Local Fukaya categories (Mohammed Abouzaid)

Abstract: I will explain joint work with Yoel Groman and Umut Varolgunes whose purpose is to define a Fukaya category associated to each compact subset of a closed symplectic manifold. Much of the difficulty has to do with curvature, and I will explain how to build the necessary algebraic toolkit to resolve them.

Auslander-Reiten quivers of ADE curve singularities and Lagrangian Floer theory (Cheol-Hyun Cho)

Abstract: For ADE singularity, indecomposable Cohen-Macaulay modules (or equivalently $\Z/2$-graded matrix factorizations) are classified and described by Auslander-Reiten quivers. For ADE curve singularity $f(x,y)$, we consider Berglund-H\"ubsch dual singularity $f^t(x,y)$ and their Milnor fiber together with diagonal symmetry group G. We consider G-equivariant Lagrangian Floer theory of the Milnor fiber to construct a full functor to matrix factorization category of f, And discuss the relationship of AR quiver and Lagrangian Floer theory. This is a joint work with Dongwook Choa and Wonbo Jung.

Augmentation, Alexander polynomial, and Annuli (Tobias Ekholm)

Abstract: We give a formula for the Alexander polynomial of a knot in terms of its Augmentation polynomial. The formula gives a certain deformation of the Alexander polynomial.

Lagrangian Floer theory of Divisor complement (Kenji Fukaya)

Abstract: I report a work in progress on the Lagrangian Floer theory of divisor complement.I will explain how the `Myer Vietoris type sequence' of Lagrangian Floer homology is expected to be obtained when family of symplectic manifolds degenerates to a union of two symplectic manifolds which intersect transversally on the smooth divisor.

A Klein TQFT : the local real Gromov-Witten theory of curves（Penka Georgieva）

Abstract: The local Gromov-Witten theory of curves studied by Bryan and Pandharipande revealed strong structural results for the local GW invariants, which were later used by Ionel and Parker in the proof of the Gopakumar-Vafa conjecture.

In this talk I will report on a joint work with Eleny Ionel on the extension of these results to the real setting. We show that the local real GW theory gives rise to a 2-dimensional Klein TQFT defined on an extension of the category of unorientable surfaces. We use this structure to completely solve the theory by providing a closed formula for the local real GW invariants in terms of representation theoretic data. As a corollary we obtain the local version of the real Gopakumar-Vafa formula. In the case of the resolved conifold the partition function of the real GW invariants agrees with that of the SO/Sp Chern-Simons theory on S^3.

Monomial admissibility and monodromy (Andrew Hanlon)

Abstract: We will discuss monomial admissibility conditions for Laurent polynomials and their corresponding Fukaya-Seidel categories. This discussion will include the relationship of this definition of the Fukaya-Seidel category with more traditional definitions. We will use this framework to compute certain monodromy functors and natural transformations in the mirror to a smooth compact toric variety and their relationship with homological mirror symmetry.

Noncommutative resolutions of singularities from Lagrangian deformation (Hansol Hong)

Abstract: Given a Lagrangian in a symplectic manifold, one can consider its Maurer-Cartan deformation which produces a local chart of the mirror that encodes mirror geometry near this Lagrangian. Construction applies to the union of Lagrangian spheres in a certain open symplectic manifold, and produces noncommutative resolutions of well-known algebraic singularities, which are in the form of quivers with potentials. In this talk, I will examine such a construction in different dimensions, and explain how quivers can be used to effectively compare mirror geometries.

Construction of symplectic field theory and smoothness of Kuranishi structure (Suguru Ishikawa)

Abstract: Symplectic field theory (SFT) is a generalization of Gromov-Witten invariant and Floer homology for contact manifolds and symplectic cobordisms between them, which was introduced by Eliashberg, Givental and Hofer around 2000. Its algebraic structure was well studied by them, but its construction was a difficult problem. Recently, I succeeded in its construction by usign Kuranishi theory. Kuranishi theory is a theory developed by Fukaya and Ono for the construction of Gromov-Witten invariant and Floer homology for general symplectic manifolds. To

use this theory for the construction of SFT, we need to construct smooth Kuranishi structures of moduli spaces. In this talk, I will talk about my work on the construction of SFT and smoothness of Kuranishi structure.

Distinguishing symplectic manifolds via the continuous dynamics on wrapped Fukaya categories (Yusuf Baris Kartal)

Abstract: This talk is about distinguishing symplectic manifolds by using the differences in amounts of ``vector fields on Fukaya categories that integrate to periodic flows". More precisely, we use an algebraic incarnation of the classical symplectic invariant- called Flux- on deformations of wrapped Fukaya categories to partially classify open symplectic mapping tori. As an application, we obtain pairs of diffeomorphic Weinstein fillings of a contact manifold that cannot be distinguished by their symplectic cohomology groups, but that are different as Liouville domains.

