Mirror symmetry, gauged linear sigma models, matrix factorizations, and related topics
March 4-6, 2020

Wednesday, March 4

Time	Speaker	Title/Abstract
8:50 - 9:20am	Breakfast	
9:20 - 9:30am	Opening Remarks	
9:30 - 10:30am	Conan Leung	**Title:** Geometry of the Maurer-Cartan equation near degenerate Calabi-Yau varieties. **Abstract:** Motivated from Mirror Symmetry near large complex structure limit, a dgBV algebra will be constructed associated to a possibly degenerate Calabi-Yau variety equipped with local thickening data. Using this, we prove unobstructedness of smoothing of degenerated Log CY satisfying Hodge-deRham degeneracy property. This is a joint work with Kwokwai Chan and Ziming Ma.
10:30 - 11:00pm	Break	
11:00 - 12:00pm	Andrei Căldăraru	**Title:** Categorical enumerative invariants for matrix factorizations **Abstract**: I will discuss recent work with Junwu Tu on giving a precise, computable definition of invariants defined 15 years ago by Kevin Costello. These invariants are associated to a (Z/2- or Z-graded) cyclic A_infinity algebra, together with a splitting of the Hodge filtration. For algebras obtained from Fukaya categories these invariants are expected to generalize Gromov-Witten invariants. When applied to matrix factorization categories, the invariants are expected to give a definition of B-model FJRW invariants. Due to their categorical nature, the invariants make sense equally well in the presence of a group of symmetries, solving one of the existing difficulties in the theory of FJRW invariants.
12:00 - 2:00pm	Lunch	
2:00 - 3:00pm	Tsung-Ju Lee	**Title:** Mirror symmetry for singular Calabi--Yau varieties **Abstract:** In this talk, we will discuss a new construction of mirror pairs of certain singular Calabi--Yau varieties and a number of tests on these pairs. This is a joint work with S. Hosono, B. Lian, and S.-T. Yau.
3:00 - 3:30pm	Break	
3:30 - 4:30pm	Guangbo Xu	**Title:** Adiabatic limit of gauged Witten equation **Abstract:** In 1809.00424 Tian and I constructed correlation functions associated to a gauged linear sigma model in the geometric phase. The gauged Witten

| | | equation used in the construction is a generalization of the vortex equation in two dimensions. These correlators are expected to agree with Gromov--Witten invariants up to a "coordinate change." I will explain how to prove this correspondence using the adiabatic limit of the gauged Witten equation. This is a joint work in progress with Tian. |

Thursday, March 5

Time	Speaker	Title/Abstract
9:00 - 9:30am	Breakfast	
9:30 - 10:30am	Albrecht Klemm	**Title:** Topological String on genus one fibred CY 3-folds with N-sections and Jacobi forms **Abstract:** The all genus topological string amplitudes on Calabi-Yau 3-folds are generating functions of the symplectic invariants of holomorphic curves. We argue that the Fourier-Mukai transform on the A-model category as well as the holomorphic anomaly of the B-model restrict these amplitudes to be meromorphic Jacobi-forms of Gamma_1(N) subgroups of SL(2,ZZ). Vanishing conditions and in the non-compact case Nakajima's blow up equations allow to fix the amplitudes explicetly.
10:30 - 11:00pm	Break	
11:00 - 12:00pm	Rachel Webb	**Title:** Virtual Cycle on the Moduli Space of Maps to a Complete Intersection **Abstract:** A driving question in Gromov-Witten theory is to relate the invariants of a complete intersection to the invariants of the ambient variety. In genus-zero this can often be done with a ``twisted theory,'' but this fails in higher genus. Several years ago, Chang-Li presented the moduli space of p-fields as a piece of the solution to the higher-genus problem, constructing the virtual cycle on the space of maps to the quintic 3-fold as a cosection localized virtual cycle on a larger moduli space (the space of p-fields). Their result is analogous to the classical statement that the Euler class of a vector bundle is the class of the zero locus of a generic section. I will discuss work joint with Qile Chen and Felix Janda where we extend Chang-Li's result to a more general setting, a setting that includes standard Gromov-Witten theory of smooth orbifold targets and quasimap theory of GIT targets. This work is joint with Qile Chen and Felix Janda.
12:00 - 2:00pm	Lunch	
2:00 - 3:00pm	Elana Kalashnikov	**Title:** Finding mirrors for Fano quiver flag zero loci. **Abstract**: One interesting feature of the classification of smooth Fano varieties up to dimension three is that they can all be described as certain subvarieties in GIT quotients; in particular, they are all either toric complete intersections (subvarieties of toric varieties) or quiver flag zero loci (subvarieties of quiver flag varieties). Fano varieties are expected to mirror certain Laurent polynomials; given such a Fano toric complete intersection, one can produce a Laurent

