YOUNG TOPOLOGISTS MEETING 2026

Copenhagen, Denmark
29 June - 3 July, 2026

Schedule & abstracts

University of Copenhagen

General information

Conference overview

Young Topologists Meeting 2026 will take place at the Department of Mathematical Sciences, University of Copenhagen. This booklet follows the online programme and the submitted speaker list. Room assignments: main lectures and a-slots are in Auditorium 4; b-slots are in Auditorium 3.

• Dates: 29 June - 3 July, 2026.

• Venue: Department of Mathematical Sciences, Universitetsparken 5, 2100 Copenhagen.

• Main lectures: Achim Krause (University of Oslo) and Luciana Basualdo Bonatto (University of Oxford).

• Auditorium 4: main lectures and contributed talks 1a-20a.

• Auditorium 3: contributed talks 1b-20b.

• Main webpage: math.ku.dk/english/calendar/events/ytm26/.

Monday

29 June 2026

Time	Auditorium 4	Auditorium 3
08:30-09:15	**Registration**	
09:15-09:30	**Opening**	
09:30-10:30	**Achim Krause (University of Oslo)** **Main lecture 1** **Auditorium 4**	
11:00-11:30	1A Jackson Morris University of Washington Higher Witt K-theory	1B Yun Liu Indiana University Bloomington Quasi-flag manifolds and moment graphs
11:35-12:05	2A Tim Lüders University of Vienna Higher dagger categories	2B Jake Cordes University at Albany SuPerPoV: Score and evolution of the stratospheric polar vortex via persistent homology
12:05-13:30	**Lunch**	
13:30-14:00	3A Noam Nissan Weizmann Institute Norm structures for motivic spectra	3B Lucas Williams Binghamton University Invariants for families of periodic points
14:05-14:35	4A Francis Baer Wayne State University The J-homomorphism in the unstable Adams spectral sequence	4B Maroš Grego Charles University, Prague The rational homology of $\mathrm{Out}(F_8)$, $\mathrm{Aut}(F_7)$ and related groups
14:35-15:15	**Pastries**	
15:15-15:45	5A Michael Jung Vrije Universiteit Amsterdam Realizability of homology with local coefficients	5B Gonzalo Ortega Carpintero City St George's, University of London The persistent fundamental group and lower central series barcodes
15:50-16:20	6A Avital Binyamin The Hebrew University Decategorification of Algebraic Structures and λ-Rigs	6B Alba Sendón Blanco Vrije Universiteit Amsterdam Nested Pontryagin-Thom construction and nested boundaries
Evening	**Posters and Pizza**	

Main lectures and a-slots: Auditorium 4. b-slots: Auditorium 3.

Tuesday

30 June 2026

Time	Auditorium 4	Auditorium 3
09:30-10:30	**Luciana Basualdo Bonatto (University of Oxford)** **Main lecture 1** **Auditorium 4**	
11:00-11:30	7A Preston Cranford Northwestern University E_3-MU-Thom spectra	**7B Jan McGarry Furriol** Stockholm University Characteristic classes of smooth sphere-product bundles
11:35-12:05	8A Konstantin Emming Wayne State University Filtrations in $\mathbb{C}$-motivic stable homotopy theory	8B Vanny Doem IIT Kharagpur The ring structure of RO(G)-graded stable homotopy groups of spheres for finite Abelian groups G
12:05-13:30	**Lunch**	
13:30-17:50	**Social events**	

Main lectures and a-slots: Auditorium 4. b-slots: Auditorium 3.

Wednesday

1 July 2026

Time	Auditorium 4	Auditorium 3
09:30-10:30	**Achim Krause (University of Oslo)** **Main lecture 2** **Auditorium 4**	
11:00-11:30	9A Qi Zhu Max Planck Institute for Mathematics in Bonn Structured Real Snaith Theorems	9B Matic Simonič University of Ljubljana Extending the Kauffman bracket to knots and links with bonds
11:35-12:05	10A Matthew Niemiro Harvard University Higher cardinalities in higher heights	10B Euan Aitken Radboud University Nijmegen Equivariant linear isometries and infinite little discs operads
12:05-13:30	**Lunch**	
13:30-14:30	**Luciana Basualdo Bonatto (University of Oxford)** **Main lecture 2** **Auditorium 4**	
14:35-15:15	**Pastries**	
15:15-15:45	11A Ryan Quinn Utrecht University Structured quotients and higher real K-theories	11B Fangji Liu University of Pennsylvania On the classifying space of a Morse flow category
15:50-16:20	12A Elias Klakken Angelsen University of Oslo Semi-orthogonal decompositions and algebraic K-theory of group rings	12B Zoltán Lelkes University of Glasgow Cohomology of the diffeomorphism group of the connected sum of two generic lens spaces
16:20-16:45	**Break**	
16:45-17:15	13A Anton Engelmann University Mainz Normed coalgebras in equivariant homotopy theory	13B Ricardo Gloria-Picazzo University of Houston Decoding topological information of a Riemann surface from the spectrum of the Laplacian
17:20-17:50	14A Filipp Buryak Université Paris Cité Representation stability of high dimensional string links	14B Colin Fourel Université de Strasbourg Morse flow categories as exit path categories
Evening	**Dinner**	

Main lectures and a-slots: Auditorium 4. b-slots: Auditorium 3.

