Vita

Name Haruzo Hida

Institutional Address

UCLA Mathematics Department, Los Angeles, CA 90095-1555, U.S.A.

Professional Preparation

B.A. Mathematics, Kyoto University, Japan, 1975
M.A. Mathematics, Kyoto University, Japan, 1977
Dr. of Science, Mathematics, Kyoto University, Japan, 1980

Appointments

Distinguished Research Professor, UCLA Department of Mathematics, 2020–
Distinguished Professor, UCLA Department of Mathematics, 1998–2020
Professor, UCLA Department of Mathematics, 1987–1998
Associate Professor, Hokkaido University, Japan, 1984–1987
Assistant Professor, Hokkaido University, Japan, 1977–1984

Honors

Elected to American Academy of Arts and Sciences, 2022
AMS Leroy P. Steele Prize for Seminal Contribution to Research, 2019
Docteur Honoris Causa, Université de Paris XIII (France), 2015
Inaugural Fellow of the American Mathematical Society, 2012
Senior Scholar, Clay Mathematics Institute, 2010–11
Colloquium Speaker, National Academy of Science, 1996
Spring Prize, Mathematical Society of Japan, 1992
Guggenheim Fellowship, 1991–1992
International Congress of Mathematicians, 45 minute speaker, 1986

Research Interest

Current research interest of mine is: The study of (i) p-adic Hecke algebra over number fields; (ii) Modular Iwasawa theory; (iii) Study of Galois deformation rings; and (iv) Cyclicity and indecombosability problems in Iwasawa theory via Galois deformation. I initiated the theory of p-adic Hecke algebras in 1986. The research revealed many new features of modular/automorphic forms (see Langlands' review of my Spinger book listed below). In particular, I discovered that each p-ordinary elliptic and Hilbert modular form can be lifted to a p-adic family of modular forms equipped with a large Galois representation with values in $GL_2(\mathbb{Z}_p[[X]])$ and new p-adic L-functions. This theory had a strong impact upon many influential number theorists. Let me list a few of them: (1) it inspired B. Mazur to conceive his deformation theory of Galois representation; (2) it gave a foundation of the proof of Shimura-Taniyama conjecture and Fermat's last theorem by A. Wiles and R. Taylor; (3) it has been generalized to the theory of eigenvarieties by R. Coleman/B. Mazur; (4) it was used essentially in the proof by Skinner-Urban of the p-adic Birch and Swinnerton-Dyer conjecture. In addition, a proof of the anticyclotomic main conjecture (in the Iwasawa theory for CM fields) was given (under mild conditions) along the line developed by J. Tilouine and myself. Now using these techniques developed in the past 30 years, I am studying cyclicity of the adjoint Selmer group of the Hecke algebra, developing through Taylor–Wiles theory a new estimate of the number of generators of the Selmer group over the Hecke algebra. In particular, for instances of Selmer groups for Artin representations, we can prove upper estimate to be 1 and hence cyclicity of the Selmer group and local indecomposability of modular Galois representations [9, Chapters 7–8].

Publications: Here is a list of 9 books authored (or co-edited) by Hida closely related to the above description of research. A full publication list is available in this web page.

[1] *Elementary Theory of L–functions and Eisenstein series*, Cambridge University Press, 1993
[2] *On the search of genuine p–adic modular L–functions for $GL(n)$*, Memoires SMF **67**, 1996
[3] *Modular Forms and Galois Cohomology*, Cambridge University Press, 2000,
[4] *p-Adic Automorphic Forms on Shimura Varieties*, Springer 2004
[5] *Hilbert Modular Forms and Iwasawa Theory*, Oxford University Press, 2006
[6] *Geometric Modular Forms and Elliptic Curves*, World Scientific, 2011
[7] *Elliptic Curves and Arithmetic Invariants*, Springer, 2013.
[8] *p-Adic Aspects of Modular Forms*, edited by Baskar Balasubramanyam, Haruzo Hida, A Raghuram, Jacques Tilouine, World Scientific Publishing Co., Singapore, 2016
[9] *Elementary Modular Iwasawa Theory*, World Scientific, 2022.