IMBM[1] Istanbul Topology Days
A Conference on Developments in Contact Topology, Mapping Class Groups, and Beyond

Schedule and Abstracts



Boğaziçi University
May 14 – 17, 2026
Istanbul, Turkey

[1]Istanbul Center for Mathematical Sciences

Istanbul Topology Days: A Conference on
Developments in Contact Topology, Mapping Class Groups, and Beyond
Boğaziçi University, Istanbul, Turkey
May 14 – 17, 2026

Invited Speakers

Mustafa Korkmaz (Middle East Technical University, Turkey)
Aleksandra Marinković (University of Belgrade, Serbia)
Gordana Matić (University of Georgia, USA)
Elif Medetoğulları (TED University, Turkey)
Ina Petkova (Dartmouth College, USA)
Bülent Tosun (University of Alabama, USA)
Andy Wand (University of Glasgow, Scotland)
Öykü Yurttaş (Boğaziçi University and Dicle University, Turkey)

Conference Scientific Committee:

Ko Honda (University of California, Los Angeles, USA)
Yıldıray Ozan (Middle East Technical University, Turkey)
Athanase Papadopoulos (University of Strasbourg, France)

Conference Organizing Committee:

Bahar Acu (Boğaziçi University and Pitzer College of the Claremont Colleges)
Ferit Öztürk (Boğaziçi University)
Öykü Yurttaş (Boğaziçi University and Dicle University)

Local Organizing Committee:

Bahar Acu (Boğaziçi University and Pitzer College of the Claremont Colleges)
Ahmet Yasin Çakmak (Boğaziçi University)
Ronahi Haykır (Boğaziçi University)
Şeyma Karadereli (Boğaziçi University)
Kerem Kubilay (Boğaziçi University)
Cem Yalım Özel (Boğaziçi University)
Ferit Öztürk (Boğaziçi University)
Öykü Yurttaş (Boğaziçi University and Dicle University)

Conference Funding and Website:

This conference is supported by TÜBİTAK 1001 under Grant No. 124F147 and TMD-MAD Fund of Turkish Mathematical Society.

https://sites.google.com/view/istanbultopologydays/

Schedule

All talks will be held in Anderson Hall TB 310.

Thursday, May 14, 2026 (Day 1)

9:00–9:45	Registration
9:45–10:00	Opening Remarks
10:00–11:00	**Aleksandra Marinković** (Background Talk)
11:00–11:30	Çay/Kahve Break
11:30–12:30	**Mustafa Korkmaz** (Background Talk)
12:30–2:30	Lunch
2:30–3:30	**Andy Wand** (Background Talk)
3:30–4:00	Çay/Kahve Break
4:00–5:00	**Bülent Tosun** (Background Talk)

Friday, May 15, 2026 (Day 2)

10:00–11:00	**Ina Petkova** (Background Talk)
11:00–11:30	Çay/Kahve Break
11:30–12:30	**Gordana Matić** (Research Talk)
12:30	Conference Photo
12:30–2:30	Lunch
2:30–3:30	**Mustafa Korkmaz** (Research Talk)
3:30–4:00	Çay/Kahve Break
4:00–5:00	**Elif Medetoğulları** (Research Talk)
6:30–	Conference Dinner

Schedule

All talks will be held in Anderson Hall TB 310.

Saturday, May 16, 2026 (Day 3)

10:00–11:00	**Aleksandra Marinković** (Research Talk)
11:00–11:30	Çay/Kahve Break
11:30–12:30	**Bülent Tosun** (Research Talk)
12:30–2:30	Lunch
2:30–3:30	**Andy Wand** (Research Talk)
3:30–4:00	Çay/Kahve Break
4:00–5:00	Lightning Talks

- Hasan Suluyer (METU)
- Jerónimo García-Mejía (University of Warwick)
- Emir Gül (METU)
- Rohan Suresh Mahure (IISERB)
- Nur Sağlam (University of Georgia)
- Şeyma Karadereli (Boğaziçi)
- Saliha Kıvanç (Hacettepe)
- Oğuz Şavk (METU)
- Livio Ferretti (University of Glasgow)
- Manousos Manouras (Nantes)

Sunday, May 17, 2026 (Day 4)

10:00–11:00	**Öykü Yurttaş** (Research Talk)
11:30–12:30	**Ina Petkova** (Research Talk)
12:30	Closing

Invited Talks Titles and Abstracts

Mustafa Korkmaz, Middle East Technical University, Ankara, Turkey
Background Talk:
Title: Mapping class groups of surfaces
Abstract: The surface mapping class group is a fundamental object in low-dimensional topology. In this introductory talk, I will introduce these groups, their group theoretical properties, specializing on certain relations and various generating sets.

