Curriculum Vitae

Alexander Mramor

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1. Research Interests:

My research interests are in geometric analysis. My work thus far has involved mean curvature flow and minimal surfaces but my interests in the field are broad.

2. Current Position:

J.J. Sylvester Assistant Professor, Johns Hopkins University, 2019-2022.

3. Education:

- PhD in mathematics, June 2019
  University of California, Irvine
  Thesis advisor: Richard Schoen

- BS with honors in mathematics, May 2013
  University of Missouri–Columbia
  Magna Cum Laude (3.89/4)

4. Current awards/support:

AMS-Simons travel grant, 2020-2022

5. Publications and preprints:

(1) (joint with Theodora Bourni) Nonplanar ancient curve shortening flows in $\mathbb{R}^3$ from grim reapers. Submitted. arXiv: 2201.02134. (2022)

(2) On self shrinkers of medium entropy in $\mathbb{R}^4$. To appear in Geometry and Topology. arXiv: 2106.10243. (2021)

(3) An unknottedness result for self shrinkers with multiple ends. Submitted. arXiv: 2011.09373. (2020)

(4) An unknottedness theorem for noncompact self shrinkers. Submitted. arXiv:2005.01688. (2020)

(5) Compactness and finiteness theorems for rotationally symmetric self shrinkers. J. Geometric Analysis. 31, 5094–5107 (2021)

(6) (joint with Theodora Bourni and Mat Langford) On the construction of closed nonconvex nonsoliton ancient mean curvature flows. To appear in Int. Math. Res. Not. (2019)

(7) (joint with Alec Payne) Ancient and Eternal Solutions to the Mean Curvature Flow from Minimal Surfaces. Math. Ann., 380 (2021), no. 1, 569-591.

(8) (joint with Alec Payne) Nonconvex Surfaces which Flow to Round Points. To appear in Comm. Anal. Geom. arXiv:1901.02863. (2019)

(9) (joint with Shengwen Wang) Low Entropy and the Mean Curvature Flow with Surgery. To appear in Calc Var PDE. arXiv:1804.04115. (2018)

(10) Regularity and stability results for the level set flow via the mean curvature flow with surgery. To appear in Comm. Anal. Geom. (2018)

(11) (joint with Shengwen Wang) On the topological rigidity of self shrinkers in $\mathbf{R}^3$. Int. Math. Res. Not. 2020, 1933-1941 (2020).

(12) Entropy and generic mean curvature flow in curved ambient spaces. Proc. Amer. Math. Soc. 146 (2018), 2663-2677.

(13) A finiteness theorem via the mean curvature flow with surgery. J Geometric Analysis 28 (2018), 3348–3372.

6. Talks given and planned:

(1) University of Chicago, geometric analysis seminar, 5/24/2022
(2) University of Science and Technology of China, geometric analysis seminar, 5/19/2022
(3) University of Copenhagen, Conference on mean curvature flow and related topics, 3/7/2022 – 3/11/2022
(4) Differential geometry seminar Torino, 12/7/2021
(5) University of Tennessee–Knoxville, geometric analysis seminar, 10/19/2021
(6) Oberwolfach PDE seminar, 7/25/2021 –7/31/2021.
(7) Canadian Mathematical Society 75th + 1 Anniversary Summer Meeting, 6/7/2021–6/11/2021.

(8) Rutgers University, geometric analysis seminar, 2/2/2021.
(9) Jeonbuk National University, online workshop "An invitation to geometric analysis," 12/1/12020 – 12/5/2020.
(10) Cornell University, geometric analysis seminar, 10/16/2020
(11) AMS sectional meeting, Special session "Geometry of Submanifolds and Integrable Systems" 9/12/2020 – 9/13/2020
(12) Harvard University, differential geometry seminar, 4/16/2020
(13) Lafayette–Lehigh geometry-topology conference, Lafayette university, 3/21/2020 Postponed due to COVID-19
(14) University of Pennsylvania, differential geometry seminar, 3/5/2020
(15) University of Tennessee–Knoxville, geometric analysis seminar, 10/25/2019
(16) AMS sectional meeting, Special Session on "Geometric Partial Differential Equations and Variational Methods, II," 11/9/2019
(17) University of California, Santa Cruz, differential geometry seminar, 2/28/2019
(18) University of California, Irvine, differential geometry seminar, 10/16/2018
(19) Contributed talk at the 2018 Barrett lectures, University of Tennessee– Knoxville, 6/1/2018
(20) Contributed talk at math connections 2018, University of California, Riverside, 5/19/2018
(21) University of Tennessee–Knoxville, geometric analysis seminar, 11/29/2017
(22) California State University Fullerton, colloquium, 4/28/2017

7. Teaching experience:

I have been/will be the instructor for the following courses at JHU:
- math 110.107 Calculus 2 for Biological and Social Sciences
- math 110.302 Differential Equations and Applications
- math 110.304 Introduction to Number Theory
- math 110.405 Real Analysis 1
- math 110.406 Real Analysis 2
- math 110.416: Honors Analysis 2
- math 110.439: Intro to Differential Geometry
- math 110.619: Lie Groups and Lie Algebras
- math 110.745 Introduction to Curvature Flows
- math 110.800 Independent Study-Graduates (reading course on minimal surfaces)

I have been a teaching assistant for the following courses at UCI, most multiple times:
- math 2B: single variable integration
- math 2E: multivariable integration
- math 3A: introduction to linear algebra

- math 3D: elementary differential equations
- math 118: theory of differential equations
- math 121B: linear algebra 2
- math 140A: elementary analysis 1
- math 140B: elementary analysis 2
- math 147: complex analysis
- math 161: modern geometry
- math 162A: differential geometry 1

My duties as a TA at UCI were to lead discussion twice a week for typically two courses a quarter, hold office hours, design and grade quizzes, and proctor exams.

8. Past awards/support received:

Received at UC Irvine:

- 2019 Kovalevsky award for outstanding thesis,
- 2017-2018 Connelly award for excellence in research and teaching,
- 2013-2014 GAANN fellowship

Received in undergraduate:

- Hazel Shelton Grabosch award in mathematics,
- Brian W. Dellande scholarship,
- Anthony W. Rollins scholarship,
- Mizzou A&S scholarship,
- Honorable mention in the 2011 mathematical contest in modeling (with Bach Tran and Devin Smittle)

9. Outreach/synergetic activities:

- Co-organizer for the JHU analysis seminar
- Co-organizer for the JHU junior colloquium
- Volunteer for stemcx: tutoring over zoom for K-12 students in Baltimore during the COVID-19 epidemic (fall 2020)

At UCI:

- Co-organizer for the departmental working seminar in geometric analysis: weekly or biweekly talks given by students and faculty on areas of their current research interest.

- Volunteer for the outreach programs math CEO, UCI math circle, mathcounts: these are programs for K-12 students, including those in underserved areas, to foster early interest in mathematics.

10. Article refereeing

I have been a referee for: Journal of the AMS, American Journal of Mathematics, IMRN, Communications in PDE, Transactions of the AMS, Journal of Topology and Analysis, Geometriae Dedicata.