2447.
23. Young-Heon Kim, Robert McCann and Micah Warren. Calibrating optimal transportation with Pseudo-Riemannian geometry. *Math. Res. Lett.* **17**, (6) (2010) 1183–1197.
24. Simon Brendle and Micah Warren. A boundary value problem for minimal Lagrangian graphs. *J. Differential Geom.* **84** (2010) 267-287.
25. Micah Warren. Calibrations Associated to Monge-Ampère Equations. *Trans. AMS.* **362**(8), (2010), 3947–3962.
26. Micah Warren and Yu Yuan. Hessian and gradient estimates for three dimensional special Lagrangian equations with large phase. *American J. Math.*, **132**, (3) (2010) 751-770.
27. Jingyi Chen, Micah Warren, and Yu Yuan. Hessian estimates for convex solutions to special Lagrangian equations. *Comm. Pure. Appl. Math.* **62** (4), (2009) 583-595.
28. Micah Warren and Yu Yuan. Hessian estimates for the sigma-2 equation in dimension three. *Comm. Pure. Appl. Math.*, **62** (3) (2009) 305-321.
29. Micah Warren and Yu Yuan. Explicit gradient estimates for minimal Lagrangian surfaces of dimension two. *Math Z.*, **262** (4), (2008) pp. 867-879.
30. Micah Warren and Yu Yuan. A Liouville type theorem for special Lagrangian equations with constraints. *Comm. Partial Differential Equations.*, 33(4-6) (2008) 922–932.

Book

Bitcoin: A Game-theoretic analysis. de Gruyter. 2023, (328 pages)
 ISBN: 9783110772838

Minicourses

July 2014 - “Lower Ricci Curvature Bounds on Metric Measure spaces.” Xi’an Jiaotong University, Xi’an, China.

Invited Talks

- August 2023 Non-Linear Critical Point Theory in Analysis and Geometry, BIRS, Kelowna, B.C.,
- June 2023. PDE in Seoul 2023: Conference in honor of Professor Mikhail Safonov’s 70th birthday, Seoul, South Korea.
- November 2022. University of Oregon Geometric Analysis Seminar
- July 2021. Universität Konstanz differential geometry seminar, delivered remotely
- November 2019. Fall Western Sectional Meeting, Riverside CA.
- October 2019. University of Oregon Machine Learning Meetup, Falling Sky Pizzeria, Eugene, OR.
- October 2018. University of Oregon Geometric Analysis Seminar
- April 2018. Spring Western Sectional Meeting, Portland, OR.
- February 2018. Conference on geometric and nonlinear partial differential equations. NSW, Australia.
- December 2017. University of Oregon Basic Notions Seminar.
- October 2017. University of Oregon Geometric Analysis Seminar
- June 2017, Dynamical Geometric Analysis in Orsay, Orsay, France.
- May 2017 . University of Oregon Geometric Analysis Seminar.
- April 2017. Generated Jacobian Equations, Banff International Research Station.
- October 2016. University of California Irvine Differential Geometry Seminar.
- October 2016. University of Oregon Geometric Analysis Seminar.

- March 2016. TODA Seminar, The Ohio State University.
- February 2016. UBC Differential Geometry /Geometric Analysis seminar, Vancouver, BC.
- September 2015. Princeton University, Differential Geometry /Geometric Analysis seminar.
- September 2015. PDE/Applied Math Seminar, Indiana University.
- August 2015. Conference on Analysis and Geometry, Hefei, Anhui, China.
- April 2015. University of Oregon Geometric Analysis Seminar.
- February 2015. University of Oregon Geometric Analysis Seminar.
- February 2015. University of Oregon Probability Seminar.
- October 2014. University of California Irvine Differential Geometry Seminar.
- October 2014. University of Oregon Geometric Analysis Seminar.
- May 2014 . University of Oregon Geometric Analysis Seminar.
- November 2013. University of Oregon Probability Seminar.
- October 2013. University of Oregon Geometric Analysis Seminar.
- October 2012. University of Washington Differential Geometry Seminar.
- October 2012. Modern Math Workshop, Seattle, WA.
- April 2012. Manifolds with Special Holonomy and their Calibrated Submanifolds and Connections. Banff International Research Station.
- July 2011. Workshop on Partial Differential Equations, Oberwolfach, Germany.
- November 2010. Workshop on Geometric Probability and Optimal Transportation, Fields Institute, Toronto.
- Sept 2010. Columbia Geometry / Analysis Seminar.
- April 2010. Optimal transportation and applications, Banff International Research Station, Banff, Canada .

- March 2010. CUNY Differential Geometry Seminar.
- December 2009. PDE Seminar - Brown University .
- October 2009. Geometry/Topology Seminar - Stony Brook University.
- October 2009. Differential Geometry - Geometric Analysis Seminar - Princeton University.
- July 2009. Differential Geometry - Mathematical Physics - Partial Differential Equations Seminar - University of British Columbia.
- April 2009. Differential Geometry and Geometric Analysis Seminar, Princeton University.
- November 2008. Institute for Advanced Study.
- November 2008. Nonlinear analysis and PDE Seminar , Rutgers University.
- March 2008. Differential Geometry and Geometric Analysis Seminar, Princeton University.
- December 2007. Minimal submanifolds and related problems, Banff International Research Station, Banff, Canada
- November 2007. Differential Geometry - Mathematical Physics - Partial Differential Equations Seminar - University of British Columbia.
- July 2007. Workshop on Partial Differential Equations, Oberwolfach, Germany.
- May 2007. UW Differential Geometry/PDE Seminar.

