

# Analysis and Data Science Seminar

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## NONCOMMUTATIVE DYNAMICAL SYSTEMS AND CROSSED PRODUCTS OF VON NEUMANN ALGEBRAS

Tuesday, November 11, 2025  
3:00 P.M. in Catskill 130

**ABSTRACT.** We study the dynamics of actions of discrete groups on von Neumann algebras, continuing a line of work that extends classical results on ergodic actions of discrete abelian groups on probability spaces. Each such action gives rise to a *crossed product* von Neumann algebra  $M \rtimes G$ , which contains copies of both the acting group  $G$  and the algebra  $M$  and encodes the interaction between them.

Our main results show that the regularity of certain natural subalgebras of  $M \rtimes G$ , and certain intermediate subalgebras, reflects “almost periodic” features of the underlying action. These results yield noncommutative analogues of classical results in ergodic theory and examples that distinguish the behavior of noncommutative dynamical systems from their classical counterparts.

This is joint work with Jon Bannon, Ionuț Chifan, Kunal Mukherjee, Roger Smith, and Alan Wiggins.