Thursday

2 July 2026

Time	Auditorium 4	Auditorium 3
11:00-12:00	**Achim Krause (University of Oslo)** **Main lecture 3** **Auditorium 4**	
12:05-13:30	**Lunch**	
13:30-14:00	15A Dominik Schrimpel LAGA, USPN Motivic filtration of topological cyclic homology of ku	**15B Nicolas Gues** LAGA - Université Paris XIII A homotopy-theoretic approach to representation stability
14:05-14:35	16A Julie Bannwart Universität Mainz Unstable η-periodic and η-complete motivic homotopy theory	16B Travis Casey University of Oklahoma Cycling signatures: topological classification of recurrence in high-dimensional dynamical systems
14:35-15:15	**Pastries**	
15:15-15:45	17A Klaus Mattis University of Mainz Étale synthetic deformations	17B Bruno Galvez EPFL/UPJV Characteristic classes for singular spaces
15:50-16:20	18A Alex LaJeunesse University of Colorado Boulder Strict Picard spectra at low chromatic heights	18B Matthew Scalamandre University of Toronto Koszul duality for symplectic Steinberg modules

Main lectures and a-slots: Auditorium 4. b-slots: Auditorium 3.

Friday

3 July 2026

Time	Auditorium 4	Auditorium 3
09:30-10:30	**Luciana Basualdo Bonatto (University of Oxford)** **Main lecture 3** **Auditorium 4**	
11:00-11:30	19A Courtney Hauf University of Colorado Boulder Equivariant parameterized cohomology	19B Sarah Anderson Purdue University Representation stability of the equivariant homology of ordered configuration spaces and the homological periodicity of spherical braid groups
11:35-12:05	20A Marius Verner Bach Nielsen Norwegian University of Science and Technology On the geometrization of synthetic spectra	20B Artem Semidetnov University of Geneva The operad associated to a crossed simplicial group
12:05-13:30	**Closing+Lunch**	

Main lectures and a-slots: Auditorium 4. b-slots: Auditorium 3.

Invited lecture series

Luciana Basualdo Bonatto (University of Oxford)
Main lecture series · Room: Auditorium 4

Mapping class groups, operads, and Grothendieck-Teichmüller theory

Grothendieck-Teichmüller theory uses geometric and topological objects to shed light on one of the most mysterious structures in number theory: the absolute Galois group of the rationals. At its core, this theory suggests that we should build a tower of mapping class groups, whose symmetries are expected to encode this Galois group. In this lecture series, we will develop the main ideas and tools that enter modern topological approaches to Grothendieck-Teichmüller theory. We will begin with an overview of mapping class groups and some of the key geometric techniques used to study them. We will then introduce operads and modular operads as a framework for organizing gluing operations and compatibility conditions, explaining how a dendroidal viewpoint provides both motivation and structure. Finally, we will bring these ideas together in the construction of a Teichmüller tower as a modular operad of mapping class groups, equipped with an action of the absolute Galois group of $\mathbb{Q}$.

Achim Krause (University of Oslo)
Main lecture series · Room: Auditorium 4

Perspectives on spectra

In these lectures, I want to explore some modern perspectives on spectra and stable homotopy theory. After reviewing several perspectives on the category of spectra, we will consider several ways in which spectra can be "controlled through algebra", culminating in the machinery of synthetic spectra and a very elegant proof of the Nilpotence Theorem due to Burklund. In the final lecture, I want to outline an ongoing project with Ben Antieau we refer to as "effective spectra", which follows a somewhat different angle on the "control spectra through algebra" theme.

Contributed abstracts

Monday abstracts

Talk 1A · Jackson Morris (University of Washington)
Monday, 11:00-11:30 · Auditorium 4

Higher Witt K-theory

A useful tool for detecting periodicity in stable homotopy theory are the higher real K-theory spectra, which arise as fixed points of the Lubin-Tate spectra. In motivic homotopy theory, periodicity is more complicated, and it has been less obvious how to systematically study this exotic structure. In joint work with Ormsby, we show that the Tate fixed points of the motivic Lubin-Tate spectra, which we call Higher Witt K-theories, are viable candidates for studying exotic periodicity. Curiously, these spectra demonstrate a diachromatic blueshift phenomenon: if the motivic Lubin-Tate theory is of height n, then the associated Higher Witt K-theory detects height n-1 exotic phenomena. This is work in progress.

Talk 1B · Yun Liu (Indiana University Bloomington)
Monday, 11:00-11:30 · Auditorium 3

Quasi-flag manifolds and moment graphs

The equivariant rational cohomology of flag manifolds is closely related to the algebra of quasi-invariants and quasi-covariants, which are generalizations of invariant polynomials for finite reflection groups. In this talk, we will explain how to obtain a mod-p cohomological decomposition, including the case p=0, of a flag manifold along its moment graph, and how this framework can be generalized to construct spaces whose even-degree G- and T-equivariant rational cohomology coincide precisely with the algebras of quasi-invariants and quasi-covariants.

