准教授 **Camila Sehnem (Operator Algebra Theory)**

My main research area is functional analysis in general, and more specifically operator algebra theory. I am interested in various generalized notions of group and semigroup actions on C^*-algebras, such as correspondences and partial automorphisms. I have been working on constructions of operator algebras from these actions, mostly C*-algebras, although non-self-adjoint operator algebras and von Neumann algebras have also played important role in my work.

The main projects I have been involved recently concern the ideal structure of C^*-algebras from (partial) group actions on non-commutative C^*-algebras, which we refer as (partial) C^*-dynamical systems. Unital commutative C^*-algebras correspond to continuous functions on compact space by Gelfand representation theorem. An action of a discrete group G on a commutative C^*-algebra then corresponds to a topological action of G, that is, an action by homeomorphisms on compact space. Although we can say that at the current stage the ideal structure of C^*-algebras associated to group actions on commutative C^*-algebras is well-understood, the progress towards understanding the structure of C^*-algebras from actions on non-commutative C^*-algebras since work of Olesen and Pedersen and Rieffel in the early 80s has been slow.

In recent collaboration with M. Kennedy and L. Kroell [1] we made significant progress towards understanding the ideal structure of C^*-algebras arising from group actions on non-commutative C^*-algebras. We completely characterized the primality of the reduced crossed product C^*-algebra associated to an arbitrary action of a discrete group in terms of the underlying C^*-dynamical system. This characterization is also new in the context of topological actions that are not minimal, in the sense that they admit nontrivial invariant open subsets. When the underlying group lies in a certain class that contains all finitely generated groups of polynomial growth, we were in addition able to completely characterize the *ideal intersection property* for actions of these groups. This is a crucial step to determine the ideal structure of these C^*-algebras as it allows us in several situations to transfer the ideal structure from the underlying C^*-algebra acted upon the group to the associated crossed product C^*-algebra.

In the context of partial C^*-dynamical systems, based on a project that was part of L. Kroell's PhD thesis [2], I have developed together with M. Kennedy and L. Kroell a boundary theory for arbitrary partial actions of discrete groups on non-commutative C^*-algebras. This work extends much of the main features of non-commutative boundaries for group actions introduced by Hamana in a series of papers that goes back to the late 70s. Non-commutative boundaries for group actions have played a central role in the analysis of the ideal structure of group C^*-algebras and of crossed products by group actions on C^*-algebras in general.

[1] Matthew Kennedy, Larissa Kroell, and Camila F. Sehnem, *Primality and the ideal intersection property for reduced crossed products.* preprint.

[2] Larissa Kroell, *Partial C*-dynamical systems and the ideal structure of partial reduced crossed products* (2025). PhD thesis. University of Waterloo.