

INTRODUCTION TO THE TATE ISSUE

SUSAN FRIEDLANDER

Last year the AMS published the *Collected Works of John Tate*¹ whose brilliant mathematics revolutionized areas of number theory, algebraic geometry, and algebra. His scientific accomplishments place him among the most significant mathematicians of the 20th century. This issue of the *Bulletin of the American Mathematical Society* celebrates John Tate and the publication of his collected works. For over more than six decades, Tate’s work has been recognized by many awards and distinctions including the Abel prize in 2010 “for his vast and lasting impact on the theory of numbers and the wealth of essential mathematical ideas and constructions that he initiated”. The articles in this issue of the *Bulletin* illustrate some of these ideas and give a historical overview of Tate’s prolific collaboration with Jean Pierre Serre.

The influence of Tate’s work was spread not only through his groundbreaking publications but also through his many PhD students, mainly during his professorship at Harvard from 1954 to 1990 after which he became the Sid W. Richardson Chair in Mathematics at the University of Texas in Austin. These mathematicians are listed in Table 1.

TABLE 1. LIST OF FORMER STUDENTS²

Edward Assmus, Jr.	Harvard University	1958
Leonard Evens	Harvard University	1960
James Cohn	Harvard University	1961
Andrew Ogg	Harvard University	1961
Stephen Shatz	Harvard University	1962
Jonathan Lubin	Harvard University	1963
Saul Lubkin	Harvard University	1963
Judith Obermayer	Harvard University	1963
Stephen Lichtenbaum	Harvard University	1964
J. Michael Schlessinger	Harvard University	1964
John Labute	Harvard University	1965
Gustave Efroymsen	Harvard University	1967
John McCabe	Harvard University	1967
James Milne	Harvard University	1967
Shankar Sen	Harvard University	1967
Robert Warfield, Jr.	Harvard University	1967
George Bergman	Harvard University	1968

¹*Collected Works of John Tate, Parts I and II*, Barry Mazur and Jean-Pierre Serre, editors, Volume 24, American Mathematical Society, 2016.

²This list originally appeared in *Collected Works of John Tate, Part I*, Barry Mazur and Jean-Pierre Serre, editors, Volume 24, American Mathematical Society, 2016.

TABLE 1 (CONTINUED)

William Waterhouse	Harvard University	1968
Michael Razar	Harvard University	1970
Carl Pomerance	Harvard University	1972
Kenneth Kramer	Harvard University	1973
Kenneth Ribet	Harvard University	1973
Lawrence Risman	Harvard University	1973
Alan Candiotti	Harvard University	1974
Joseph Carroll	Harvard University	1974
Joe Buhler	Harvard University	1977
Daniel Flath	Harvard University	1977
Robert Kottwitz	Harvard University	1977
Jerrold Tunnell	Harvard University	1977
James Weisinger	Harvard University	1977
Benedict Gross	Harvard University	1978
Theodore Chinburg	Harvard University	1980
Vijaya Murty	Harvard University	1982
Joseph Silverman	Harvard University	1982
Gregory Call	Harvard University	1986
Jeremy Teitelbaum	Harvard University	1986
Dinesh Thakur	Harvard University	1987
Stephen DiPippo	Harvard University	1990
Ki-Seng Tan	Harvard University	1990
Joongul Lee	University of Texas at Austin	1996
Karrolyne Fogel	University of Texas at Austin	1998

John Tate himself received his PhD from Princeton University in 1950 with Emil Artin as his thesis advisor. According to the Mathematics Genealogy Project, Tate traces his mathematical lineage through a very famous group whose family tree includes Hölder, Kummer, Bessel, and the great mathematician Carl Friedrich Gauss. With this Germanic ancestry in mind, we chose a postage stamp picturing Gauss as the cover image for the Tate issue of the *Bulletin*. This stamp was issued by the Deutsche Bundespost in 1955 to commemorate the centennial of Gauss's death.

The material in this issue of the *Bulletin* is the following.

- John Tate surveys number theory in the 20th century. Here we publish part 1 covering 1900–1940. Part 2 will be published in a future issue of the *Bulletin*.
- J. S. Milne reviews the *Collected Works of John Tate*.
- Pierre Colmez presents Tate's work and the Serre–Tate correspondence.
- Burt Totaro writes on recent progress on the Tate Conjecture.
- Joseph Silverman discusses Tate's "Haverford" lecture notes on the arithmetic of elliptic curves.

The final two articles survey recent mathematics whose roots connect with different areas pioneered by John Tate, namely rigid analytic spaces and K -Theory. These surveys are

- Herwig Hauser's article on the classical Artin approximation theorems.
- Alexander Merkurjev's article on the essential dimension, introduced by J. Buhler and Z. Reichstein.

To demonstrate the number and significance of the topics to which John Tate made fundamental contributions, we reproduce on the following pages the table of contents of an article by J. S. Milne on the work of John Tate that appeared in the book series on the Abel Prize winners.

DEPARTMENT OF MATHEMATICS, UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES, CALIFORNIA, 90089

E-mail address: `susanfri@usc.edu`