Talk 2A · Tim Lüders (University of Vienna)
Monday, 11:35-12:05 · Auditorium 4

Higher dagger categories

Higher dagger categories have recently emerged as a promising framework for encoding defects and stratifications in topological quantum field theories using higher categorical methods. While classical examples of dagger categories, such as Hilbert spaces or categories of spans, are easy to describe, higher dagger categories are vastly more intricate structures that are deeply tied to the topology of cobordisms for chosen tangential structures. However, there is a good supply of examples due to the cobordism-hypothesis inspired, in higher dimensions, open conjecture that any symmetric monoidal n-category with sufficiently many duals gives rise to a higher dagger category. In this talk, I will review essential ideas underlying the developing theory of higher dagger structures in rigorously established contexts.

Talk 2B · Jake Cordes (University at Albany)
Monday, 11:35-12:05 · Auditorium 3

SuPerPoV: Score and evolution of the stratospheric polar vortex via persistent homology

Classifying the stratospheric polar vortex provides predictability for surface weather on extended-range timescales. However, providing a scientifically sound classification is challenging: all the definitions proposed in over 60 years of study depend on empirically chosen parameters and yield different results when one of them changes. Moreover, as they are based on static thresholds, it is not straightforward to use them to study the spatiotemporal evolution of the vortex. Here, we introduce SuPerPoV, a score system that computes displacement and split ratios of the polar vortex using tools from topological data analysis, thus providing a sound classification of the polar vortex. The scores are computed by adapting superlevel set persistence and comparing prominent features. Our definition is entirely threshold-free and implemented open source. The scores generally recovers previous definitions and are output for a user-defined number of days, thus showing the evolution of the event. SuPerPoV offers a paradigm shift in the study of the polar vortex, hopefully bringing a deeper understanding of the polar vortex and related extreme events, such as sudden stratospheric warmings.

Talk 3A · Noam Nissan (Weizmann Institute)
Monday, 13:30-14:00 · Auditorium 4

Norm structures for motivic spectra

Bachmann and Hoyois created a norm structure for Voevodsky's motivic category SH. We construct a similar structure for the category MS created by Annala and Iwasa. In so doing, we develop a theory generalizing higher algebra to the context of internal category theory. We also apply this new higher algebra to generalize a recent theorem of Cnossen, Lenz and Linskens providing extra functoriality to those six functor formalisms that can be constructed by an open-proper decomposition to all six functor formalisms.

Talk 3B · Lucas Williams (Binghamton University)
Monday, 13:30-14:00 · Auditorium 3

Invariants for families of periodic points

In this talk we investigate invariants that count periodic points of a map. Given a self map f of a compact manifold we could detect n-periodic points of f by computing the Reidemeister trace of f^n or by computing the equivariant Fuller trace. In 2020 Malkiewich and Ponto showed that the collection of Reidemeister traces of f^k for varying k|n and the equivariant Fuller trace are equivalent as periodic point invariants, and they conjecture that for families of endomorphisms the Fuller trace will be a strictly richer invariant for n-periodic points. In this talk we will explain our new result which confirms Malkiewich and Ponto's conjecture. We do so by proving a new Pontryagin-Thom isomorphism between equivariant parameterized cobordism and the spectrum of sections of a particular parametrized spectrum and using this result to carry out geometric computations.

Talk 4A · Francis Baer (Wayne State University)
Monday, 14:05-14:35 · Auditorium 4

The J-homomorphism in the unstable Adams spectral sequence

The unstable J-homomorphism provides a fundamental link between geometric structures on manifolds and unstable homotopy theory. In this talk, we describe an approach to systematically computing the unstable J-homomorphism via the unstable Adams spectral sequence for spheres and special orthogonal groups. We then apply these results to problems in differential topology, including the classification of nontrivial embeddings of exotic spheres and smooth structures on products of spheres.

Talk 4B · Maroš Grego (Charles University, Prague)
Monday, 14:05-14:35 · Auditorium 3

The rational homology of Out(F_8), Aut(F_7) and related groups

Using the forested graph complex of Conant and Vogtmann, we have computed the rational group homology of Out(F_8), Aut(F_7) and several other groups related to homotopy auto-equivalences of graphs. We have found multiple non-trivial homology classes, which have appeared rather scarcely in the homology of Out(F_n) thus far, although we know that, asymptotically, their number grows super-exponentially. F8 seems to be at the border before this explosion of non-trivial classes occurs. Joint work with Thomas Willwacher.

Talk 5A · Michael Jung (Vrije Universiteit Amsterdam)
Monday, 15:15-15:45 · Auditorium 4

Realizability of homology with local coefficients

A fundamental question in geometric topology, known as the Steenrod problem, asks whether a given homology class can be realized as the image of the fundamental class of a smooth manifold. While this was largely settled by Thom in the 1950s for constant coefficients, the case for local coefficients remained unanswered. In this talk, we introduce the twisted Thom space and sketch the twisted Pontryagin-Thom construction adapted for local coefficients to provide a criterion for realizability. We will discuss the resulting obstructions by building the Postnikov tower of the twisted Thom space within the slice category over BO(1), and highlight how this framework differs from the classical setting. This is joint work with Baylee Schutte and Mark Grant.

