Princeton University

Honors Faculty Members
Receiving Emeritus Status

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The biographical sketches were written by
colleagues in the departments of those honored.

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Joseph John Kohn

Joseph John Kohn is a major figure in modern mathematical analysis, whose groundbreaking work on the interaction between partial differential equations and functions of several complex variables has dominated that area of mathematical research over almost a half century.

Joe was born in Prague, Czechoslovakia, the son of a notable architect who practiced there. He and his family left Czechoslovakia in 1939 and spent some years in Ecuador before moving to New York City in 1945. After receiving his B.S. degree from MIT, he came to Princeton as a graduate student, where he was a student of Donald Spencer, and received his Ph.D. in 1956. After serving as an instructor at Princeton for a year, then as a member of the Institute for Advanced Study from 1957 to 1958, he joined the faculty at Brandeis University, where he became professor of mathematics and served as chair of the mathematics department from 1963 to 1966. He returned to Princeton as a professor of mathematics in 1968, where he has remained until retiring this year. During his years at Princeton, he chaired the Department of Mathematics from 1973 to 1976, from 1993 to 1996, and in 2002, and held the Henry Burchard Fine research chair from 2002 to 2003.

Joe's mathematical work began with his thesis and immediately subsequent papers in which he solved the d-bar Neumann problem for strongly pseudoconvex domains, demonstrating the existence and regularity of solutions of that equation and developing a variety of applications of his method, such as another proof of the Newlander-Nirenberg theorem. In analyzing the non-elliptic nature of the boundary conditions, Joe was led to study the anisotropic behavior of the tangent spaces to the boundary, and thereby to introduce an area of research that has occupied the attention of a number of mathematicians

ever since. One aspect of this research was in the joint work with Hugo Rossi on the tangential Cauchy-Riemann equations, introducing the Kohn-Rossi cohomology and the Kohn Laplacian. Another aspect of this research was in joint work with Louis Nirenberg on consequences of the subelliptic nature of the d-bar Neumann problem, leading to their famous joint paper in which they developed the calculus of pseudodifferential operators. In another joint paper they discovered an example of a pseudoconvex domain with no supporting function, so that the traditional integral representation formulas cannot be applied and only Kohn's L2 estimates are applicable. Joe introduced into the study of pseudoconvex domains other basic notions, that of boundaries of finite type and the theory of ideals of subelliptic multipliers, which have been essential in a good deal of the further study of these domains. This has led to a considerable range of new results in microlocal analysis. Joe's study of hypoellipticity in partial differential equations and the detailed study of the estimates needed to analyze degenerate elliptic equations have been major topics in his further work and in extensive work with Nirenberg. Joe's influence in all of these areas has been increased by the work of his 16 Ph.D. students at Princeton and at Brandeis, and the well over 60 students his own students already have produced.

Joe has been a visiting professor at many other universities, including Harvard University, the University of Mexico, the University of Buenos Aires, the University of Florence, the Institut des Hautes Études Scientifiques in Paris, the Instutute des Hautes Etudies, and the Charles University in Prague, and he has received an honorary doctorate from the University of Bologna. He won the Steele Prize of the American Mathematical Society in 1979 for his fundamental paper on harmonic integrals on strongly convex domains, the Balzano Medal from the Czechoslovak Mathematics and Physics Society in 1990, and the Stefan Bergman Prize in analysis from the American Mathematical Society in 2004. He was elected to the American Academy of Arts and Sciences in 1966 and to the National Academy of Science in 1988. He has served the mathematical community in a wide range of positions,

as editor of the *Transactions of the American Mathematical Society* and the *Annals of Mathematics,* as a member of the Board of Trustees of the American Mathematical Society, and as a member of the Board of the Mathematical Sciences of the National Academy of Science.