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**

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 (violist); Athena Wilkinson (violinist); and Sophie May Bowden (violinist)

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**

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

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