Talk 5B · Gonzalo Ortega Carpintero (City St George's, University of London)
Monday, 15:15-15:45 · Auditorium 3

The persistent fundamental group and lower central series barcodes

We present an efficient algorithm, based on discrete Morse theory, for computing the persistent fundamental group of a filtered CW-complex in terms of explicit group presentations. From these presentations, we derive persistent invariants associated with the lower central series and obtain a family of barcodes that capture topological features not detected by persistent homology. This framework extends the scope of topological data analysis by enabling the study of non-abelian aspects of the fundamental group from filtered data. This is a joint work with Ximena Fernandez.

Talk 6A · Avital Binyamin (The Hebrew University)
Monday, 15:50-16:20 · Auditorium 4

Decategorification of Algebraic Structures and λ-Rigs

We study the decategorification of higher algebraic structures encoded by algebraic monads on the ∞-category of spaces. We prove that for any algebraic monad T, the functor π_0 Tj inherits a finitary monad structure on Set, characterizing the discrete T-modules. We apply this framework to the theory of 2-rigs, showing that the decategorification of the monad for symmetric monoidal Cauchy-complete linear categories recovers Borger's notion of λ-rigs. Specifically, we construct a natural lift of the equivalence-class functor π_0 core : Cat → Set to a functor 2-Rig → λ-Rig.

Talk 6B · Alba Sendón Blanco (Vrije Universiteit Amsterdam)
Monday, 15:50-16:20 · Auditorium 3

Nested Pontryagin-Thom construction and nested boundaries

Imagine that you have a nested manifold: a small manifold inside a big manifold. You know that the big manifold is a boundary and that the small manifold is a boundary. With this information, when can you assert that your nested manifold is a nested boundary? We delve in this problem via a nested Pontryagin-Thom construction: the study of nested manifolds up to cobordism amounts to the study of homotopy groups of... bananas! I will discuss this result and some of its surprising consequences.

Tuesday abstracts

Talk 7A · Preston Cranford (Northwestern University)
Tuesday, 11:00-11:30 · Auditorium 4

E_3-MU-Thom spectra

The Hopkins-Mahowald theorem realizes the Eilenberg-Mac Lane spectra F_p as E_2-Thom spectra. Mahowald also showed that connective complex K-theory spectrum ku is not a spherical Thom spectrum. We will discuss how to view F_2, $\mathbb{Z}$, and ku as E_3-MU-Thom spectra.

Talk 7B · Jan McGarry Furriol (Stockholm University)
Tuesday, 11:00-11:30 · Auditorium 3

Characteristic classes of smooth sphere-product bundles

We prove the existence of many non-trivial characteristic classes of smooth oriented bundles with fibre a product $S^n \times S^n$ of odd-dimensional spheres. We do so by proving injectivity of the map from the ring of rational characteristic classes of oriented fibrations with fibre $S^n \times S^n$; the latter is proven by Berglund-Zeman to be isomorphic to the group cohomology of the symmetric powers of the standard representation of a certain finite-index subgroup Γ of $SL_2(\mathbb{Z})$. These characteristic classes of smooth bundles are not generalised Miller-Morita-Mumford classes, and they exist in arbitrarily large cohomological degrees. Inspired by an example given by Morita, we provide a collection of smooth oriented $S^n \times S^n$-bundles, indexed by cyclic subgroups of Γ, which detect any given non-zero characteristic class of such fibrations.

Talk 8A · Konstantin Emming (Wayne State University)
Tuesday, 11:35-12:05 · Auditorium 4

Filtrations in $\mathbb{C}$-motivic stable homotopy theory

Empirical evidence suggests that there is an interesting class of motivic spectra, at least containing the sphere spectrum and very effective Hermitian K-theory, whose effective motivic slices are indexed by the Adams-Novikov E_2-page of their Betti realizations. In this talk, we will show that there are more $\mathbb{C}$-motivic spectra satisfying this property. For example, the $\mathbb{C}$-motivic modular forms spectrum mmf. Our approach to this problem will also recompute the slices of the aforementioned spectra in a unified way. Our results will rely on a deep understanding of the filtered spectrum model for $\mathbb{C}$-motivic stable homotopy theory due to Gheorghe-Isaksen-Krause-Ricka. We will construct filtered spectrum models for the effective filtration and use these to compute the effective slices.

Talk 8B · Vanny Doem (IIT Kharagpur)
Tuesday, 11:35-12:05 · Auditorium 3

The ring structure of RO(G)-graded stable homotopy groups of spheres for finite Abelian groups G

Let G be a finite Abelian group. The main objective of this talk is to determine the ring $\pi\hat{}G\_\star(S^0)$, where $\star$ denotes RO(G)-grading and S^0 is the rational equivariant sphere spectrum. After this computation, we want to discuss its relevance to the study of the rational stable homotopy type of equivariant complex projective spaces $\mathbb{C}P(V)$ for complex representations V.