Podcasts and Digital Events

- *How to attack Bitcoin (feat. Micah Warren)* - Episode 120 **Crypto Critics Corner** June 2023
- *Bitcoin: A game-theoretic analysis.* De Gruyter panel.
<https://www.youtube.com/watch?v=wKr8jECz53U> May 2023

Referee Service

- American Journal of Mathematics
- Differential Geometry and Applications
- Journal of Differential Geometry
- Journal of Functional Analysis
- Advances in Mathematics
- Communications in Pure and Applied Analysis
- Duke Mathematical Journal
- International Mathematics Research Notices
- Math Research Letters
- Mathematische Annalen
- Pacific Journal of Mathematics
- Proceedings of the American Mathematical Society
- Transactions of the American Mathematical Society
- Annales de l'Institut Henri Poincaré / Analyse non linéaire
- Analysis and PDE
- Calculus of Variations and PDE

Graduate Students

- Arunima Bhattacharya. Graduates 2019. (Currently: Assistant Professor at UNC, Chapel Hill)

Committee Service, Seminar Organization and other Service Activities

- University of Oregon Faculty Senate 2023-2025
- University of Oregon Library Committee 2023-2025

- UO Math Climate Committee 2023-2024
- UO Math Webwork Committee 2022-2023
- UO Math Advising Committee 2022-2023
- Postdoctoral Search Committee 2021-2022 (chair), (2023-2024)
- Teaching Effective Committee 2020-2021, 2022-23, 2023-34
- Graduate Affairs Ph.D Committee, 2018-2019.
- Assessment Committee, 2018.
- Travel Committee, 2017-2018, 2018-2019 (chair).
- Postdoctoral Search Committee 2016-2017.
- Colloquium Committee, 2015-2016.
- Open Search Committee, Winter 2014-2015.
- Orals Exam Committee, Demetre Kazaras, Gavin Armstrong, Gabriel Montes de Oca.
- Organizer, University of Oregon Geometric Analysis seminar, Spring 2014-Sept 2019 .
- University of Oregon Math Department Scholarships and Awards Committee, Spring 2014
- Graduate Admissions Committee, Princeton University, 2013.
- Graduate Admissions Committee, Princeton University, 2012.
- Undergraduate Placement Officer, Princeton University July 2011 -June 2013.
- Organizer, Princeton University Differential Geometry and Geometric Analysis seminar, Sept 2008 -2012.
- Reviewer for Mathematical Reviews.

Teaching, University of Oregon

- Math 607 Topics course on Optimal Transport, Fall 2023

- Math 251 Calculus I. Fall 2023
- Math 415 Intro Analysis III. Spring 2023
- Math 253. Calculus III. Spring 2023.
- Math 107 University Math III. The Mathematics of Voting and Elections. Winter 2023.
- Clark Honors College 441: Bitcoin: What could possibly go wrong?
- Math 320 Ordinary Diff. Eq. Spring 2018
- Math 618 Real Analysis. Spring 2022.
- Math 411/412 Functions of a Complex Variable. Winter/Spring 2022
- Math 637-8-9 Differential Geometry, Fall 2014, Winter 2015, Spring 2015, Fall 2016.
- Math 433 Differential Geometry: Spring 2017, Spring 2020
- Math 607 Mean Curvature Flow, Fall 2015.
- Math 607 Non-linear elliptic PDE, Spring 2014.
- Math 307 Intro to Proof, Winter 2014.
- Math 252 Calc II. Winter 2014. Fall 2020, Winter 2021
- Math 456 Discrete Dynamical Systems, Spring 2016, Spring 2019.
- Math 461 Statistics, Fall 2017, Fall 2018.
- Math 420 Advanced ODE, Spring 2017.
- Math 256 Ordinary Diff. Eq. Fall 2013, Spring 2016, Winter 2017, Fall 2017, Fall 2018, Fall 2020, Winter 2021 (course head 2018 - present).
- Math 422 Fourier Analysis, Winter 2018. Winter 2019

Teaching, Princeton University

- Linear Algebra (MAT 204) Spring 2013.(Course Head)
- Linear Algebra (MAT 203),Fall 2012.
- Complex analysis, Spring 2012.
- Differential Equations, Fall 2011.
- Math 201, Multivariable Calculus, Spring 2011 (Course Head).
- Real Analysis, Fall 2010.
- Graduate course on optimal transportation, with Alice Chang. Spring 2010.
- Math 103, 202, 201, Instructor, University 2008 -2012

Teaching, University of Washington

- Calculus With Analytic Geometry I,II,III. Instructor, three summer quarters, 2004-2006.
- Intro to Differential Equations. Instructor, Spring 2005, Summer 2006, Fall 2006.
- Linear Analysis (Math 554). Grading and Office Hours. 2007-2008.