

**Stony Brook University
The Graduate School**

Doctoral Defense Announcement

Abstract

Local Lagrangian and Fixed-Point Floer (Co)homologies

By

Shamuel Auyeung

This work consists of two logically-independent parts. In the first, we define a broad class of local Lagrangian intersections coined quasi-minimally degenerate (QMD) before developing techniques for studying their local Floer homology. The main result is: if L_0, L_1 are two Lagrangian submanifolds whose intersection decomposes into QMD sets, there is a spectral sequence converging to their Floer homology $HF_*(L_0, L_1)$ whose E^1 page is obtained from local data given by the singular homologies of the QMD pieces. We then give some applications of these techniques towards studying affine varieties, reproducing some prior results using our more general framework. The second part studies the fixed-point Floer cohomology of monodromies of Milnor fibrations arising from algebraic isolated hypersurface singularities. The main result is a novel proof that families of such singularities with constant Milnor number also have constant multiplicity and log canonical threshold. This answers a conjecture of Zariski and recovers a theorem of Varchenko. The proof uses a TQFT formalism and adjacencies of singularities.

Date: July 12, 2023

Program: Mathematics

Time: 11 am

Dissertation Advisor: Mark McLean

Place: Math Tower, 5-127