Wednesday abstracts

Talk 9A · Qi Zhu (Max Planck Institute for Mathematics in Bonn)
Wednesday, 11:00-11:30 · Auditorium 4

Structured Real Snaith Theorems

We give a short proof of the Real Snaith equivalences and multiplicative refinements thereof. The key ingredient is control over structured Real orientations, a machinery that can be applied to obtain a multiplicative structure on Real Brown-Peterson theory. We apply the Real Snaith theorems to compute THR(KUR) and THR(MUPR). This requires a norm inverted variant of the Real Snaith theorems, which we prove via the nilpotence theorem. Everything is joint work with Ryan Quinn.

Talk 9B · Matic Simonič (University of Ljubljana)

Wednesday, 11:00-11:30 · Auditorium 3

Extending the Kauffman bracket to knots and links with bonds

The Kauffman bracket polynomial is a classical invariant of knots and links, embeddings of circles in three-dimensional space, defined via a skein relation. In various applications, such as modeling proteins with intramolecular bonds, such as disulfide bridges, it is natural to consider knots and links equipped with additional connections between distinct strands, called bonds, known as bonded knots. We introduce a skein-theoretic extension of the Kauffman bracket to this setting by defining a bonded Kauffman bracket skein module. We study this module in both the rigid and topological categories, and show that it is infinitely generated and torsion-free in each case. In the rigid setting, expressing bonded knots in a natural basis yields an invariant closely related to the APS bracket and the Simplified RNA polynomial.

Talk 10A · Matthew Niemiro (Harvard University)
Wednesday, 11:35-12:05 · Auditorium 4

Higher cardinalities in higher heights

The cardinality of a finite set lives in $\pi_0(S)$. Work of Hopkins-Lurie, Carmeli-Schlank-Yanovsky, and subsequent authors has identified the property/structure of "higher semiadditivity" present throughout homotopy theory. In particular, the categories of K(n)- and T(n)-local spectra are "higher semiadditive." In this situation, there is a "higher height cardinality" associated to any space with sufficiently finite homotopy groups, which now exists as an element of the homotopy groups of the K(n) and T(n)-local spheres. These invariants are hard to compute. We will discuss forthcoming work to understand and compute new cardinalities, joint with Shacar Carmeli and Amartya Shekhar Dubey.

Talk 10B · Euan Aitken (Radboud University Nijmegen)
Wednesday, 11:35-12:05 · Auditorium 3

Equivariant linear isometries and infinite little discs operads

Operads are indispensable tools in modern homotopy theory. In particular, the infinite little discs operad plays a foundational role in the infinite loop space theory of May. Moreover, in stable homotopy theory, the linear isometries operad used to be the preferred tool to understand commutative ring spectra. While they often serve different purposes, there is no meaningful homotopical distinction between nonequivariant linear isometries and infinite little discs operads; May's product trick shows that they are equivalent in any sensible model category of operads. This is not true equivariantly. As noted by Blumberg-Hill, if G is a finite group and U is a G-universe, then there need not be a zig-zag of weak equivalences connecting the linear isometries operad L(U) and the infinite little discs operad D(U). In recent work, we have shown that such a chain of equivalences exists if and only if U is the complete universe of some quotient of the group G. The proof uses a unique combination of homotopy theory, representation theory and combinatorics.

Talk 11A · Ryan Quinn (Utrecht University)
Wednesday, 15:15-15:45 · Auditorium 4

Structured quotients and higher real K-theories

Many tools now exist for constructing multiplicative structures on quotients in higher algebra. In equivariant homotopy theory, however, such structures are much harder to construct. In joint work with Qi Zhu, we develop a new method for building structured equivariant quotients. This produces equivariant multiplicative structures on Real and higher Real analogues of truncated Brown-Peterson spectra, answering questions of Hahn-Wilson and Angelini-Knoll-Kong-Quigley. We also show that these quotients orient Lubin-Tate theories. Combined with work of Meier-Shi-Zeng and Duan-Hill-Li-Liu-Shi-Wang-Xu, this yields explicit periodicities for the Hopkins-Miller higher real K-theories.

Talk 11B · Fangji Liu (University of Pennsylvania)
Wednesday, 15:15-15:45 · Auditorium 3

On the classifying space of a Morse flow category

We show that the classifying space of the flow category of a tame Morse function on a smooth, closed manifold M recovers the homotopy type of M, thereby addressing a claim in a preprint of Cohen-Jones-Segal. The tameness assumption is that the compactified moduli spaces of broken gradient trajectories are locally contractible, ensuring the flow category is topologically well-behaved. We construct a Morse function and Riemannian metric on $S^2 \times S^1$ for which the associated flow category fails to recover the correct homotopy type, showing that the tameness hypothesis is crucial. Together, these results clarify the extent to which transversality assumptions can be relaxed so that the flow category models the homotopy type of the underlying manifold. This is joint work with Maxine Calle.

