

TOPICS IN GEOMETRIC ANALYSIS I

T. TORO

MATH 581: FALL 2018

Geometric Analysis has seen fundamental breakthroughs in the last few years. The work of Cheeger, Naber, and Valtorta has given crucial information about the size of the critical set of harmonic functions, and about the structure and size of the singular set to solutions of variational problems. The progress on these questions is due to the introduction of amazingly simple and powerful tools. Namely:

- Quantitative Differentiation (Cheeger, Naber, Valtorta)
- Quantitative Stratification (Cheeger, Naber, Valtorta)
- Rectifiable Reifenberg (Naber, Valtorta)

The goal of this class is to present these tools and describe some of their applications.

References:

- *Critical sets of elliptic equations* J. Cheeger, A Naber, D Valtorta (arXiv:1207.4236)
- *Volume estimates on the critical sets of solutions to elliptic PDEs*, A Naber, D Valtorta (arXiv:1403.4176)
- *Rectifiable-Reifenberg and the Regularity of Stationary and Minimizing Harmonic Maps*, A Naber, D Valtorta (arXiv:1504.02043)
- *The Singular Structure and Regularity of Stationary and Minimizing Varifolds*, A Naber, D Valtorta (arXiv:1505.03428)
- *Stratification for the singular set of approximate harmonic maps*, A Naber, D Valtorta (arXiv:1611.03008)
- *Quantitative Reifenberg theorem for measures*, N. Edelen, A Naber, D Valtorta (arXiv:1612.08052)

Instructor Information:

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Office hours: Wednesday 2:15-3:15 or by appointment.

Class schedule: Monday - Wednesday 9:00-10:20. Some Fridays 9:00-10:20.

Prerequisites: Real Analysis or instructors approval.