

Mohammad Safdari

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Languages: Persian (native), English (fluent)

RESEARCH INTERESTS: Nonlinear Partial Differential Equations, Mathematical Physics

EDUCATION

- University of California, Berkeley, CA, USA, Aug 2009 - Dec 2014
Ph.D. in Mathematics
Title: Variational Inequalities with Gradient Constraints
Advisers: Prof. L. C. Evans, Prof. N. Reshetikhin
- Sharif University of Technology, Tehran, Iran, Sep 2007 - Aug 2009
M.Sc. in Pure Mathematics
Title: The Ricci flow with applications to the Poincaré and Calabi conjectures
- Sharif University of Technology, Tehran, Iran, Sep 2003 - Jun 2007
B.Sc. in Pure Mathematics

EMPLOYMENT

- Assistant Professor, Department of Mathematical Sciences, Sharif University of Technology, Tehran, Iran, Sep 2016 - Present
- Visiting Assistant Professor, Department of Mathematics, University of California, Riverside, CA, USA, Jul 2021 - Jun 2022
- Postdoctoral Research Fellow, School of Mathematics, Institute for Research in Fundamental Sciences (IPM), Tehran, Iran, Apr 2015 - Sep 2016

GRANTS, AWARDS, AND HONOURS

- Elected Prominent Scientist by Federation of Scientific Leaders of Iran¹, 2022
- Aghaz Grant² from Iran National Science Foundation (INSF), 2019 - 2021
- Young Assistant Professors' Grant from Bonyad-e-Nokhbegan³, 2017 - 2018
- Postdoctoral Grant from Bonyad-e-Nokhbegan, 2015 - 2016
- Graduate Division Summer Grant, UC Berkeley, 2011 - 2012
- First Rank in a National Mathematics Competition for undergraduates, Iran, 2006
- Outstanding Student Certificate by Sharif University President, 2006
- Second Prize, International Mathematical Competition for University Students (IMC), Blagoevgrad, Bulgaria, 2005

¹An award given to Iranian scientists for quality of research

²A grant for early career researchers

³Iran's National Elites Foundation

PUBLICATIONS AND PREPRINTS

1. A weakly coupled system of p -Laplace type in a heat conduction problem (with M. Fotouhi and H. Shahgholian), arXiv:2309.12794, 38 pp, submitted
2. Nonlocal equations with gradient constraints, *Calc. Var. Partial Differ. Equ.*, 62(7):193, 30 pp, 2023.
3. Nonlocal fully nonlinear double obstacle problems, arXiv:2105.09417, 15 pp, to appear in *Differ. Integral Equ.*
4. Double obstacle problems and fully nonlinear PDE with non-strictly convex gradient constraints, *J. Differ. Equ.*, 278:358–392, 2021.
5. Global optimal regularity for variational problems with nonsmooth non-strictly convex gradient constraints, *J. Differ. Equ.*, 279:76–135, 2021.
6. The distance function from the boundary of a domain with corners, *Nonlinear Anal.*, 181:294–310, 2019.
7. An example of non-embeddability of the Ricci flow, *Ann. Global Anal. Geom.*, 55(4):681–685, 2019.
8. The regularity of some vector-valued variational inequalities with gradient constraints, *Commun. Pure Appl. Anal.*, 17(2):413–428, 2018.
9. On the shape of the free boundary of variational inequalities with gradient constraints, *Interfaces Free Bound.*, 19(2):183–200, 2017.
10. The free boundary of variational inequalities with gradient constraints, *Nonlinear Anal.*, 123-124:1–22, 2015.
11. Direct method in the calculus of variations (This is an expository article in Persian for undergraduate students appeared in *Sharif Math Journal*.)
12. Riemannian & Kähler-Ricci flow, –Poincaré, geometrization and Calabi conjectures (This is an expository article in Persian appeared in *Farhang va Andisheye Riyazi* published by the Iranian Mathematical Society.)

