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Research field: Number theory
Key words: Langlands correspondence, Shimura varieties, Rapoport-Zink spaces

Present research:

I am interested in the Langlands correspondence, which relates Galois representations of number fields with automorphic forms/representations. Recently, I am investigating how the Langlands correspondence appears in the geometry of Shimura varieties and their local counterparts, Rapoport-Zink spaces, by means of arithmetic geometry and the theory of automorphic representations. I am also working on foundations of étale cohomology theory of rigid spaces for the purpose of applying to the research above.

Notice for the students:

In modern number theory, we usually combine various techniques such as geometric method and representation-theoretic method. In order to proceed research in this field, I think two things are important: one is to find favorite areas which you understand deeply, and the other is to grasp rough pictures of various theories and relations between them. At the seminar in the first course of the graduate school, you will focus on a few important theories and try to understand them thoroughly. However, I also recommend to find occasions to come in touch with many other related areas.

As for mathematical knowledge, it is desirable to acquire the basics on algebras (commutative algebra, homological algebra, elementary representation theory), algebraic number theory and the theory of schemes. Apart from them, the following will be frequently used: algebraic groups, étale cohomology, rigid geometry (adic spaces), abelian varieties, p-divisible groups, representation theory of real and p-adic reductive groups. In the graduate school, you will learn some of them and do research by using them. I recommend to begin studying some of them before your graduation, because more knowledge gives you a broader vision.