Talk 12A · Elias Klakken Angelsen (University of Oslo)
Wednesday, 15:50-16:20 · Auditorium 4

Semi-orthogonal decompositions and algebraic K-theory of group rings

When stable ∞-categories admit semi-orthogonal decompositions (SODs), their algebraic K-theory breaks apart into possibly simpler pieces. Classic examples of semi-orthogonal decompositions can be found in algebraic geometry. The derived category of $\mathbb{P}^1$_R has useful properties, such as being proper and admitting a convenient SOD. For K-theoretic purposes, one can use this decomposition to prove $\mathbb{A}^1$-invariance of K-theory for sufficiently nice rings. Inspired by this, we investigate how such $\mathbb{P}^1$-like decompositions can be implemented at a categorical level through stable module categories and Tate-constructions, and we discuss work in progress towards fiber sequences for K($\mathbb{Z}$[(C_p)^k]) for k ≥ 2. If time admits, this talk will also function as a crash course to elementary tt-geometry.

Talk 12B · Zoltán Lelkes (University of Glasgow)
Wednesday, 15:50-16:20 · Auditorium 3

Cohomology of the diffeomorphism group of the connected sum of two generic lens spaces

We consider two non-diffeomorphic three-dimensional lens spaces that are of a certain "generic" type and calculate the cohomology of the diffeomorphism group of their connected sum. Our approach builds on techniques of Hatcher and is inspired by the work of Boyd, Bregman and Steinebrunner, who recently proved that classifying spaces of diffeomorphism groups of closed oriented 3-manifolds are always of finite type.

Talk 13A · Anton Engelmann (University Mainz)
Wednesday, 16:45-17:15 · Auditorium 4

Normed coalgebras in equivariant homotopy theory

Thanks to Quillen we can understand rational, simply connected spaces in terms of algebraic models. More precisely, he showed that the chains functor from such spaces to coalgebras in rational spectra is fully faithful. A similar result for rational G-spaces is expected, when replacing coalgebras by the richer category of normed coalgebras, which takes the Hill-Hopkins-Ravenel norm into account. The goal of this talk is to present a key tool for proof of the above statement. Namely, that certain G-spaces are ambidextrous for rational genuine G-spectra. This yields a genuine equivariant analogue of the well-known result that in rational spectra homotopy orbits and homotopy fixed points over finite groups agree.

Talk 13B · Ricardo Gloria-Picazzo (University of Houston)
Wednesday, 16:45-17:15 · Auditorium 3

Decoding topological information of a Riemann surface from the spectrum of the Laplacian

It is well known that the spectrum of the Laplace-Beltrami operator on a Riemannian manifold encapsulates rich information about the metric. It is interesting to ask how much topological information is encoded in the spectrum of a Riemann surface. In complex geometry, the Riemann-Roch theorem connects the genus information of a surface with the algebraic properties of its function field. Given a Riemann surface S with genus g, we can use the Riemann-Roch theorem to estimate from above the k-th eigenvalue of the Laplacian on S in terms of its genus g. This demonstrates that the genus constrains the eigenvalues of the Laplacian. Furthermore, when S is embedded in $\mathbb{R}^3$ as the boundary of a domain D, we can combine this upper bound in terms of genus along with Li-Yau's bound to relate the spectrum of S to the spectrum of D in terms of a constant K_g, which only depends on genus g. This result explains, through topological invariants, how the spectrum of a domain D is related to the spectrum of its boundary, providing a bridge between spectral geometry and topology.

Talk 14A · Filipp Buryak (Université Paris Cité)
Wednesday, 17:20-17:50 · Auditorium 4

Representation stability of high dimensional string links

Because spaces of string links possess highly non-trivial symmetric group actions, their homology fail to stabilise in the classical sense. Church and Farb's theory of representation stability provides an appropriate algebraic framework to study such sequences of representations. In this talk, I will start by introducing some basic concepts of representation stability before shifting focus to Goodwillie-Weiss embedding calculus. Specifically, we will look at the combinatorial rational models for embedding spaces developed by Fresse, Turchin, and Willwacher, and see how these models allow us to deduce representation stability for the spaces of string links.

Talk 14B · Colin Fourel (Université de Strasbourg)
Wednesday, 17:20-17:50 · Auditorium 3

Morse flow categories as exit path categories

Given a Morse function on a closed smooth manifold and a Smale gradient-like vector field adapted to it, one can construct a topological category called the flow category associated with this data. Its objects are the critical points of the function, and its morphisms are the broken trajectories of the gradient connecting critical points. Like any topological category, a flow category models an ∞-category, and a theorem of Cohen-Jones-Segal states that the homotopy type underlying this ∞-category is that of the manifold itself. However, different choices of Morse-Smale pairs on the same manifold can give rise to non-equivalent ∞-categories. I will present a result I obtained, which asserts that the ∞-category associated with the flow category of a Morse-Smale pair is equivalent to the exit-path ∞-category associated with the stratification of the manifold by the stable manifolds of the gradient.

Thursday abstracts

Talk 15A · Dominik Schrimpel (LAGA, USPN)
Thursday, 13:30-14:00 · Auditorium 4

Motivic filtration of topological cyclic homology of ku

We compute the associated graded of the motivic filtration of the topological cyclic homology of ku, the connective complex K-theory, in coefficients modulo p and v_1. This provides a new computation for prime p=3, and alternative computation for higher primes. We give an independent proof for higher Bott multiplicity, detected from THH of ku, inherent to the structure of the motivic filtration.