Research Talk:
Title: Low-dimensional linear representations of mapping class groups
Abstract: One of the central unsolved problems in the theory of mapping class groups is the existence of a faithful linear representation into the general linear group of the n-dimensional complex vector space for some n. For an orientable surface of genus g, there is a well-known symplectic representation of dimension $2g$. I will discuss that following:

1. Any representation of dimension less than $2g$ is trivial.
2. Up to conjugacy, the symplectic representation is the unique nontrivial linear representation in dimension $2g$.
3. There is no faithful linear representation in dimensions less than $4g - 3$.
4. The classification of representations in dimension $2g + 1$.

Aleksandra Marinković, University of Belgrade, Serbia
Background Talk:
Title: Symplectic and contact toric manifolds
Abstract: I will first explain basic properties of toric actions on closed symplectic manifolds. Then, I will introduce toric actions on symplectic manifolds with a convex or concave contact type boundary. Such a toric action preserves the contact structure on the boundary, and, therefore, the boundary itself is a contact toric manifold. To every contact toric manifold we associate a moment cone, a moment map image of the symplectisation, that also admits a toric action. I will describe how to recognise from the moment cone if the contact toric 3-manifold is tight or overtwisted.

Research Talk:
Title: Concave contact structures on linear plumbings and generalisations
Abstract: In this talk I will first recall the plumbing construction of 4-manifolds, according to the associated plumbing graphs. Plumbings are introduced in 60th's by Milnor and Wall, and later developed by Hirzebruch, Neumann etc. Then, I will explain how to impose a symplectic structure with a contact type boundary on these manifolds. When all base surfaces are spheres and the plumbing is linear, I will show that, if at least one self-intersection number of base spheres is non-negative, the plumbing admits a structure of a symplectic toric manifold with a concave contact boundary. I will explain how to determine if this contact structure is tight or overtwisted, by looking into the corresponding moment cone that depends only on self-intersection numbers of base spheres. I will extend these results to certain non-linear plumbings. This talk is based on a joint work with Jo Nelson, Ana Rechtman, Laura Starkston, Shira Tanny and Luya Wang.

Gordana Matić, University of Georgia, USA
Research Talk:
Title: Calculating Spectral Order in Heegaard Floer Homology
Abstract: We describe an invariant of contact structures in dimension three that arises as a refinement of the Ozsvath-Szabo contact class in Heegaard Floer homology. This "spectral order" invariant takes values in the set $Z_{\geq 0} \cup \infty$. It is zero for overtwisted contact structures, and computable (in a limit) from any supporting open book decomposition. It is nondecreasing under Legendrian surgery, hence ∞ for Stein-fillable contact structures, so finiteness of the invariant is an obstruction to Stein fillability. We give some examples and describe an algorithm to compute the spectral order associated to a given open book and a basis of arcs on the page. This is joint work with Cagatay Kutluhan, Jeremy Van Horn-Morris and Andy Wand.

Elif Medetoğulları, TED University, Turkey
Research Talk:
Title: Ping-Pong and Beyond via Dynnikov Coordinates
Abstract: Dynnikov coordinates give a combinatorial description of curves on punctured disks, where mapping class group actions are expressed by piecewise-linear update rules. In this talk, I use these coordinates to study subgroups generated by relaxed curves. For configurations of relaxed curves with prescribed intersection properties, I define regions in the coordinate space and use them to implement a ping-pong argument for freeness. The update rules allow us to track how these regions behave under the action by following how inequalities between coordinate entries change.