T-equivariant disc potentials (Siu-Cheong Lau)

Abstract: Lagrangian Floer theory developed by Fukaya-Oh-Ohta-Ono has played a central role in symplectic geometry and mirror symmetry. In particular, we have a well-defined disc potential for weakly unobstructed Lagrangians. In this talk, we will study and compute a torus-equivariant version of the disc potential for Lagrangian tori and certain Lagrangian immersions which are important for the SYZ construction. This is a joint work with Yoosik Kim and Xiao Zheng.

A symplectic look at the Fargues-Fontaine curve (Yanki Lekili)

Abstract: I will explain how to introduce a Frobenius twist in the construction of Fukaya category. This new construction applied to a symplectic 2-torus gives a symplectic mirror to the Fargues-Fontaine curve of p-adic Hodge theory. This is joint work in progress with David Treumann.

Arboreal skeleta (David Nadler)

Abstract: I will discuss progress in understanding Weinstein manifolds via skeleta with simple singularities. Joint work with Y. Eliashberg and D. Alvarez-Gavela.

TBA (Emanuel Scheidegger)

Skeins on branes (Vivek Shende)

Abstract: I will describe how to count open higher genus curves in Calabi-Yau 3-folds, and give an enumerative interpretation of the coefficients of the HOMFLYPT polynomial. This is joint work with Tobias Ekholm. Time permitting, I will speculate on categorification.

Deformation theory of pseudoholomorphic curves relative to an SNC divisor (Mohammad Farajzadeh Tehrani)

Abstract: Moduli spaces of pseudoholomorphic curves in the presence of an SNC (simple normal crossings) divisor appear naturally in Gromov-Witten theory, Mirror Symmetry, and various other applications. In this talk, we introduce an analytical setup for studying the deformation theory of such curves. In particular, we derive an analog of Ruan-Tian perturbations of the Cauchy-Riemann operator for these moduli spaces. Such perturbations, together with a new compactification that was introduced recently, enable a geometric construction of Gromov-Witten type invariants for certain semi- positive pairs in arbitrary genera.

Mirror symmetry for Grassmannians and cluster transformations (Kazushi Ueda)

Abstract: We will discuss a construction of Rietsch's mirror for Grassmannians from the point of view of cluster structures, and the description of the Fukaya categories in terms of matrix factorizations. If the time permits, we will also discuss the other direction of homological mirror symmetry. This is a joint work in progress with Yuichi Nohara.

Chen’s proof of the Kotshchick-Morgan conjecture and (equivaraint) K-theoretical Donaldson invariants (Bai-Ling Wang)

Abstract: In this talk, I will first briefly review two important results in Bohui Chen’s PhD thesis: Bubble tree compactification of instanton moduli spaces and his proof of the Kotshchick-Morgan conjecture. As a new application, we will define the K-theoretical Donaldson invariant and establish its wall crossing formula for b^+ =1 manifolds. In the presence of compact Lie group (such as U(1)) action, there is an equivariant version of these results. This is work in progress with Bohui Chen.

On the Hamiltonian Gromov—Witten invariants for compact symplectic manifolds (Rui Wang)

Abstract: Based on joint work with Bohui Chen and Bai-Ling Wang, we explain the construction of Hamiltonian Gromov—Witten invariants for a compact symplectic manifold which admits compact Lie group Hamiltonian action. The invariants are constructed through moduli spaces of symplectic vortices with cylindrical-ended metrics. Analytic setup for the moduli spaces will be explained. Applications, including a version of quantization for Kirwan morphism (under the assumption that the Lie group is abelian) will be introduced.

A Compactness Theorem for translation invariant ASD equation and Atiyah--Floer conjecture（Guangbo Xu）

Abstract: In this talk we will consider the anti-self-dual equation over the product of the real line and a three-manifold with cylindrical end for gauge group SO(3). I will explain the proof of a Gromov--Uhlenbeck type compactness result for this equation. This is the first step towards constructing a natural bounding cochain for the symplectic side of the SO(3) Atiyah--Floer conjecture.

Fukaya category of Landau-Ginzburg model and the algebra of the infrared (Dingyu Yang)

Abstract: In the first part of the talk, I will go over my joint work with Huijun Fan and Wenfeng Jiang on how to define a Fukaya category from a tame holomorphic Morse function on a Kähler manifold, where some of the key points are the use of Witten equation and a highly non-trivial C^0 compactness argument. Then, I will explain how to use Witten equation to construct moduli spaces underlying the algebra of infrared of Gaiotto-Moore-Witten, which incorporates our construction as a natural sub-picture. Here, the space of all pointed subdivisions of the convex hull of the critical values of the holomorphic Morse function provides the setting of coherent families of Witten equation solutions. Mathematically, the algebra structure is formulated by Kapranov-Kontsevich-Soibelman as L infinity structure of secondary polytope and its restriction to A infinity structure, and I will outline how to approach some of their conjectures. If time permits, I will touch upon the wall-crossing aspect and mirror symmetry.