Geometry and Topology Seminar

Spring 2011, METU, Ankara

Time / Location: Mondays 15:40 / İkeda

Schedule of talks

TIME	SPEAKER	TITLE
February 24 Mon, 15:40	General Seminar by Barış Coşkunüzer (Koç University)	Generic uniqueness of area minimizing disks for extreme curves
February 28 Mon, 15:40	Mehmetcik Pamuk (METU)	Contact Structures on 5-Manifolds
March 7 Mon, 15:40	Alexander Degtyarev (Bilkent University)	Hurwitz equivalence of braid monodromy factorizations
March 14 Mon, 15:40	Alexander Degtyarev (Bilkent University)	Hurwitz equivalence of braid monodromy factorizations (part II)
March 17 Thur, 15:40	General Seminar by Mustafa Kalafat (METU)	Analysis and Group Theory on Gravitational Instantons
March 21 Mon, 15:40	Mohan Bhupal (METU)	Nonsqueezing in $R^{2n} \times S^1$ via generating functions
March 26 Sat, 12:30-13:30	Mini Workshop at Seminar Room Burak Özbağcı (Koç University)	Heegaard Floer homology and Seiberg-Witten Floer homology
March 26 Sat, 14:00-15:00	Mini Workshop at Seminar Room Barış Coşkunüzer (Koç University)	Foliations of Hyperbolic Space by Constant Mean Curvature Hypersurfaces
March 26 Sat, 15:30-16:30	Mini Workshop at Seminar Room Tolga Etgü (Koç University)	Tight contact structures on laminar free hyperbolic 3-manifolds
April 4 Mon, 15:40	Elif Medetoğulları (Atılım University)	Tight Contact Structures on Seifert Fibred 3-Manifolds over S^2(SFM)
April 7 Thur, 15:40	General Seminar by Ferit Öztürk (Boğaziçi University)	`Topology, in contact, in real`
April 11 Mon, 15:40	Ferihe Atalan (Ozan) (Atılım University)	McCarthy's result on the first cohomology group of cofinite subgroups in mapping class groups
April 18 Mon, 15:40	Sergey Finashin (METU)	Chirality of real cubic fourfolds and symmetries of hyperbolic lattices via Coxeter's diagrams
April 25 Mon, 15:40	Sergey Finashin (METU)	Chirality of real cubic fourfolds and symmetries of hyperbolic lattices via Coxeter's diagrams (part II)
May 2 Mon, 15:40	Sergey Finashin (METU)	Cubic curves and surfaces: some complex and real enumerative aspects
May 9 Mon, 15:40	Ahmet Beyaz (METU)	Some Symplectic 6-Manifolds
May 16 Mon, 15:40	Cağrı Karakurt (Texas Austin)	Action of the cork twist on Floer homology

Abstracts

Mehmetcik : In this talk first I will review some existence results about contact structures on 5-manifolds.   Then I am going to talk about the work in progress with Ahmet Beyaz about symplectic fillings of contact 5-manifolds.

Bayram : I will talk about some modifications and extensions of general theory of relativity (GR). Since GR does not work at extremely small and large distances as well as it does in the solar system scale, physicists search for consistent extensions of the theory. I hope to give some basic introduction to these theories.

Mustafa : We give a brief survey of conjectural classification of the gravitational instantons, which are exact solutions to the Einstein field equation in general relativity. Then we show that a complete simply-connected hyperkahlerian 4-manifold with an isometric triholomorphic circle action is obtained from the Gibbons-Hawking ansatz with some suitable harmonic function. This comes as an application of classification of positive harmonic functions. This is joint work with Justin Sawon.

Burak : Kutluhan-Lee-Taubes proved recently that the Heegaard Floer homology and the Seiberg-Witten Floer homology of a 3-manifold are isomorphic. In my talk I will outline their proof.

Barış : In this talk, we first give a survey of known results on asymptotic Plateau problem. Then we give a sketch of the proof of the following statement: the constant mean curvature hypersurfaces in the hyperbolic n-space spanning the boundary of a star shaped domain in the asymptotic sphere give a foliation of the hyperbolic n-space.

Elif : By Honda, Kazez and Matic (also independently by Colin), it is known that if there is an incompressible torus in a closed, connected, irreducible 3-manifold M, one can construct infinitely many tight contact structures on M. When a SFM has 4 or more singular fibers, there is always a vertical incompressible torus, so that one can construct infinitely many tight contact structures all of which have positive torsion. If we fix the torsion it is also known that there will be a finite number of tight contact structures. However this number is not known for many cases. Following the techniques that is used to find the number of tight contact structures on SFM with 3 singular fibers by Honda, Wu, Ghiggini, we derived the number of Stein fillable, zero torsion tight contact structures for some cases depending on the e-0 invariant of the SFM with 4 singular fibers.In this talk we will try to mention the techniques that are used to find these numbers. (and if there is time left, we will try to mention the problems about the cases e-0=-1,-2,-3 and what is done for SFM with 3 singular fibers for these problematic cases.)

Ferit: On every 3-manifold there is a completely non-integrable 2-plane distribution called a contact structure. Some 3-manifolds have an orientation preserving, nontrivial Z=2 action called a real structure. If the real structure sends the contact structure to its negative, such a pair on the manifold is called a real contact structure. The natural examples of real contact 3-manifolds are links of algebraic surface singularities given by polynomials with real coefficients. In this talk I am going to present some recent results with Nermin Salepci, including uniqueness of real tight contact 3-ball and the Giroux correspondence in real setting. The talk will be elementary and will be a mixture of mathematics and the impressions of Mexican mathematical life that I acquired during my short stay in Cuernavaca.

Ferihe: Let S be a connected closed orientable surface of genus g>2. Suppose that - is a subgroup of finite index in the mapping class group containing the Torelli group. In this talk, I will give the proof of the fact that the first cohomology group of - with integer coefficients is trivial which is proved by J.D. McCarthy.

Sergey: The problem of chirality of real algebraic hypersurfaces (i.e., deformation equivalence of ones to their mirror-reflection image) in the case of cubic fourfolds is reduced to a certain symmetry problem for the corresponding hyperbolic lattices (the eigenlattices of the complex conjugation). This symmetry is detected by Coxeter's diagram of the corresponding root systems. I will try to explain the geometry of the hyperbolic polyhedra and their symmetries behind these constructions.

Sergey: Complex cubic surface contain 27 lines. If the surfaces are real and the lines are counted with certain signs, then the algebraic sum is 3. This kind of phenomena will be discussed.

Çağrı: We utilize the Ozsvath-Szabo contact invariant to detect the action of involutions on certain homology spheres that are surgeries on symmetric links, generalizing a previous result of Akbulut and Durusoy. Potentially this may be useful to detect different smooth structures on 4-manifolds by cork twisting operation. This is a joint work with S. Akbulut.