MATH-IMS Joint Colloquium Series
The Chinese University of Hong Kong

This MATH-IMS Joint Colloquium Series in pure mathematics is organized by the Department of Mathematics and the Institute of Mathematical Sciences (IMS) at the Chinese University of Hong Kong. The series focus on all areas of pure mathematics together with theoretical developments and applications.

Date: October 22, 2020 (Thursday)
Time: 10am – 11am (Hong Kong Time)
Zoom Link: https://cuhk.zoom.us/j/98846779826

Atiyah class and sheaf counting on local Calabi-Yau 4-folds

Speaker: Professor Artan Sheshmani
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Abstract: We discuss Donaldson-Thomas (DT) invariants of torsion sheaves with 2 dimensional support on a smooth projective surface in an ambient non-compact Calabi Yau fourfold given by the total space of a rank 2 bundle on the surface. We prove that in certain cases, when the rank 2 bundle is chosen appropriately, the universal truncated Atiyah class of these codimension 2 sheaves reduces to one, defined over the moduli space of such sheaves realized as torsion codimension 1 sheaves in a noncompact divisor (threefold) embedded in the ambient fourfold. Such reduction property of universal Atiyah class enables us to relate our fourfold DT theory to a reduced DT theory of a threefold and subsequently then to the moduli spaces of sheaves on the base surface. We finally make predictions about modularity of such fourfold invariants when the base surface is an elliptic K3.

Bio: Professor Artan Sheshmani obtained his B.S. in Mechanical and Civil Engineering at Sharif University of Technology, Iran, in 2003, and his Ph.D. in Mathematics at the University of Illinois at Urbana-Champaign in 2011 under the supervision of Prof. Sheldon Katz and Tom Nevins. After that, he has been a postdoc at the University of British Columbia and a member of the Max Planck Institute of Mathematics. Prof. Sheshmani is currently an Associate Professor at Aarhus University, an international affiliate member of the International laboratory for Mirror Symmetry and Automorphic Forms, and a senior personnel at Harvard CMSA. He has hold visiting positions at MIT and Harvard University. Prof. Sheshmani is an algebraic geometer with research interests in Gromov Witten theory, Donaldson Thomas theory, Calabi-Yau geometries, and mathematical aspects of String Theory. He was awarded the DFF Research Leader grant in 2019.