

# Workshop: Homological mirror symmetry and higher genus invariants

Events for:  
Monday, May 22nd - Friday, May 26th

## Monday, May 22nd

9:45am **Tony Pantev - SCGP 102**

**Title:** Non-commutative Hodge structures

**Abstract:** I will give an introduction to the Hodge theory arising in Homological Mirror Symmetry. I will discuss pure nc Hodge structures, their Betti and de Rham aspects, and their relation to categorical nc geometry. I will review examples from singularity theory, symplectic topology, and complex geometry with a special attention to Fukaya and matrix factorization categories. As application I will describe a Bogomolov-Tian-Todorov theorem for the deformations of Fano varieties and Landau-Ginzburg models, the various definitions of Hodge numbers for non-commutative Hodge structures of Landau-Ginzburg type, and the role they play in mirror symmetry.

10:45am **Break - SCGP Lobby**

11:00am **John Pardon - SCGP 102**

**Title:** Virtual fundamental cycles in Floer theory

**Abstract:** I will present the framework of "implicit atlases" for constructing virtual fundamental cycles on moduli spaces of pseudo-holomorphic curves. These methods are broadly applicable to moduli spaces appearing in Floer theory, and emphasis will be placed on this generality.

12:00pm **Lunch - SCGP Cafe**

1:30pm **Kevin Costello - SCGP 102**

**Title:** The higher genus B model and BCOV theory"

**Abstract:** "We will start by reviewing the role of Givental's Fock space formalism in abstract topological field theory, and in the B model. This will serve as a motivation for the introduction of the BCOV quantum field theory on a Calabi-Yau manifold. The last two lectures will describe a class of integrable hierarchies that appear in BCOV theory on the product of a Calabi-Yau manifold with the complex line."

2:30pm **Coffee Break - SCGP 102**

3:00pm **Nick Sheridan - SCGP 102**

**Title:** Genus-zero Gromov-Witten invariants from the Fukaya category"

**Abstract:** "I will explain in detail how to extract genus-zero Gromov--Witten invariants from the Fukaya category. This will be based on joint work with Ganatra and Perutz that builds on work of many people, including Barannikov, Costello, Katzarkov, Kontsevich and Pantev."

## **Tuesday, May 23rd**

9:45am **Tony Pantev - SCGP 102**

**Title:** Non-commutative Hodge structures

**Abstract:** I will give an introduction to the Hodge theory arising in Homological Mirror Symmetry. I will discuss pure nc Hodge structures, their Betti and de Rham aspects, and their relation to categorical nc geometry. I will review examples from singularity theory, symplectic topology, and complex geometry with a special attention to Fukaya and matrix factorization categories. As application I will describe a Bogomolov-Tian-Todorov theorem for the deformations of Fano varieties and Landau-Ginzburg models, the various definitions of Hodge numbers for non-commutative Hodge structures of Landau-Ginzburg type, and the role they play in mirror symmetry.

10:45am **Break - SCGP Lobby**

11:00am **John Pardon - SCGP 102**

**Title:** Virtual fundamental cycles in Floer theory

**Abstract:** I will present the framework of "implicit atlases" for constructing virtual fundamental cycles on moduli spaces of pseudo-holomorphic curves. These methods are broadly applicable to moduli spaces appearing in Floer theory, and emphasis will be placed on this generality.

12:00pm **Lunch - SCGP Cafe**

1:00pm **SCGP Weekly Talk: Kevin Costello - SCGP 102**

**Title:** The higher genus B model and BCOV theory"

**Abstract:** "We will start by reviewing the role of Givental's Fock space formalism in abstract topological field theory, and in the B model. This will serve as a motivation for the introduction of the BCOV quantum field theory on a Calabi-Yau manifold. The last two lectures will describe a class of integrable hierarchies that appear in BCOV theory on the product of a Calabi-Yau manifold with the complex line."

2:30pm **Coffee Break - SCGP 102**

3:00pm **Nick Sheridan - SCGP 102**

**Title:** Genus-zero Gromov-Witten invariants from the Fukaya category"

**Abstract:** "I will explain in detail how to extract genus-zero Gromov--Witten invariants from the Fukaya category. This will be based on joint work with Ganatra and Perutz that builds on work of many people, including Barannikov, Costello, Katzarkov, Kontsevich and Pantev."

