Young Women in Geometric Topology

Hausdorff Center for Mathematics

July 13-15, 2026

Schedule

	Monday	Tuesday	Wednesday
930	Miniseries 1.1 (Loving)	Miniseries 2.1 (Silvero)	Miniseries 2.2 (Silvero)
1000			
1030	Coffee		
1100	Short talk (Morgan)	Miniseries 1.2 (Loving)	Short talk (Terron)
1130	Short talk (Monika)		Short talk (Marino)
1200	Lunch		
1230			
1300			
1330	Plenary talk (Kjuchukova)	Lightning talks (10 mins each)	Plenary talk (Casali)
1400			
1430	Career talk (Kjuchukova)		Short talk (Truöl)
1500	Coffee		
1530	Panel discussion (Loving, Piacenza, Truöl)	Career talk (Loving)	Career talk (Silvero)
1600		Career talk (Casali)	Small group discussions
1630		Small group pre-discussion	
1700			
1730		Barbecue	
1800			
1830			
1900			
1930			
2000			

Venue: Hausdorff Institute for Mathematics

45 Poppelsdorfer Allee, 53115 Bonn, Germany.

Minicourses

Speaker: Marissa Loving
Affiliation: University of Wisconsin-Madison
Title: An intro to end-periodic homeomorphisms
Abstract: In my first talk, I will introduce a type of homeomorphism of certain infinite-type surfaces that displays a wide range of interesting geometric, topological, and dynamical behaviors. For example, end-periodic homeomorphisms admit hyperbolic mapping tori whose volume can be controlled by their action on a naturally associated graph. In my second talk, I will focus on some of my recent work exploring the dynamics of end-periodic homeomorphisms via their stretch factors.

Speaker: Marithania Silvero
Affiliation: University of Seville
Title: From Jones polynomial to Khovanov homology
Abstract: Khovanov homology was introduced as a categorification of the celebrated Jones polynomial. This bigraded homological invariant detects the unknot and provides geometric and topological information about knots (for example, it gives a lower bound for the 4-genus and detects fiberedness among positive links). In this short course we will review the definition of Khovanov homology and present some of its main properties. We will also explore the Khovanov skein sequence and sketch how to use it to get interesting (new) results.

Plenary talks

Speaker: Maria Rita Casali
Affiliation: University of Modena and Reggio Emilia
Title: Kirby diagrams, trisections and gems of PL 4-manifolds
Abstract: The talk reviews the main achievements regarding the interactions between gem theory (which makes use of edge-colored graphs to represent PL-manifolds of arbitrary dimension) and both the classical representation of PL 4-manifolds via Kirby diagrams and the more recent one via trisections. In particular, algorithmic procedures are presented to pass from one representation to the other, allowing to yield estimations of the involved invariants, as well as to produce examples of triangulations of exotic 4-manifolds.

Speaker: Alexandra Kjuchukova
Affiliation: University of Notre Dame
Title: From linking numbers in S^3 to building covers of B^4
Abstract: I will give a sharp homotopy-theoretic obstruction to extending a branched cover of a knot K in S^3 to a cover of B^4 branched along a smooth surface bounded by K. In the case of dihedral covers, the obstruction can be evaluated by computing the self-linking number of a single curve in a Seifert surface for K. I will illustrate the computation in examples and explain how to build the branching surface when the obstruction vanishes. As an aside, I will show that the same self-linking number is enough to prove that an infinite family of algebraically slice knots are not ribbon. Joint work with Kent Orr.

Short talks

Speaker: Monika
Affiliation: University of Warsaw
Title: Contact surgery numbers of projective spaces
Abstract: A celebrated theorem of Ding and Geiges states that every connected, oriented, closed 3-manifold with a cooriented contact structure can be obtained via contact surgery along a Legendrian link in the standard tight contact 3-sphere. This leads to a complexity measure for contact 3-manifolds: the contact surgery number (csn), which is defined as the minimal number of components required in such a link presentation. The contact surgery numbers for the 3-sphere, certain lens spaces, and Brieskorn spheres have been studied extensively in the works of John Etnyre, Rima Chatterjee, Marc Kegel, and Sinem Onaran. In this talk I will talk about the joint work with Marc Kegel which extends the study of csn to projective spaces by classifying all contact structures on 3-dimensional projective spaces that have contact surgery number 1. We also see that there exists infinitely many contact structures on 3-dimensional projective spaces with csn 2.

Speaker: Laura Marino
Affiliation: University of Hamburg
Title: The singular surfaces behind link homologies
Abstract: Khovanov–Rozansky homology is a way of enhancing a polynomial invariant of links into a homology theory, whose rich structure captures geometric information on links. The backbone of the construction are certain singular surfaces, equipped with a labelling of their facets, called foams, along with an evaluation of closed foams. In this talk, after explaining how foams appear in link homologies, I will describe a calculus for foams in 3d space. This is based on joint work with L. J. Goertz and P. Wedrich.

Speaker: Porter Morgan
Affiliation: University of Massachusetts-Amherst
Title: Constructing irreducible 4-manifolds with spin universal covers
Abstract: A closed, smooth, orientable 4-manifold X with order two fundamental group is determined up to homeomorphism by its intersection form and its w2-type, i.e. whether it and its double cover admit spin structures. There are three possible options for the w2-type: (1) X and its double cover are both non-spin, (2) X and its double cover are both spin, and (3) X is non-spin but its double cover is spin. In this talk, we'll review fundamental properties of spin structures, from which we'll derive tools to determine the w2-type of a given manifold. Then we'll outline how to construct irreducible 4-manifolds with each possible w2-type. This is joint work with Mihail Arabadji.

