# Schedule, Title/abstract

## Saturday Morning, April 13

9:00- **Junwu Tu**

*Introduction to categorical enumerative invariants*

Abstract. In the first talk, we shall begin by recalling the fact that Hochschild cohomology of an associative algebra has a Gerstenhaber algebra structure. Then we discuss its chain level extension (conjectured by Deligne) that the Hochschild cochain complex of A carries an $E_2$-algebra structure. Finally, we shall describe the construction of categorical enumerative invariants (CEI) in genus zero. In the second talk, we extend the previous genus zero construction to higher genus setting.

10:00- **Catherine Cannizzo**

*Fukaya categories of Landau-Ginzburg Models*

Abstract: We will define symplectic Landau-Ginzburg models and see how they arise as SYZ (Strominger-Yau-Zaslow) mirrors to varieties of general type in work of Abouzaid-Auroux-Katzarkov and Chan-Lau-Leung (a phenomenon explained physically by Hori and Vafa). Then we will define the Fukaya category of a Landau-Ginzburg model, generalizing Seidel's setting for exact Lefschetz fibrations to the non-exact setting and more singular fibrations, as in recent work of Abouzaid-Auroux. We will do a couple of examples, by considering mirrors to theta divisors and to blow-ups of abelian varieties. These are joint works with Haniya Azam, Heather Lee, Chiu-Chu Melissa Liu and with Sara Venkatesh.

11:00- **Andrei Căldăraru**

*CEI in the singular case*

Abstract: The current definition of CEI requires a complete splitting of the Hodge filtration of the underlying A-infinity algebra (or, equivalently, a trivialization of the circle action on the induced TCFT). This requires us to assume that the algebra is smooth and proper.

However, the expectation that CEI compute analogs of Gromov-Witten invariants suggests that it should be possible to partially define CEI for some degenerate singular cases in the B-model. (This is matched by predictions in symplectic geometry about Fukaya categories of smooth, but not proper, symplectic manifolds.) In my talk I shall discuss how one can attempt to make sense of these predictions, and present several open questions related to these problems.

## Saturday Afternoon, April 13

14:30- **Yunfan He**

*Holomorphic anomaly equation for categorical enumerative invariants for elliptic curves*

Abstract: Categorical enumerative invariants are a certain type of invariant associated to an A-infinity algebra and a splitting of the Hodge filtration on its cyclic homology. Conjecturally, when taking the A-infinity algebra that is Morita invariant to the Fukaya category and the canonical splitting, it should recover the Gromov-Witten invariant. When taking $D^b(Coh(E))$ for an elliptic curve, there are two splittings that one can use. We show that by comparing the CEI associated to these two splittings, one can prove holomorphic anomaly equation. This is based on joint work with Andrei Caldararu and Junwu Tu.

15:30- **Jae Hwang Lee**

*A Quantum H*(T)-module via Quasimap Invariants*

Abstract: For X a smooth projective variety, the quantum cohomology ring $QH*(X)$ is a deformation of the usual cohomology ring $H*(X)$, where the product structure is modified to incorporate quantum corrections. These correction terms are defined using Gromov–Witten invariants. When X is toric with geometric quotient description $V//T$, the cohomology ring $H*(V//T)$ also has the structure of a $H*(T)$-module. In this paper, we introduce a new deformation of the cohomology of X using quasimap invariants with a light point. This defines a quantum $H*(T)$-module structure on $H*(X)$ through a modified version of the WDVV equations. We explicitly compute this structure for the Hirzebruch surface of type 2. We conjecture that this new quantum module structure is isomorphic to the natural module structure of the Batyrev ring for a semipositive toric variety.

16:30- **Song Yu**

*Integrality structures in open and closed Gromov-Witten theory*

Abstract: We will discuss an extension of the well-known Gopakumar-Vafa integrality in Gromov-Witten theory to the open Gromov-Witten theory of toric Calabi-Yau 3-folds relative to Aganagic-Vafa Lagrangians. In this setting, integrality and finiteness properties are captured by a resummation formula of Labastida-Mariño-Ooguri-Vafa originally discovered in the context of Chern-Simons knot/link invariants and large-N duality. We will discuss a verification of these properties for the open Gromov-Witten invariants of toric Calabi-Yau 3-folds. As a consequence, we will explain how to apply the open/closed correspondence in Gromov-Witten theory, developed jointly with Chiu-Chu Melissa Liu, to obtain integrality properties of a class of genus-zero Gromov-Witten invariants of toric Calabi-Yau 4-folds, which provides additional examples to the higher-dimensional integrality conjecture of Klemm-Pandharipande.

## Sunday Morning, April 14

9:00- **Konstantin Aleshkin**

*General GLSM invariants*

Gauged Linear Sigma Models (GLSM) have been an active area of research in mathematical physics for 30 years. However, the mathematical theory of general GLSM is fairly new. I will start by explaining how GLSM naturally appear in the context of more classical curve counting theories. Then I will talk about definitions and constructions of moduli spaces of maps, virtual fundamental classes, and invariants in GLSM, mostly following foundational works by Fan-Jarvis-Ruan and Favero-Kim.

10:00- **Catherine Cannizzo**

*Homological Mirror Symmetry for Theta Divisors and Blowups*

Abstract: In the previous talk, we studied the Fukaya category in a couple examples. We will start this talk by studying the bounded derived category of coherent sheaves of the original complex mirrors in these examples. Then we will show results for the two examples in answer to Kontsevich's homological mirror symmetry conjecture. Features include a mirror exact sequence computing morphisms in the theta divisor case, and a mirror semi-orthogonal decomposition in morphisms for the blowup case. The Fukaya category, or symplectic geometry side, is known as the "A-side" while the bounded derived category of coherent sheaves, or complex geometry side, is known as the "B-side." These are joint works with Haniya Azam, Heather Lee, Chiu-Chu Melissa Liu and with Sara Venkatesh.

11:00- **Junwu Tu**

*Introduction to categorical enumerative invariants, part 2*

12:00- **Konstantin Aleshkin**

*General GLSM invariants, part 2*