The argument is based on the use of the update rules together with explicit computations. We also get a refinement of a classical intersection-type inequality, and a coordinate-based description of constructions of free and right-angled Artin subgroups. This work was carried out within the scope of a TÜBİTAK No:123F221 research project.

Ina Petkova, Dartmouth College, USA
Background Talk:
Title: An Introduction to Knot Floer Homology
Abstract: Knot Floer homology is a powerful invariant of knots and links, developed by Ozsvath and Szabo in the early 2000s. Among other properties, it detects the genus, detects fiberedness, and gives a lower bound to the 4-ball genus. The original definition involves counting holomorphic curves in a high-dimensional manifold, and as a result the invariant can be hard to compute. In 2007, Manolecu, Ozsvath, and Sarkar came up with a purely combinatorial description of knot Floer homology for knots in the 3-sphere, called grid homology. I will sketch an outline of the original construction, and then discuss grid homology in greater detail.

Research Talk:
Title: GRID Invariants Generalizations and Lagrangian Cobordisms
Abstract: In 2006, Ozsvath, Szabo, and Thurston defined invariants of Legendrian knots using grid homology. I will describe various generalizations of these GRID invariants, and use them to obstruct decomposable Lagrangian cobordisms in the symplectization of the standard contact structure. Based on collaborations with: Jubeir, Schwartz, Winkeler, and Wong; Lewis, Ojakli, and Shapiro; Wong.

Bülent Tosun, University of Alabama, USA

Background Talk:

Title: On embedding problems for 3-manifolds in 4-space

Abstract:In this pre-talk I will focus on various 3-manifold embedding problems in 4-dimensional Euclidean space $\mathbb{R}^4$. Given a closed, orientable 3-manifold Y, it is of great interest but often a difficult problem to determine whether Y may be smoothly embedded in $\mathbb{R}^4$. This is the case even for integer homology spheres, and restricting to special classes such as Seifert manifolds; the problem is open in general. On the other hand, under additional geometric considerations coming from symplectic geometry (for example, hypersurfaces of contact type in $\mathbb{R}^4$) or complex geometry (such as the boundaries of holomorphically or rationally convex domains in complex Euclidean space $\mathbb{C}^2$), the problems often become tractable and in certain cases a uniform answer is possible. I will survey these perspectives, explain how they relate to one another and highlight related conjectures and open problems.

Research Talk:

Title: On Weinstein domains in symplectic manifolds

Abstract: In this talk, I will focus will be on the topology of contact type hypersurfaces in symplectic manifolds. More specifically, I will investigate the question: given a (simple) symplectic manifold X, which manifolds can arise as contact type hypersurfaces in X? The situation in dimension 4, which will be our primary focus, is expected to be significantly more constrained. After providing some background and context, I will report on recent joint work with T. Mark that identifies an obstruction for a contact 3-manifold to embed in certain closed symplectic 4-manifolds as the boundary of a Weinstein domain – a stronger requirement than contact type. I will also explore consequences of this obstruction for the symplectic topology of such domains in small rational surfaces.

Andy Wand, University of Glasgow, Scotland

Background Talk:

Title: Mapping class group monoids in contact topology

Abstract:Many fundamental properties of contact structures can be characterized by monoids in surface mapping class groups; this viewpoint moreover provides a particularly accessible framework for introducing such properties. This talk will describe a number of these monoids, focusing on background concepts and relevance to current research.

Research Talk:

Title: Positivity and Stein fillability of contact 3-manifolds

Abstract: We will discuss motivation for and approaches to the question of when the monoid in the mapping class group of a surface with boundary corresponding to monodromies of open book decompositions of Stein fillable contact 3-manifolds differs from the monoid of mapping classes which admit factorizations into positive Dehn twists. In particular, combining new(ish) results with previous work of several people, we give a complete solution to this problem, showing that the monoids coincide only for planar surfaces. This is joint work with Vitalijs Brejevs.

