MONDAY JUNE 3, 2024

Ivar EKELAND (Paris Dauphine)

Title: *Memories from the eighties*

Yakov ELIASHBERG (Stanford)

Title: *Non-trivial elements in the homotopy groups of spaces of high-dimensional Legendrian knots*

Abstract: The generating functions and hypersurfaces construction yields injection of stable homotopy groups of Waldhausen's h-cobordism and Cerf's pseudoisotopy spaces into homotopy groups of various spaces of Legendrian submanifolds. This is a joint work with Thomas Kragh.

Dustin CONNERY-GRIGG (Sorbonne Université)

Title: *Dynamics through the Floer-theoretic lens and Floer theory through the dynamical lens*

Abstract: In this talk I will discuss the question of interpreting (Hamiltonian) Floer-theoretic objects in terms of topological dynamics in low dimensions, together with the relationship of this question to a certain picture of how Hamiltonian Floer theory may be combined with the theory of finite energy foliations introduced by Hofer-Wysocki-Zehnder in order to gain an understanding of the structure of Hamiltonian systems on surfaces (via a Floer-theoretic construction of certain foliations introduced by Le Calvez in his study of surface homeomorphisms).

Pazit HAIM KISLEV (Tel Aviv)

Title: *A counterexample to Viterbo's conjecture*

Abstract: Viterbo's volume-capacity conjecture, which asserts that the ball has the largest capacity among all convex bodies of the same volume, is an influential conjecture in the field of symplectic capacities. Since its introduction in 2000, it has initiated and contributed to numerous research directions. In this talk, I will present a counterexample to Viterbo's conjecture in every dimension. In particular, this implies that not all capacities coincide on the class of convex domains.

David NADLER (Berkeley)

Title: *Speculations on barcodes*

Abstract: I'll explain how to view sheaves, in good situations, as maps into a moduli space of barcodes, and in turn as principal bundles on bifurcations spaces. This provides a useful perspective on many results about rulings of Legendrian knots. I'll speculate on what it might be good for in general. (Based on joint discussions with D. Álvarez-Gavela and Y. Eliashberg.)

TUESDAY JUNE 4, 2024

Paul SEIDEL (MIT)

Title: *Recent progress on the exponential type conjecture*

Abstract: Take a Fano variety (or closed monotone symplectic manifold). Gromov-Witten theory associates to it a linear differential equation in one variable, with poles at zero and at infinity. One of those poles is very well understood, the other less so: at the most basic level, our expectations are encoded into the exponential type conjecture.

There are now two partial proofs of this conjecture. One uses a geometric assumption, the existence of a smooth anticanonical divisor (Pomerleano-Seidel 2023); the other involves a homological algebra assumption (Chen 2024). The proofs use quite different strategies, but have some philosophical ingredients in common, none of which are apparent from the formulation of the problem: reduction to mod p coefficients; and (different kinds of) Fukaya categories. The outcome is a slightly confusing situation, where we have clearly made some progress, but don't yet see how the puzzle pieces fit together.

I will try to explain what the problem is; what basic tools about differential equations can be useful; and then say a bit about what enters into the proofs.

Viatcheslav KHARLAMOV (Strasbourg)

Title: *The loss of Smith-Thom maximality by Hilbert square*

Abstract: In an ongoing joint work with R. Rasdeaconu, we investigate the maximality of the Hilbert square of real algebraic varieties. We found that, starting from dimension two, many deformation classes of algebraic varieties do not contain any real variety whose Hilbert square is maximal. For example, the K3-surfaces have never a maximal Hilbert square.

In this talk I intend to outline the current state of our knowledge on this subject.

Laure SAINT-RAYMOND (IHES)

Title: *Internal waves in a domain with topography*

Abstract: Stratification of the density in an incompressible fluid is responsible for the propagation of internal waves. In domains with topography, these waves exhibit interesting properties. In particular, in 2D these waves concentrate on attractors for some generic frequencies of the forcing. At the mathematical level, this behaviour can be analyzed in the inviscid case with tools from geometry, spectral theory and micro local analysis.

Patrick BERNARD (Paris Dauphine)

Title: *Non-degeneracy of closed orbits for a generic potential*

Abstract: We prove that adding a generic potential to a convex Hamiltonian on a cotangent bundle makes all periodic orbits on a given energy level non-degenerate.

Alberto ABBONDANDOLO (Bochum)

Title: *Closed characteristics on the boundary of convex domains*

Abstract: An old question in symplectic dynamics is whether closed characteristics on the boundary of a four dimensional smooth convex bounded domain which minimise the action are unknotted. I will show how this question can be addressed by a combined use of Clarke's duality, Floer homology and the theory of psequdoholomorphic curves in symplectizations. This talk is based on a joint work with Oliver Edtmair and Jungsoo Kang.

WEDNESDAY JUNE 5, 2024

Viktor GINZBURG (Santa Cruz)

Title: *Invariant Sets and Hyperbolic Periodic Orbits*

Abstract: The presence of hyperbolic periodic orbits or invariant sets often has an affect on the global behavior of a dynamical system. In this talk we discuss two theorems along the lines of this phenomenon, extending some properties of Hamiltonian diffeomorphisms to dynamically convex Reeb flows on the sphere in all dimensions.

The first one, complementing other multiplicity results for Reeb flows, is that the existence of a hyperbolic periodic orbit forces the flow to have infinitely many periodic orbits. This result can be thought of as a step towards Franks' theorem for Reeb flows in higher dimensions. The second result is a contact analogue of the higher-dimensional Le Calvez-Yoccoz theorem proved by the speaker and Gurel and asserting that no periodic orbit of a Hamiltonian pseudo-rotation is locally maximal. The talk is based on a joint work with Erman Cineli, Basak Gurel and Marco Mazzucchelli.

