教員名: 上田福大 (Ueda, Fukuhiro)

教員の大分野名: Algebra

教員の小分野名: Arithmetic Geometry, Number Theory

分野のキーワード: p-adic Hodge theory, Galois representations, K theory

研究分野紹介: In number theory, especially in Langlands Program, a central question is: Which Galois representations come from algebraic geometry? It is conjectured by Fontaine and Mazur that the key condition is "potentially log-crystalline". In the mid 1990's, a highly nontrivial case of this conjecture was proved by Wiles, namely the Taniyama-Shimura conjecture. Today, the Fontaine-Mazur conjecture in dimension two for the rational field is settled, as a result of various works in the past decades, including my work with Y. Hu.

In fact, the condition "log-crystalline" was rooted in the study of comparison between p-adic étale cohomology and crystalline cohomology, the so-called comparison theorem in p-adic Hodge theory, initially known as Grothendieck's mysterious functor, which was proved in various generalities. In a paper with J. Tong, we have adapted the approach of pro-etale site to prove the comparison for cohomologies with non-trivial coefficients, and also in the relative setting. The comparison theorems over more general bases naturally leads us to the study of motives and K-theory. My current focus is the calculation of étale cohomology of arithmetic schemes via K-theory and higher class field theory.

P-adic Hodge theory also has applications to (families of) automorphic forms. My earlier works include a construction of eigenvarieties in dimension two over arbitrary number fields via p-adic Hodge theory.

志望者に期待すること:

Local class field theory, as in Serre's book "Local Fields";

Class field theory, as in the book "Algebraic Number Theory" ed. by Cassal and Froehlich;

Scheme theory and cohomology, as in Liu's book"Algebraic Geometry and Arithmetic Curves".