Öykü Yurttaş, Boğaziçi University and Dicle University, Turkey
Research Talk:
Title: Fast computations for pseudo-Anosov mapping classes
Abstract: We present a quadratic-time algorithm for computing the stretch factor and invariant measured foliations of a pseudo-Anosov mapping class given as a word in the generators, in joint work with Margalit, Strenner, and Taylor. This gives the first sub-exponential time algorithm for the problem. We also introduce a tropical Laurent polynomial representation of the mapping class group of a punctured surface, developed with Alessandrini, via explicit formulae describing the action of each generator in terms of normal coordinates, which we use to illustrate the algorithm.

Lightning Talks Session Titles and Abstracts

Presenter: Livio Ferretti (University of Glasgow, Scotland)
Title: *Invariant framings for fibred links*
Abstract: We will introduce the notion of an invariant framing for a fibred link, i.e. a nowhere-vanishing vector field on the fibre surface which is invariant under the action of the monodromy, and state some partial results and open questions concerning the existence of such framings.

Presenter: Jerónimo García-Mejía (University of Warwick, UK)
Title: *No distortion allowed: Mapping class groups, Out(F_n), and beyond*
Abstract: The study of mapping class groups of finite-type surfaces has long inspired work on the outer automorphism groups of free groups, $\mathrm{Out}(F_n)$. These groups share important features. One example is that their simplest subgroups, those generated by a single infinite element, sit inside the group in a "nice" geometric way, they are undistorted (they look like straight lines at large scale).

The group $\mathrm{Out}(F_n)$ is part of the broader family of outer automorphism groups of right-angled Artin groups (RAAGs), which also includes $\mathrm{GL}(n,)$.This leads to a natural question: do the shared features properties still hold in this broader setting?

A step in this direction comes from a subgroup called the "untwisted" automorphisms, introduced by Charney, Stambaugh, and Vogtmann. Roughly speaking, this subgroup behaves more like $\mathrm{Out}(F_n)$ than like $\mathrm{GL}(n,)$. Work of Fioravanti shows that this subgroup can also be described as the group of automorphisms preserving a certain large scale structure canonically associated to the RAAG. We prove that in this setting too, cyclic subgroups remain well-behaved: they are undistorted. This is based on work in progress with Ric Wade.

Presenter: Emir Gül (Middle East Technical University, Turkey)
Title: *Involution Generators for Big Mapping Class Groups*
Abstract: For surfaces of finite type, the structure of the mapping class group is a classical and well-understood subject. We know that these groups are generated by finitely many Dehn twists and, perhaps more surprisingly, can even be generated by a small number of torsion elements. However, the story changes dramatically when we consider surfaces of infinite type. In this setting, the mapping class group becomes a Polish group, and standard generating sets often fail to capture the full topological complexity of the group. Let $S(n)$, for $n \in \mathbb{N}$, be the infinite-type surface of infinite genus with n ends, each of which is accumulated by genus. The mapping class groups of these types of surfaces, $\mathrm{Map}(S(n))$, are not countably generated but they can be topologically countably generated. We show that for $n \geq 16$, $\mathrm{Map}(S(n))$ can be topologically generated by four involutions. Furthermore, the mapping class groups of the Loch Ness Monster surface ($n = 1$) and the Jacob's Ladder surface ($n = 2$) can be topologically generated by three involutions. Based on joint work with Tülin Altunöz, Celal Can Bellek, Mehmetcik Pamuk and Oğuz Yıldız.

Presenter: Şeyma Karadereli (Boğaziçi University, Turkey)
Title: *Real Algebraic Overtwisted Contact Structures on 3-Sphere*
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 will present our recent result which proves that every overtwisted contact structure on the 3-sphere with positive three-dimensional invariant d_3 are real algebraic with the pages of the associated open books being planar.

Presenter: Saliha Kıvanç (Hacettepe University, Turkey)
Title: *Legendrian Non-simple Knots: The Case of Whitehead Doubles*
Abstract: Legendrian knot theory provides a rich framework for studying knots in contact geometry. This talk focuses on Whitehead doubles of the trefoil knot and demonstrates their non-simplicity, meaning that knots sharing the same classical invariants can still be distinct. This distinction is detected using the LOSS invariant from knot Floer homology, highlighting the power of modern invariants in distinguishing knots where classical invariants fail.