		polynomial via the Landau-Ginzburg model. In this talk, I'll discuss finding mirrors of four dimensional Fano quiver flag zero loci via finding degenerations of the ambient quiver flag varieties. These degenerations generalise the Gelfand-Cetlin degeneration, which in the Grassmannian case has an important role in the cluster structure of its coordinate ring.
3:00 - 3:30pm	Break	
3:30 - 4:30pm	David Favero	**Title:** Exceptional Collections for Factorizations of Invertible Polynomials with Maximal Symmetry **Abstract:** I will discuss recent joint work with Daniel Kaplan and Tyler Kelly wherein we prove that the equivariant derived category of factorizations of an invertible polynomial with its maximal symmetry group has a full exceptional collection. In the Gorenstein case, this full exceptional collection is also strong. The former was conjectured by Hirano-Ouchi and the latter was conjectured (in general) by Takahashi and Lekili-Ueda. This should be of use in proving homological mirror symmetry for Berglund-Hubsch-Krawitz pairs.

Friday, March 6

Time	Speaker	Title/Abstract
9:00 - 9:30am	Breakfast	
9:30 - 10:30am	Mark Shoemaker	**Title:** Genus-zero Gromov—Witten Theory under extremal transitions **Abstract:** From a singular projective variety X_0, one can potentially obtain a smooth variety by smoothing or via a crepant resolution. If X is a smoothing of X_0 and Y is a crepant resolution, we say that X and Y are related by extremal transition. It is speculated that the moduli space of Calabi—Yau threefolds is connected via such transitions. Therefore, understanding the behavior of Gromov—Witten Theory under extremal transitions has important applications to mirror symmetry. In this talk I will describe a general procedure which produces extremal transitions between hypersurfaces in toric varieties and explain how their Gromov—Witten theories relate. Joint with Rongxiao Mi.
10:30 - 11:00pm	Break	
11:00 - 12:00pm	Chenglong Yu	**Title:** Calabi-Yau varieties via cyclic covers and arithmetic ball quotients **Abstract:** In this talk, we consider Calabi-Yau varieties arising from cyclic covers of smooth projective varieties branching along simple normal crossing divisors. The crepant resolutions give complete families of smooth Calabi-Yau manifolds. In some cases, the corresponding period maps factor through ball quotients. We give a classification of such examples for cyclic covers of some Fano varieties, especially the product of three projective lines. This generalizes the work of Sheng-Xu-Zuo. Some of the Calabi-Yau manifolds obtained are related to the Borcea-Voisin construction and studied in Rohde's thesis. This is

		a joint work with Zhiwei Zheng.
12:00 - 2:00pm	Lunch	
2:00 - 3:00pm	Mauricio Romo	**Title:** Hemisphere partition function, LG orbifolds and FJRW invariants **Abstract:** We consider LG orbifolds and the central charges of their B-branes (equivariant matrix factorizations) in the context of Gauged Linear Sigma Models (GLSM). We will focus on the hemisphere partition function on the GLSM extension of certain LG orbifolds, and how this provides information about their Gamma class, I/J-function and some predictions about FJRW invariants.
3:00 - 3:30pm	Break	
3:30 - 4:30pm	Yun Shi	**Title:** On motivic Donaldson-Thomas theory on the local projective plane **Abstract:** Donaldson-Thomas (DT) theory is an enumerative theory which produces a count of ideal sheaves of 1-dimensional subschemes on a Calabi-Yau 3-fold. Motivic Donaldson-Thomas theory is a categorification of the DT theory. This categorification contains more refined information of the moduli space, e.g. the singularities of the moduli space. In this talk, I will give a brief introduction to motivic DT theory. I will also discuss some results on this theory for moduli spaces of sheaves on the local projective plane.