Shira TANNY (Princeton)

Title: *From Gromov–Witten theory to the closing lemma*

Abstract: An old question of Poincaré concerns creating periodic orbits via perturbations of a flow/diffeomorphism. While pseudoholomorphic methods have successfully addressed this question in dimensions 2-3, the higher-dimensional case remains less understood. I will describe a connection between this question and Gromov–Witten invariants, which goes through a new class of invariants of symplectic cobordisms. This is a joint work with Julian Chaidez.

Zhengyi ZHOU (Chinese Academy of Science)

Title: *Bourgeois contact manifolds are tight*

Abstract: We will explain that Bourgeois' contact structures on $M \times T^2$ determined by the supporting open books of a contact manifold M are always tight. This answers a question by Lisi-Marinković- Niederkrüger in the negative. The proof is based on a contact homology computation leveraging holomorphic foliations and Bao-Honda's semi-global Kuranishi structures. This is based on a joint work with Russell Avdek.

THURSDAY JUNE 6, 2024

François LAUDENBACH (Nantes)

Title: *Claude, a topologist in symplectic topology*

Kei IRIE (RIMS Kyoto)

Title: *A conjectural chain model for positive S^1-equivariant symplectic homology of star-shaped toric domains in C^2*

Abstract: For any compact star-shaped domain in C^2, we introduce a filtered chain complex which conjecturally computes the positive S^1-equivariant symplectic homology of the domain. We explain a consequence of the conjecture on the asymptotic of the Gutt-Hutchings capacities, as well as a plan to prove the conjecture via degeneration of almost complex structures.

Francis NIER (Université Sorbonne Paris Nord)

Title: *Bar codes and small eigenvalues of the Witten and Bismut hypoelliptic Laplacians*

Abstract: In two collaborations with Claude Viterbo and Dorian Le Peutrec, we showed how the exponential scales of the small eigenvalues of Witten Laplacians in the semiclassical limit are exactly determined by topological quantities. In the second work, we used the bar codes of persistent homology and proved results valid for general smooth functions with a finite number of critical values. This approach is radically different from the instanton approach commonly used in such problems, and it does not assume that the potential is a Morse function. I will explain the motivations and some ideas for this analysis.

After this, I will present more recent and similar results obtained for Bismut hypoelliptic Laplacians with Xingfeng Sang and Francis White, in the double asymptotic regime of large frictions and small temperatures.

Yusuke KAWAMOTO (ETH Zurich)

Title: Q*uantitative Floer theory and coefficients*

Abstract: I will discuss the dependence of quantitative information of Floer theory, especially spectral invariants, on the choice of coefficients. In particular, I will present some phenomena that are specific to integer coefficients, including an answer to a variant of a question posed by Nancy Hingston. The material is based on a joint work with Egor Shelukhin.

Nathalie WAHL (Copenhagen)

Title: *Strings on manifolds*

Abstract: The Viterbo theorem gives a bridge between symplectic cohomology and the homology of free loop spaces on manifolds. On the free loop space side, we see a rich structure that goes under the name string topology, arising from considering when loops intersect or self-intersect. In this talk, I'll give some illustrative examples, and explain in particular how the string coproduct has turned out to be a really subtle invariant.

Paul BIRAN (ETH Zurich)

Title: *Approximations in the Fukaya Category*

Abstract. We will present a (partially) conjectural picture which suggests that the Fukaya category can be approximated, in an appropriate sense and with respect to natural metrics, by small families of objects. We will also show how this leads to various measurements concerning growth of functors. Based on joint work with Giovanni Ambrosioni and Octav Cornea.

FRIDAY JUNE 7, 2024

Mohammed ABOUZAID (Stanford)

Title: *Exact Floer homotopy*

Abstract: I will describe a formalism, building on the one recently developed with Blumberg, for defining filtered Hamiltonian Floer homotopy groups in the exact setting, and analogous invariants to symplectic and Rabinowitz homology. This is joint work in progress with Kai Cieliebak.

Amanda HIRSCHI (Sorbonne Université)

Title: *On stabilisations of symplectic 4-manifolds*

Abstract: The Donaldson 4-6 question asks how deformation classes of stabilised symplectic forms, i.e. after taking the product with S^2, are related to the underlying smooth structures on the underlying smooth manifold in dimension 4. I will describe one example of a smooth 4-manifold admitting two symplectic forms which remain deformation inequivalent after taking the product with S^2, giving counterexamples to one implication of the conjectured relation. On the other hand, I will explain why two symplectic manifolds, whose stabilisations are deformation equivalent, have the same Gromov-Witten invariants. This is joint work with Luya Wang.

Frédéric LE ROUX (Sorbonne Université)

Title: *The group of diffeomorphisms of the two-torus and the fine curve graph*

Abstract: The fine curve graph has been introduced recently by Bowden, Hensel and Webb to answer a question from Burago, Ivanov and Polterovich, showing the unboundedness of the commutator length on groups of surface diffeomorphisms. Subsequent works by Bowden-Hensel-Mann-Militon-Webb and Guihéneuf-Militon suggest the possibility of a rich dictionary between the fine curve graph and the rotation set. In this joint work with Sebastian Hensel we enlarge the dictionary and derive an explicit criterion which implies that two torus maps generate a free group.

Emmanuel GIROUX (CNRS/École Normale Supérieure)

Title: *Towards a Morse-Smale theory of symplectic Lefschetz fibrations*

Abstract: TBA.