Speaker: Susanna Terron
Affiliation: University of Glasgow
Title: Automorphisms on Khovanov homology
Abstract: Since the introduction of Khovanov homology, its functoriality, or the lack thereof, has been a central topic of research. Starting from the cobordism category, one can associate to each cobordism a morphism in Khovanov homology, well defined up to a sign. But what morphisms can be obtained in such a way? In this talk I'll recall the correspondence between cobordisms and maps on Khovanov homology, and define the monodromy group, first introduced by Jacobsson in 2002, focusing on automorphisms induced by circular cobordisms.

Speaker: Paula Truöl
Affiliation: University of Glasgow
Title: The Conway knot has infinite concordance order
Abstract: A knot in the 3-sphere is slice if it bounds a smooth disk in the 4-ball. One long-standing problem in knot theory was determining whether the Conway knot was slice. In 2018, Lisa Piccirillo solved this problem by proving that the knot is not slice. In this talk, we will highlight some of the ideas in her proof. If time permits, we will also discuss a similar strategy from our ongoing joint work with Chiara Donatone, Marc Kegel, and Lukas Lewark, where we show that the Conway knot has infinite concordance order. In other words, every m-fold connected sum of m copies of the Conway knot is not slice.

Lightning talks

Speaker: Giulia Carfora
Affiliation: University of Glasgow
Title: An obstruction to lens spaces embedding in $\mathbb{C}P^2$
Abstract: In this talk, we discuss an obstruction to lens spaces embedding in $\mathbb{C}P^2$, derived by Owens. It is known that any lens space $L(p,q)$ that embeds in $\mathbb{C}P^2$ separates it into a rational homology 4-ball B and a positive definite manifold M such that $H_1(M) = 0$ and $H_2(M) = \mathbb{Z}$. Lisca classified lens spaces bounding rational homology balls. We may construct a new manifold X by gluing M to P, the positive definite plumbing bounded by $-L(p,q)$. Then, by Donaldson's Diagonalisation Theorem, the intersection lattice of X is equivalent to the standard intersection lattice on $\mathbb{Z}^{b_2(P)+1}$. Using the obstruction derived by Owens, we obtain additional conditions on the embedding of the intersection lattice of P in $\mathbb{Z}^{b_2(P)+1}$, and thus determine which lens spaces of type 2 or 3 from Lisca's classification are unobstructed from embedding in $\mathbb{C}P^2$.

Speaker: Gemma Di Petrillo
Affiliation: University of Trento
Title: Deformations of hyperbolic 3-manifolds in the 5-dimensional hyperbolic space: a combinatorial approach featuring quaternions
Abstract: By Mostow-Prasad rigidity, finite-volume hyperbolic 3-manifolds admit a unique complete hyperbolic structure. However, one can try to deform this structure in higher-dimensional spaces, in the following sense: every such manifold M naturally induces a 5-dimensional hyperbolic manifold M', with infinite volume, which is diffeomorphic to $M \times \mathbb{R}^2$ and into which M lies geodesically as the horizontal section $M \times \{0\}$. Does the new manifold M' admit new hyperbolic structures? In this short seminar, I will present an approach to this deformation problem, based on the work of Thurston on the hyperbolic Dehn filling theorem. The main idea is to equip the manifold M with an ideal triangulation, realize the tetrahedra geometrically in the hyperbolic space, and then glue them back together with isometries. In the three-dimensional case, this procedure admits an algebraic translation via complex shape parameters and gluing equations. In our setting, the hyperbolic 5-space is identified with $\mathcal{H} \times \mathbb{R}^+$, where $\mathcal{H}$ is the algebra of quaternions. I will show how this leads to quaternionic shape parameters and consistency equations, which can be solved explicitly for the figure-eight knot complement.

Speaker: Şeyma Karadereli
Affiliation: Boğaziçi University
Title: Real algebraic overtwisted contact structures on 3-spheres
Abstract: A real algebraic link in the 3-sphere is defined as the zero locus in the 3- sphere of a real algebraic function from $\mathbb{R}^4 \to \mathbb{R}^2$ with an isolated singularity at the origin. A real algebraic open book decomposition on the 3-sphere is by definition the Milnor fibration of such a real algebraic function. In this talk, I would like to present our published result together with recent progress I have made, which together prove that every overtwisted contact structure on the 3-sphere is real algebraic with the pages of the associated open books being planar.

Speaker: Pamela Shah
Affiliation: University of British Columbia
Title: A Fake Hopf Link
Abstract: Examples of non-trivial links with trivial Jones polynomial are known to exist, at least for links with more than one component. The question of whether the Jones polynomial detects the unknot U has been open since the polynomial's discovery in the early '80s. It is also unknown whether there exists a fake unknot, that is, a knot K with $V_K(t) = \pm t^n V_U(t)$ for some integer n. The Hopf link is the simplest non-trivial two-component link. In this lightning talk, we answer the question: does there exist a fake Hopf link?

Speaker: Maria Stuebner
Affiliation: University of Oxford
Title: The Casson–Whitney Number of Twist-Roll Spun Knots
Abstract: The smooth 4-dimensional Poincaré conjecture, which asks whether every homotopy 4-sphere is also diffeomorphic to the 4-sphere, remains one of the key open problems in geometric topology. One construction for possibles counterexamples is the Gluck twist, obtained by removing a tubular neighborhood of a 2-knot and regluing via the nontrivial diffeomorphism. Schwartz and Naylor recently proved that the Gluck twist of any twist-roll spun knot with unknotting number one is standard, using a length-one regular homotopy to the unknot. I will present an infinite family of twist-roll spun knots for which no such length-one homotopy exists, obstructing a direct extension of their argument. The key tool is an inequality chain squeezing the Casson–Whitney number between the Nakanishi index of the Alexander module and the classical unknotting number, together with the result that rolling leaves the Alexander module invariant.