TALKS

Theodora Bourni (Freie Universität Berlin)

"Null mean curvature" flow and marginally outer trapped surfaces

Abstract: In this talk we discuss a new second order parabolic evolution equation for hypersurfaces in space-time initial data sets, that generalizes mean curvature flow (MCF). In particular, the `null mean curvature' (a space-time extrinsic curvature quantity) replaces the usual mean curvature in the evolution equation defining MCF. This flow is motivated by the study of black holes and mass/energy inequalities in general relativity. We present a theory of weak solutions using level-set methods and outline a natural application of the flow as a parabolic approach to finding (outermost) marginally outer trapped surfaces (MOTS), which play the role of quasi-local black hole boundaries in general relativity. This is joint work with Kristen Moore.

Eduardo García-Río (Universidad de Santiago de Compostela)

Symmetry conditions for Ricci and Ricci almost solitons

Carlo Mantegazza (University of Naples)

Some variations on Ricci flow

Abstract: I will present and discuss some results and problems about some flows of metrics on Riemannian manifolds related to Ricci flow:
- The "renormalization group" flow, truncated at the second order term. The Ricci flow is its truncation at the first order (joint work with L. Cremaschi).
- The "Ricci-Bourguignon" flow, which is a perturbation of the Ricci flow equation by an extra term proportional to the product of the scalar curvature with the metric (joint work with G. Catino, L. Cremaschi, Z. Djadli, L. Mazzieri).
- A "noname" flow that I and N. Gigli introduced using the theory of optimal transport of mass, which is "tangent" to the Ricci flow at the initial time and which can be defined also for some nonsmooth metric spaces.

William H. Meeks, III (University of Massachusetts Amherst)

Recent progress in the theory of constant mean curvature surfaces

Abstract: In this talk I will discuss joint work with Joaquin Perez, Giuseppe Tinaglia, Pablo Mira and Harold Rosenberg. Joint work with Perez and Ros has led to the completion of the classification of properly embedded minimal surfaces of genus 0;

these examples are planes, catenoids, helicoids and Riemann minimal examples. Joint work with Tinaglia proves that compact disks of constant mean curvature 1 embedded in R^3 have curvature estimates away from their boundaries and there exists a universal bound on the intrinsic radius of such disks. Consequently, any complete, simply-connected embedded surface in R^3 with non zero constant mean curvature must be a round sphere. This work implies that complete embedded surfaces in R^3 of positive constant mean curvature have bounded second fundamental forms if and only if the have positive injectivity radius. We also prove that a complete embedded surface in R^3 is proper if it has finite topology or positive injectivity radius. Joint work with Perez and Ros gives the existence of removable singularity results for constant mean curvature laminations and these results lead to a complete understanding of the local structure of CMC foliations of 3-manifolds near any isolated singularity. My talk ends with an outline of my proof with Mira, Perez and Ros of the Hopf Uniqueness Theorem in homogenous 3-manifolds. This generalization proves that two such spheres of the same mean curvature are congruent and provides a description of the associated 1-dimensional moduli spaces.

Jesús Pérez García (Universidad de Granada)

Uniqueness of the grim hyperplane

Abstract: In this talk we discuss a uniqueness theorem for complete embedded translating solitons which are C^2-asymptotic to a grim hyperplane outside a compact set. This is joint work (in progress) with Francisco Martín, Andreas Savas-Halilaj and Knut Smoczyk.

Michele Rimoldi (Università degli Studi di Milano-Bicocca)

Rigidity results and topology at infinity of translating solitons of the mean curvature flow

We discuss some rigidity results and obstructions on the topology at infinity of translating solitons of the mean curvature flow in the Euclidean space. Our approach relies on the theory of f-minimal hypersurfaces.
This is a joint work with D. Impera.

Andreas Savas-Halilaj (Leibniz Universität Hannover)

Translating solitons of the mean curvature flow

Oliver Schnürer (Universität Konstanz)

Mean curvature flow without singularities

Graham Andrew Smith (Universidade Federal do Rio de Janeiro)

On complete embedded translating solitons of the mean curvature flow that are of finite genus

Mu-Tao Wang (Columbia University)

The inverse mean curvature flow and the Penrose inequality

Y.L. Xin (Institute of Mathematics, Fudan University)

Self shrinkers and translators in mean curvature flow