Focused Research Group on Hodge Theory, Moduli and Representation Theory: Workshop VI

Talks will be held in SCGP 313.

Tuesday, March 15

10:00 Matt Kerr. *Local mirror symmetry and the sunset integral*

11:30 Colleen Robles. *Analog of the Satake–Baily–Borel compactification for (arbitrary) period domains*

I will report on work-in-progress toward developing a "horizontal completion" $\Gamma\backslash D^*$ of an arithmetic quotient $\Gamma\backslash D$ of a period domain. This is part of a project with Green, Griffiths and Laza to study the KSBA compactification $\overline{\mathcal{M}}$ of a moduli space $\mathcal{M}$ of Horikawa surfaces. (What we are hoping to have is a good extension $\Phi_e : \overline{\mathcal{M}} \to \Gamma\backslash D^*$ of the period map $\Phi : \mathcal{M} \to \Gamma\backslash D$ that will enable us to apply Hodge theory to the analysis of $\overline{\mathcal{M}}$ and the boundary $\partial\mathcal{M} = \overline{\mathcal{M}}\backslash\mathcal{M}$.)

The talk will be general and non-technical: my goals are to describe the geometry underlying the construction of $\Gamma\backslash D$, and to relate the construction to the SBB compactification (in the case that D is Hermitian symmetric).

Wednesday, March 16

10:00 Patrick Brosnan. *Geometric aspects of Hessenberg varieties and the Shareshian-Wachs conjecture*

In the last FRG meeting in January at Texas A&M, I talked about the Shareshian-Wachs conjecture. But I spent most of the time saying what the conjecture is and only briefly sketched the proof of the conjecture which is contained in my recent joint work with Tim Chow. In this talk, which will be self-contained, I will explain some of the geometric aspects of the proof. One of the main highlights here is an amplification of the local invariant cycle theorem of Beilinson, Bernstein and Deligne, which gives a condition for the local invariant cycles to be isomorphic to the cohomology of the special fiber. I will discuss this along with a few other geometric aspects of the proof having to do mostly with monodromy.

11:30 Bruno Klinger. *Hodge theory and bi-algebraic geometry*

1:15 Ryan Keast. *A Generalization of Ribet's Nondegeneracy*

Let p be an odd prime. For an irreducible weight one CM Hodge structure of type (p, p), Ribet's theorem tells us that the Mumford-Tate group is maximal, aka nondegenerate. I will be talking about a recent paper in which I generalize Ribet's theorem to all odd weights.

Thursday, March 17

10:00 Greg Pearlstein. *Geometry of Nilpotent Cones in Hodge Theory*

The local monodromy of a degeneration of smooth complex projective varieties gives rise to a monodromy cone which plays a central role in constructing analogs of Mumford's toroidal compactifications for Hodge structures of arbitrary weight. In this talk, I will describe several methods for describing the possible monodromy cones which can arise in a given period domain using topological boundary components and signed Young diagrams.

11:30 Genival da Silva, Jr. *Surfaces with exceptional monodromy*

In this talk I will construct a family of elliptic surfaces with geometric monodromy group G_2.

Notes

This meeting has been scheduled to coincide with the Hodge Theory Program at the Simons Center for Geometry and Physics.

Please be aware that this is a working meeting for the FRG project. So, while the morning talks are open to public, the afternoon discussions will be attended only by the PIs, their students and post-docs, and the invited speakers.