

BOSTON UNIVERSITY GEOMETRY AND PHYSICS SEMINAR

## NESTED HILBERT SCHEMES AND LOCAL DONALDSON-THOMAS THEORY

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February 22, 2017, 4:00 – 5:00pm  
Math/Computer Science, Room 148  
111 Cummington Street, Boston

Tea: 3:45pm in Room 144

**Abstract:** We provide a rigorous and general construction of deformation obstruction theories and virtual classes for nested (flag) Hilbert scheme of one dimensional subschemes of a smooth projective algebraic surface. This will provide us with a general framework to compute a large class of invariants, such as Poincare invariants of Okonek et al, or the reduced local invariants of Kool and Thomas in the context of their local surface theory. We then compute the generating series of deformation invariants associated to these flag Hilbert schemes, and via exploiting the properties of vertex operators, show that they are modular. We finally establish a connection between Vafa-Witten invariants of local-surface threefolds and such nested Hilbert schemes. This construction eventually (after using some of Mochizukis wallcrossing techniques) enables us to compute the generating series of Seiberg-Witten invariants of the surface with respect to some modular forms. This is joint work with Amin Gholampour and Shing-Tung Yau following arXiv:1701.08902 and arXiv:1701.08899.

See <http://math.bu.edu/research/geom/seminar.html> or contact Lino Amorim ([lamorim@bu.edu](mailto:lamorim@bu.edu)) or Siu Cheong Lau ([lau@math.bu.edu](mailto:lau@math.bu.edu)) for more information.