James Lee Hafner

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By Anna Zhebrun

James Hafner was born on October 21, 1954, in California. In 1980, Dr. Hafner finished his PhD '*On the Average Order of the Divisor Function, Lattice Point Functions, and Other Arithmetical Functions'* at University of Illinois at Urbana-Champaign. He taught for a few years at CalTech and then University of California at San Diego.

His life in academia didn't last long. Wanting to focus more on computers, he joined IBM Almaden Research Division in San Jose, where he stayed for 29 years, earning more than 47 patents. He worked in diverse areas of mathematical research, including number theory, complexity theory, image databases and storage systems, and data reliability and integrity. He published papers on reliable systems, IBM Intelligent Bricks Project, storage systems and RAID.

His most influential paper was '*A rigorous subexponential algorithm for computation of class groups'* (Hafner et al, 1989) that expanded on Gauss' work on calculating equivalence classes of binary quadratic forms.

Dr. Hafner also published 3 papers directly related on Ramanujan's ideas. '*A theorem of Ramanujan on certain alternating series'* (Berndt et Hafner, 1993) was published in a book, <u>A Tribute to Emil Grosswald: Number Theory and Related Analysis</u>. In this publishing, Hafner and Berndt proved a theorem from Ramanujan's second notebook on the behavior of alternating series. As well, '*Two remarkable doubly exponential series transformations of Ramanujan'* (Berndt et Hafner, 1994) provided a proof to another one of Ramanujan's mathematical ideas. And '*A Heat Kernel Associated to Ramanujan's Tau Function*' (Hafner et Stopple, 2000) proved a conjecture that concerned the behavior of the Ramanujan's tau function.

Dr. Hafner continued his research in computers and mathematics for the rest of his life. Unfortunately, on October 24, 2015, Dr. Hafner passed away, leaving behind a legacy of mathematical and computer scientific research.