Talk 15B · Nicolas Gues (LAGA - Université Paris XIII)
Thursday, 13:30-14:00 · Auditorium 3

A homotopy-theoretic approach to representation stability

In a series of papers from the 2010s, Church, Ellenberg and Farb developed the notion of representation stability, aimed at understanding the asymptotic behavior of natural sequences of representations of the symmetric groups S_n, particularly those arising from homological invariants. In this talk, I will propose a homotopical refinement of representation stability: a derived version adapted to diagrams of spaces equipped with coherent symmetric group actions. With this point of view, I will show how one can deduce polynomial growth for the homotopy groups of ordered configuration spaces on closed manifolds and deduce homological periodicity results for moduli spaces of submanifolds.

Talk 16A · Julie Bannwart (Universität Mainz)
Thursday, 14:05-14:35 · Auditorium 4

Unstable η-periodic and η-complete motivic homotopy theory

Any motivic $\mathbb{P}^1$-spectrum admits a fracture square with respect to the algebraic Hopf map $\eta : \mathbb{P}^1 \otimes \mathbb{G}_m \to \mathbb{P}^1$, expressing it in terms of its η-periodic and η-complete parts, which are often more tractable. There is no obvious extension of this picture to motivic spaces, or only S^1-spectra. For example, the source and target of η are no longer tensor-invertible, so one cannot construct the periodization as an η-telescope. One can however define abstract localizations via suspension: a map f is called an η-periodic or η-complete equivalence if $\Sigma^\infty(f)$ is so in $\mathbb{P}^1$-spectra. We show that in good cases η-complete equivalences are preserved by Ω^∞, but this fails for η-periodic ones. Inspired by v_n-periodic spaces in chromatic homotopy theory, we instead define unstable η-periodic equivalences using certain η-periodic homotopy sheaves. We describe their properties and construct an η-Bousfield-Kuhn functor from S^1-spectra to $\mathbb{P}^1$-spectra, which preserves and detects η-periodic equivalences, and induces an equivalence on bounded above local objects. Finally, we discuss further results and motivations.

Talk 16B · Travis Casey (University of Oklahoma)
Thursday, 14:05-14:35 · Auditorium 3

Cycling signatures: topological classification of recurrence in high-dimensional dynamical systems

High-dimensional dynamical systems model a wide variety of phenomena in science, from physics and biology to economics and the social sciences. Recurrent dynamics, including periodic and almost-periodic orbits, serve as building blocks for characterizing the behavior of these systems. Algebraic topological tools are particularly well-suited to studying recurrence in nonlinear dynamical systems: they yield coarse invariants that are robust to noise and perturbation, are dimension-independent, and can be computed directly from trajectory data without reference to the governing equation. Cycling signatures leverage algebraic topology to detect and classify almost-recurrent behavior in such systems. In this talk, we present novel computational frameworks and analyses for cycling signatures in high-dimensional systems for which they were previously infeasible. Given a finite sample {x_n}_{n=1,...,N}, x_i in $\mathbb{R}^d$, of an orbit, we lift the data to the unit tangent bundle $UT(\mathbb{R}^d) = \mathbb{R}^d \times S^{d-1}$ and construct a comparison space Y as a union of cubes in a cubical grid that contain at least one sample. The first homology $H_1(Y)$

of this cubical complex encodes the topologically distinct types of cycling admitted by the system. We contribute an efficient discrete Morse theoretic algorithm to compute an explicit basis of the homology space in the full 2d dimensions of the comparison space. For an almost-recurrent segment $x_i, x_{i+1}, \ldots, x_j$ of the orbit, let Γ subset Y be the subcomplex of cubes containing the segment's points. The inclusion $\iota: \Gamma \to Y$ induces a map $\iota_*: H_1(\Gamma) \to H_1(Y)$; the image of this map is the cycling signature of the segment. This subspace structure allows one to distinguish topologically distinct cycling motions and to decompose a complex motion into simpler motions occurring over its subsegments. We describe what types of spatial, temporal, and statistical information can be inferred about the recurrent dynamics of the system from their cycling signatures. To build intuition, we first present results on the well-understood Lorenz system, before studying complex higher-dimensional systems such as Charney-DeVore.

Talk 17A · Klaus Mattis (University of Mainz)
Thursday, 15:15-15:45 · Auditorium 4

Étale synthetic deformations

Synthetic spectra form a bridge between homotopy theory and motivic homotopy theory over the complex numbers, leading to a variety of computational tools focused on the Adams-Novikov spectral sequence. In this talk I will explain how one can generalize this picture to work over more general base fields K by constructing a deformation of the category of Gal(K)-equivariant spectra, and relating it to cellular motivic spectra over K. The special fiber of this category can be identified with the derived category of comodules over a Gal(K)-equivariant version of the Hopf algebroid (MU_*, MU_*MU), hence categorifying the Gal(K)-equivariant Adams-Novikov spectral sequence. If time permits, I will explain how in certain cases this category serves as a topological model for cellular motivic spectra over K. This is joint work in progress with Swann Tubach.