<b>Wednesday, May 24th</b>
----------------------------

9:45am **Tony Pantev - SCGP 102**

**Title:** Non-commutative Hodge structures

**Abstract:** I will give an introduction to the Hodge theory arising in Homological Mirror Symmetry. I will discuss pure nc Hodge structures, their Betti and de Rham aspects, and their relation to categorical nc geometry. I will review examples from singularity theory, symplectic topology, and complex geometry with a special attention to Fukaya and matrix factorization categories. As application I will describe a Bogomolov-Tian-Todorov theorem for the deformations of Fano varieties and Landau-Ginzburg models, the various definitions of Hodge numbers for non-commutative Hodge structures of Landau-Ginzburg type, and the role they play in mirror symmetry.

10:45am **Break - SCGP Lobby**

11:00am **Kevin Costello - SCGP 102**

**Title:** The higher genus B model and BCOV theory"

**Abstract:** "We will start by reviewing the role of Givental's Fock space formalism in abstract topological field theory, and in the B model. This will serve as a motivation for the introduction of the BCOV quantum field theory on a Calabi-Yau manifold. The last two lectures will describe a class of integrable hierarchies that appear in BCOV theory on the product of a Calabi-Yau manifold with the complex line."

12:00pm **Free Afternoon - SCGP**

<b>Thursday, May 25th</b>
---------------------------

9:45am **John Pardon - SCGP 102**

**Title:** Virtual fundamental cycles in Floer theory

**Abstract:** I will present the framework of "implicit atlases" for constructing virtual fundamental cycles on moduli spaces of pseudo-holomorphic curves. These methods are broadly applicable to moduli spaces appearing in Floer theory, and emphasis will be placed on this generality.

10:45am **Break - SCGP Lobby**

11:00am **Si Li - SCGP 102**

**Title:** The higher genus B model and BCOV theory"

**Abstract:** We will start by reviewing the role of Givental's Fock space formalism in abstract topological field theory, and in the B model. This will serve as a motivation for the introduction of the BCOV quantum field theory on a Calabi-Yau manifold. The last two lectures will describe a class of integrable hierarchies that appear in BCOV theory on the product of a Calabi-Yau manifold with the complex line."

12:00pm **Lunch - SCGP Cafe**

1:30pm **Nick Sheridan - SCGP 102**

**Title:** "Genus-zero Gromov-Witten invariants from the Fukaya category"

**Abstract:** "I will explain in detail how to extract genus-zero Gromov--Witten invariants from the Fukaya category. This will be based on joint work with Ganatra and Perutz that builds on work of many people, including Barannikov, Costello, Katzarkov, Kontsevich and Pantev."

2:30pm **Coffee Break - SCGP 102**

3:00pm **Tony Pantev - SCGP 102**

**Title:** Non-commutative Hodge structures

**Abstract:** I will give an introduction to the Hodge theory arising in Homological Mirror Symmetry. I will discuss pure nc Hodge structures, their Betti and de Rham aspects, and their relation to categorical nc geometry. I will review examples from singularity theory, symplectic topology, and complex geometry with a special attention to Fukaya and matrix factorization categories. As application I will describe a Bogomolov-Tian-Todorov theorem for the deformations of Fano varieties and Landau-Ginzburg models, the various definitions of Hodge numbers for non-commutative Hodge structures of Landau-Ginzburg type, and the role they play in mirror symmetry.

<b>Friday, May 26th</b>
-------------------------

9:45am **Si Li - SCGP 102**

**Title:** The higher genus B model and BCOV theory"

**Abstract:** "We will start by reviewing the role of Givental's Fock space formalism in abstract topological field theory, and in the B model. This will serve as a motivation for the introduction of the BCOV quantum field theory on a Calabi-Yau manifold. The last two lectures will describe a class of integrable hierarchies that appear in BCOV theory on the product of a Calabi-Yau manifold with the complex line."

10:45am **Break - SCGP Lobby**

11:00am **Nick Sheridan - SCGP 102**

**Title:** "Genus-zero Gromov-Witten invariants from the Fukaya category"

**Abstract:** "I will explain in detail how to extract genus-zero Gromov-Witten invariants from the Fukaya category. This will be based on joint work with Ganatra and Perutz that builds on work of many people, including Barannikov, Costello, Katzarkov, Kontsevich and Pantev."