Week 3 Schedule

Events for:
Monday, July 15th - Friday, July 19th

Monday, July 15th

8:30am Workshop: Breakfast - SCGP Cafe
Title: Breakfast

9:30am Workshop Mini-course 1: Andrew Neitzke - SCGP 102
Speaker: Andrew Neitzke
Title: Higgs bundles and nonabelian Hodge

Abstract: I will discuss the hyperkahler metrics on moduli spaces of Higgs bundles. These metrics are difficult to describe explicitly, because their construction involves solving a nonlinear PDE (Hitchin's equation). There is a conjectural picture originating in quantum field theory which gives an alternative route to describing the metrics, expressing them in terms of period integrals and integer (Donaldson-Thomas) invariants. I will explain this picture, focusing on simple examples.

10:45am Workshop: Coffee Break - SCGP Cafe
Title: Coffee Break

11:30am Workshop Mini-course 1: Melody Chan - SCGP 102
Speaker: Melody Chan
Title: Moduli spaces of abelian varieties via tropical geometry

Abstract: In recent joint work with Francis Brown, Søren Galatius, and Sam Payne, we identify a Hopf algebra structure on the weight 0 cohomology with compact supports of the moduli space of abelian varieties, and we prove consequences of it that change the landscape of what is known about the unstable cohomology of $A_g$, $GL_n(Z)$, and $SL_n(Z)$. My goal will be to discuss certain ingredients to this work. The ingredients I'll highlight are related to the tropical varieties associated to toroidal compactifications of $A_g$, and invariant differential forms thereon. I intend for this lecture series to be accessible and will devote part of it to a crash course for new learners on some relevant algebraic structures.

12:45pm Workshop: Lunch - SCGP Cafe
Title: Lunch

3:30pm  **Tea Break - SCGP Cafe**

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**Tuesday, July 16th**

8:30am  **Workshop: Breakfast - SCGP Cafe**

**Title:** Breakfast

9:30am  **Workshop Mini-course 1: Martin Moeller - SCGP, 102**

**Speaker:** Martin Moeller

**Title:** Compactification of moduli spaces of differentials: logarithmic and multi-scale.

**Abstract:** We present two ways to construct a compactification of the strata of the moduli space of differentials given by a fixed type of zeros and poles, a geometric approach via multi-scale differentials and an equivalent approach in terms of logarithmic geometry. The main goal is to show that the compactification is a smooth orbifold with normal crossing boundary. In the second lecture we present applications to computations of invariants, such as the Euler characteristic and the Kodaira dimension.

10:45am  **Workshop: Coffee Break - SCGP Cafe**

**Title:** Coffee Break

12:45pm  **Group Photo - SCGP Lobby**

**Title:** Group Photo

12:45pm  **Workshop: Lunch - SCGP Cafe**

**Title:** Lunch

2:30pm  **Workshop Forward-looking talk: Marc Burger - SCGP 102**

**Speaker:** Marc Burger

**Title:** Forwad-looking talk
3:30pm  **Tea Break - SCGP Cafe**

5:00pm  **Summer Concert Series**

**Title:** Summer Concert Series

**Abstract:** Performance by Ramtin Mohasselyazdi (composer and pianist); Eric Ness (cellist and composer); Evanglea Andreadis (violinist); Athena Wilkinson (violinist); and Sophie May Bowden (violinist)

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**Wednesday, July 17th**

8:30am  **Workshop: Breakfast - SCGP Cafe**

**Title:** Breakfast

9:30am  **Workshop Mini-course 2: Andrew Neitzke - SCGP 102**

**Speaker:** Andrew Neitzke

**Title:** Higgs bundles and nonabelian Hodge

**Abstract:** I will discuss the hyperkahler metrics on moduli spaces of Higgs bundles. These metrics are difficult to describe explicitly, because their construction involves solving a nonlinear PDE (Hitchin's equation). There is a conjectural picture originating in quantum field theory which gives an alternative route to describing the metrics, expressing them in terms of period integrals and integer (Donaldson-Thomas) invariants. I will explain this picture, focusing on simple examples.

10:45am  **Workshop: Coffee Break - SCGP Cafe**

**Title:** Coffee Break

11:30am  **Workshop: Second mini-course talk - SCGP 102**

**Title:** Second mini-course talk

12:45pm  **Workshop: Lunch - SCGP Cafe**

**Title:** Lunch

2:30pm  **Workshop Forward-looking talk: Nikita Nekrasov - SCGP 102**
**Speaker:** Nikita Nekrasov

**Title:** Forward-looking talk

3:30pm **Tea Break - SCGP Cafe**

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**Thursday, July 18th**

8:30am **Workshop: Breakfast - SCGP Cafe**

**Title:** Breakfast

9:30am **Workshop Mini-course 2: Melody Chan - SCGP, 102**

**Speaker:** Melody Chan

**Title:** Moduli spaces of abelian varieties via tropical geometry

**Abstract:** In recent joint work with Francis Brown, Søren Galatius, and Sam Payne, we identify a Hopf algebra structure on the weight 0 cohomology with compact supports of the moduli space of abelian varieties, and we prove consequences of it that change the landscape of what is known about the unstable cohomology of $A_g$, $GL_n(Z)$, and $SL_n(Z)$. My goal will be to discuss certain ingredients to this work. The ingredients I'll highlight are related to the tropical varieties associated to toroidal compactifications of $A_g$, and invariant differential forms thereon. I intend for this lecture series to be accessible and will devote part of it to a crash course for new learners on some relevant algebraic structures.

10:45am **Workshop: Coffee Break - SCGP Cafe**

**Title:** Coffee Break

12:45pm **Workshop: Lunch - SCGP Cafe**

**Title:** Lunch

2:30pm **Workshop Forward-looking Talk: TBD - SCGP 102**

**Speaker:** TBD

**Title:** Forward-looking Talk

3:30pm **Tea Break - SCGP Cafe**
6:00pm **Workshop Banquet - SGCP Cafe**

**Title:** Workshop Banquet Dinner

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**Friday, July 19th**

8:30am **Workshop: Breakfast - SCGP Cafe**

**Title:** Breakfast

9:30am **Workshop Mini-course 2: Martin Moeller - SCGP, 102**

**Speaker:** Martin Moeller

**Title:** Compactification of moduli spaces of differentials: logarithmic and multi-scale.

**Abstract:** We present two ways to construct a compactification of the strata of the moduli space of differentials given by a fixed type of zeros and poles, a geometric approach via multi-scale differentials and an equivalent approach in terms of logarithmic geometry. The main goal is to show that the compactification is a smooth orbifold with normal crossing boundary. In the second lecture we present applications to computations of invariants, such as the Euler characteristic and the Kodaira dimension.

10:45am **Workshop: Coffee Break - SCGP Cafe**

**Title:** Coffee Break

11:30am **Workshop: Second mini-course talk - SCGP 102**

**Title:** Second mini-course talk

12:45pm **Workshop: Lunch - SCGP Cafe**

**Title:** Lunch