Talk 17B · Bruno Galvez (EPFL/UPJV)
Thursday, 15:15-15:45 · Auditorium 3

Characteristic classes for singular spaces

Characteristic classes play a central role in topology and geometry, but extending them to singular spaces is a subtle problem. In the smooth setting, these classes are built from geometric objects such as vector bundles and are naturally valued in ordinary cohomology. For singular spaces, however, both the geometric input and the target theory become more delicate. One of the most important tools in this setting is intersection homology, which provides a replacement for ordinary homology better adapted to singular spaces and has played an important role in several areas, including topology, algebraic geometry, and representation theory. In this talk I will discuss some ideas and constructions that arise when trying to develop a theory of characteristic classes in a stratified setting. The guiding principle is that singular spaces still retain enough geometric and homotopical structure to support meaningful analogues of classical notions. I will explain how stratified spaces, intersection homology, and related constructions fit into this picture.

Talk 18A · Alex LaJeunesse (University of Colorado Boulder)
Thursday, 15:50-16:20 · Auditorium 4

Strict Picard spectra at low chromatic heights

Associated to any symmetric monoidal ∞-category is the Picard spectrum, the delooping of the space of invertible objects in the category. The strict Picard spectrum is the spectrum of maps from $H\mathbb{Z}$ to this Picard spectrum, and captures those invertible objects that "strictly commute with themselves." We will discuss several ways to think about these objects and explain our calculation of the strict Picard spectra of K(n)-local spheres for n=1 and 2.

Talk 18B · Matthew Scalamandre (University of Toronto)
Thursday, 15:50-16:20 · Auditorium 3

Koszul duality for symplectic Steinberg modules

Motivated by questions in algebraic K-theory, Rognes conjectured that a certain simplicial complex called the common basis complex is highly connected for local rings or Euclidean domains. More recently, this conjecture has been shown to be closely related to the Koszulness of a certain ring built out of Steinberg modules. This conjecture has implications for homological stability of the general linear group via the theory of E_k-cells. For fields, this conjecture was solved by Miller, Patzt, and Wilson. I will discuss joint work with Jeremy Miller and Robin Sroka, in which we propose analogues of these questions with the general linear group replaced by the symplectic group, and answer several of them for fields. Time permitting, I will outline a conjectural relationship between these algebraic questions and the geometry of moduli spaces.

Friday abstracts

Talk 19A · Courtney Hauf (University of Colorado Boulder)
Friday, 11:00-11:30 · Auditorium 4

Equivariant parameterized cohomology

In the 1950's, Borel introduced the first theory of cohomology for G-equivariant spaces, graded on the integers. This was then refined in the 1960's to a cohomology theory graded on RO(G), which keeps track of information related to the fixed-point spaces for various subgroups of G. A further refinement published in 2016 lead to a cohomology theory graded on the representation ring of the equivariant fundamental groupoid of the space in question. We will discuss the advantages and drawbacks of these refinements and the connections to parameterized homotopy theory.

Talk 19B · Sarah Anderson (Purdue University)
Friday, 11:00-11:30 · Auditorium 3

Representation stability of the equivariant homology of ordered configuration spaces and the homological periodicity of spherical braid groups

Representation stability is a pattern for sequences of cohomology groups with group actions that can be seen all throughout mathematics. It was proven by Church-Farb that the cohomology of the pure braid groups exhibits representation stability. Church later generalized the result to ordered configuration spaces of points in manifolds. In this talk, I will describe a further generalization of the result to the equivariant homology of ordered configuration spaces of manifolds with group actions. Then I will discuss how this generalization helps prove that the homology of spherical braid groups exhibit homological periodicity.

Talk 20A · Marius Verner Bach Nielsen (Norwegian University of Science and Technology)
Friday, 11:35-12:05 · Auditorium 4

On the geometrization of synthetic spectra

The category of synthetic spectra is a 1-parameter deformation of the category of spectra, deforming the Adams-Novikov spectral sequence. The Adams-Novikov spectral sequence is a particular example of a descent spectral sequence, so a reasonable question is whether such a category exists for any stack. In this talk I will provide an answer in the affirmative, and discuss how it compares to Pstrągowski's definition with regards to the stack whose descent spectral sequence is the Adams-Novikov spectral sequence.

Talk 20B · Artem Semidetnov (University of Geneva)
Friday, 11:35-12:05 · Auditorium 3

The operad associated to a crossed simplicial group

We introduce and study structured enhancement of the notion of a crossed simplicial group, which we call an operadic crossed simplicial group. We show that with each operadic crossed simplicial group one can associate a certain operad in groupoids. We demonstrate that symmetric and braid crossed simplicial groups can be made into operadic crossed simplicial groups in a natural way. For these two examples, we show that our construction of the associated operad recovers the E_∞-operad and the E_2-operad respectively. We demonstrate the utility of this framework through two main applications: a generalized bar construction that specializes to Fiedorowicz's symmetric and braided bar constructions, and an identification of the associated group-completed monads with Baratt-Priddy-Quillen type spaces. We also show how the framework of crossed simplicial groups allows to prove homological stability results.