SELECTED PRESENTATIONS

- Nonlocal Equations with Gradient Constraints; Geometric Aspects of Nonlinear PDE Research Program, Institute Mittag-Leffler, Stockholm, Nov 2022
- Fully Nonlinear Equations with Gradient Constraints; PDE Seminar, Purdue University, Sep 2021
- Local and Nonlocal Equations with Gradient Constraints; 52nd Annual Iranian Mathematics Conference (Invited Talk), Bahonar University of Kerman, Sep 2021
- Nonlocal Equations with Gradient Constraints; Analysis and Differential Equations Conference, in honor of M. Hesaaraki, Sharif University of Technology, Jun 2021
- Nonlinear Elliptic Equations with Gradient Constraints; Frontiers in Mathematical Sciences - 7th Conference, University of Isfahan, Jan 2020
- Gradient Constraints in PDE and Calculus of Variations; Differential Equations Seminar, Sharif University of Technology, Feb 2019
- Non-strictly Convex Gradient Constraints in Calculus of Variations; Geometry and Topology Seminar, Institute for Research in Fundamental Sciences (IPM), Feb 2019
- Variational Problems with Non-strictly Convex Gradient Constraints; New Challenges in Applied Mathematics, A joint Event of Ecole Polytechnique and Sharif University of Technology, Jul 2017
- Regularity for Variational Problems with Non-strictly Convex Gradient Constraints; The 14th International Conference on Free Boundary Problems: Theory and Applications, Shanghai Jiao Tong University, Jul 2017

- The Free Boundary of Variational Inequalities with Gradient Constraints; The 2nd School on Analysis and PDE, Institute for Research in Fundamental Sciences (IPM), May 2015
- The Free Boundary for Variational Inequalities with Gradient Constraint; Student PDE Seminar, UC Berkeley, Oct 2014
- Variational Inequalities with Gradient Constraints; Student PDE Seminar, UC Berkeley, Mar 2014

TEACHING EXPERIENCE

- Sharif University of Technology (2015 - present)
 - Graduate: Partial Differential Equations, Real Analysis, Advanced Theory of Statistics, Ordinary Differential Equations, Geometric Measure Theory, Seminar on Optimal Transportation, Seminar on Entropy and PDE
 - Undergraduate: Analysis I & II, Foundations of Mathematics, Calculus I, Linear Algebra, Introduction to Mathematics, Introduction to Statistical Learning, Differential Equations, Introduction to Linear Algebra
- University of California Riverside (2021 - 2022, online)
 - Ordinary and Partial Differential Equations 146B, Calculus of Several Variables 10B, Calculus for Life Sciences 7A, First Year of Calculus 9C
- University of California Berkeley (2010 - 2014, graduate student instructor)
 - Linear Algebra, Multivariable Calculus, Analytic Geometry and Calculus 16A, Calculus 1B

MANUSCRIPTS AND LECTURE NOTES (available through my homepage)

- Mathematical Analysis; covering standard undergraduate topics, including multivariable functions; 409 pages. In these notes, the definition of integration over surfaces and higher dimensional rectifiable sets, and the proof of divergence theorem are presented in conceptually simpler ways, avoiding the intricacies of the differential forms' machinery.
- Foundations of Mathematics; covering basic logic, set theory, and construction of numbers; 292 pages. In these notes, a novel approach for developing basic tools of mathematical logic without using the theory of sets, or natural numbers, is introduced.
- Linear Algebra; covering standard undergraduate topics; 230 pages.
- Notes on Statistical Learning; 61 pages.

SUPERVISING AND PROFESSIONAL EXPERIENCES

- Academic adviser of first-year undergraduate students majoring in mathematics, 2020 - 2022
- Academic adviser of undergraduate students majoring in mathematics, 2017 - 2020
- Supervising several master's and undergraduate theses
- Member of committee for development of new curriculums, head of undergraduate Math curriculum subcommittee

REFERENCES

- Lawrence C. Evans, Professor of Mathematics, UC Berkeley, USA
- Nicolai Reshetikhin, Professor of Mathematics, UC Berkeley, USA
- Henrik Shahgholian, Professor of Mathematics, KTH Royal Institute of Technology, Sweden
- Fraydoun Rezakhanlou, Professor of Mathematics, UC Berkeley, USA
- Morteza Fotouhi Firouzabad, Associate Professor of Mathematics, Sharif University of Technology, Iran