Office: Rm 321 in Sci. Bldg. A

Telephone: +81 (0) 52−789−2818 (ext. 2818)

E-mail: fujiwara@math.nagoya-u.ac.jp

Website: no webpage available

Membership of academic societies:
MSJ (The Mathematical Society of Japan)

Research Interest:

- Number Theory
- Arithmetic Algebraic Geometry
- Automorphic forms and Shimura varieties

Research Summary:

I am interested in themes which relate geometric viewpoint (arithmetic geometry) and analytic viewpoint (such as harmonic analysis on adeles). In particular, I am trying to understand non-abelian class field theory, which is a vast generalization of classical class field theory due to Teiji Takagi and Emil Artin.

Non-abelian class field theory is, after efforts of many mathematicians, now formulated as a correspondence between:

1. Galois representations (algebraic and geometric objects obtained mainly from algebraic varieties),
2. Automorphic representations (representation-theoretical interpretation of automorphic forms, which admit large discrete symmetries)

which is called as Langlands correspondence. This correspondence is expected to preserve L-functions defined on both sides (non-abelian reciprocity law), which yield highly non-trivial consequences in number theory.

Usually such a correspondence is obtained from a deep study of Shimura varieties. Now my interest is focused on:

1. Arithmetic geometry of Shimura varieties
2. Galois representations and p-adic Hecke algebras
3. Application of non-abelian class field theory to classical number theoretical problems

which are related to each other.

Major Publications:

[1] K. Fujiwara, Rigid geometry, Lefschetz trace formula and Deligne's conjecture, Inv. Math. **127** (1997), 489—533.

[2] K. Fujiwara, Galois deformations and arithmetic geometry of Shimura varieties, Proceedings of the International Congress of Mathematicians Madrid 2006 (2006), vol. 2, 347—371.

[3] K. Fujiwara and F. Kato, Rigid geometry and applications, Moduli spaces and Arithmetic Geometry, Advanced Studies in Pure Math. **45**, (2006), 327-386

Awards and Prizes:

- Algebra prize (1998), Mathematical Society of Japan

Education and Appointments:

1990 Assistant professor, University of Tokyo
1994 Lecturer, Nagoya University
1997 Associate professor, Nagoya University
2001 Professor, Nagoya University

Message to Prospective Students:

My main research area, number theory, has a long history. In any area which has a long history, one needs to learn many ideas and insights from the existing literature, before starting an actual research. The shortest way to understand it is, I think, to have a firm knowledge on basic notions. So I expect you to read foundational textbooks in algebra, geometry, and analysis.

At the same time, I strongly recommend to read research papers. In doing so, you will feel something, think deeply, and get inspirations. This is a route to study mathematics, especially for beginners.

My role is to offer you a technical support in mathematics. You are recommended to find your own mathematics, not mine. Mathematics is full of freedom.

To get an impression on the basic literature, please look at the following books.

[1] N. Bourbaki, Commutative Algebra, Chapters 1-7, Springer
[2] N. Bourbaki, General Topology, Chapters 1-4, Springer
[3] H. Hida, Elementary theory of L-functions and Eisenstein series, LMS.
[4] A. W. Knapp, Elliptic curves, Princeton Univ. Press.
[5] N. Koblitz, Introduction to elliptic curves and modular forms, Springer.
[6] J. P. Serre, Abelian ℓ-adic representations and elliptic curves, Research notes in Mathematics.