RUTGERS
UNIVERSITY | NEWARK

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

Colloquium

SYMPLECTIC 4-MANIFOLDS WITH PRESCRIBED BOUNDARY

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ABSTRACT:

A fundamental question in low dimensional symplectic and contact topology asks: When does a contact 3-manifold arise as the boundary of a compact symplectic 4-manifold?

In this talk, I will report on progress on this question when the contact 3-manifold is obtained by contact surgery—i.e. version of Dehn surgery in contact topology setting. As we will see, the case of contact surgeries with negative coefficients is fairly well understood, thanks to work of Eliashberg, Weinstein and Ding-Geiges. The case of contact surgeries with positive coefficients is much more subtle. I will discuss some older results (jointly with J. Conway and J. Etnyre) and some new results (jointly with T. Mark) that combine to provide a necessary and sufficient condition for contact 3-manifold, obtained by positive contact surgery along a Legendrian knot, to bound a compact symplectic 4-manifold. I will provide many examples, surprising topological applications and list related open questions.

4 − 5pm
Wednesday, April 10, 2024
Room 204, Smith Hall