Presenter: Rohan Suresh Mahure (Indian Institute of Science Education and Research, India)
Title: *Pseudo-Anosov-like maps on the infinite ladder surface*
Abstract: Let S_g be the closed surface of genus g, $\mathcal{L}$ be the infinite Jacob's ladder surface, and $\mathrm{Map}(S)$ denote the mapping class group of a surface S. Let $q_g : \mathcal{L} \to S_g$ be the regular infinite-sheeted cover with deck transformation group $\mathbb{Z}$. In this talk, we show the existence of "pseudo-Anosov-like" maps on $\mathcal{L}$ that arise as the lifts of Penner-type pseudo-Anosov maps on S_g under the cover q_g. Furthermore, we establish that these lifts are topologically transitive, mixing, and support null recurrent dynamics. Moreover, we present concrete examples of infinite families of such maps on $\mathcal{L}$.

Presenter: Manousos Manouras (Nantes Université, France)
Title: *Twisted Alexander polynomials of plane algebraic curves*
Abstract: The topology of plane algebraic curves, initiated by the work of Enriques and Zariski. The fundamental group of their complement is a natural invariant, strong enough to show that the combinatorial description of the curve may not determine its embedding. The twisted Alexander polynomials provide an accessible invariant of the group, still very sensitive to these phenomena. We study twisted Alexander polynomials, focusing on the reducible nonabelian $SL_2(\mathbb{C})$ representations. We describe a geometric parametrization of all such reducible families as projective varieties whose dimensions are governed by characteristic varieties. We show that these invariants can be computed explicitly and that their variation is controlled by a finite linear stratification of the reducible representation space, on which the Reidemeister torsion remains locally constant.

Presenter: Nur Sağlam (University of Georgia, USA)
Title: *Contact τ-Invariant for dual knots*
Abstract: The Heegaard Floer τ-invariant is a knot concordance invariant that bounds the 4–ball genus of a knot in S^3 defined by Ozsváth and Szabó using Knot Floer Homology. Later, Raoux generalized their construction to knots in a rational homology sphere and obtained lower bounds

in some of these invariants. There are various computations of τ-Invariant for many manifolds like this, for example, contact τ-invariant defined by Hedden. Motivated by these works, we aim to compute it for dual knots. Let L be a Legendrian knot in S^3 with the standard contact structure and (Y, ξ) be the manifold obtained by Legendrian surgery on L. Our goal is to calculate the τ-invariant $\tau_\xi(S^3_{tb-1}(K), K_{tb-1})$ of the dual knot K in terms of the smooth τ-invariant $\tau(K)$ in S^3 and the surgery info. This is joint work with Katherine Raoux.

Presenter: Hasan Suluyer (Middle East Technical University, Turkey)
Title: *On Conic-Line Curves of Special Pencils*
Abstract: A *pencil* is a line in the projective space of homogeneous polynomials in $\mathbb{C}[x_0, x_1, x_2]$ of some degree $d > 2$. The number m of curves whose irreducible components are only lines in some pencils of degree d curves plays an important role for the existence of special line arrangements, which are called $(m, d)-$nets. It is known that m cannot exceed 4. When the degree of each irreducible component of a curve is at most 2, this curve is called a conic-line curve and it is a union of lines or irreducible conics in the complex projective plane. Using purely algebraic–geometric and combinatorial arguments, we establish explicit upper bounds on m corresponding to the number of members of concurrent lines.

In this talk, I will present my research on constraints on the number m of conic-line curves that can appear in special pencils. I establish an upper bound, showing that $m \leq 6$. I conjecture that for large values of d, the number m of conic-line curves in a pencil must be at most 4.

Presenter: Oğuz Şavk (Middle East Technical University, Turkey)
Title: *Every negative amphichiral knot is rationally slice*
Abstract: Kawauchi proved that every strongly negative amphichiral knot is rationally slice, while Hartley showed that not all negative amphichiral knots are strongly negative amphichiral. In this talk, we extend Kawauchi's result by proving that every negative amphichiral knot is rationally slice, using a careful analysis of the JSJ decompositions of their knot complements. This is joint work with Alessio Di Prisa and Jaewon Lee.