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BIOGRAPHY OF WILLIAM BRANHAM JONES

William Branham Jones (Bill) is the youngest of three sons born to James Harding Jones and Myra Hume Jones on September 24, 1931 at Spring Hill, Tennessee, where his father was an instructor of Latin and Greek at Branham and Hughes Academy. In 1932 the great depression forced the school to close and the Jones family traveled to France so that James Jones could complete a Doctor of Letters degree in French from the University of Montpellier. Returning to the United States in 1934, the family spent a year at Lewisburg, West Virginia, where Dr. Jones was on the faculty of the Greenbrier Military Academy. Then they settled down in Jacksonville, a small town in the northeast Alabama foothills of the Appalachian mountains. Most of Bill's earliest memories are from this little town whose primary employers were a cotton mill and Jacksonville State Teachers College (JSTC) where his father was a professor of foreign languages.

Bill's formal education began in the Jacksonville public school system which was operated by the college as a laboratory for training teachers. From an early age mathematics was his favorite subject, partly because it came easily and partly because reading was difficult due to dyslexia, a disability not widely recognized at the time. At Jacksonville High

School Bill enjoyed playing team sports: fall football, winter basketball and summer baseball. He also sang in church choir, school choir and a barbershop quartet.

With the end of the war in 1946 Bill's father organized the International House Program (IHP) at JSTC which every year brought a group of foreign students to the campus to provide a cultural exchange with American students in the program and to assist in foreign language instruction. As a member of the program from his sophomore year of high school until graduation from JSTC in 1953, Bill studied French and Spanish, had meals at the International House where speaking a foreign language was required, and made lasting friendships with students from around the world. The International House experience has had far-reaching effects on Bill's life, especially in regard to his choice of working relationships. Bill served as student co-president of the IHP in his senior year in college and was a member of the JSTC varsity tennis team for three years.

With a B.A. in Mathematics, Bill entered graduate school at Vanderbilt University on a full scholarship to study mathematics and physics. In 1955 he received an M.A. in Mathematics with a thesis on "An Application of the Schwarz-Christoffel Transformation to Potential Theory." Vanderbilt faculty having major impact on Bill were Professors M.G. Boyce, E.B. Shanks and B.F. Bryant in mathematics, C.D. Curtis and I. Block in physics and N. Georgescu in statistics.

In 1956 Bill took a summer job at the National Bureau of Standards (NBS) in Boulder, Colorado, in order to be near Martha Hadley, an undergraduate English major he had met at Vanderbilt. They were married in Denver on August 27. Returning to Nashville, Bill continued working for a Ph.D. and as a mathematics instructor while Martha began teaching English and Tennessee history at East Junior High School.

Summer employment at NBS-Boulder in 1956 and 1957 introduced Bill to numerical analysis, approximation theory, digital computers and the excitement of doing research in a scientific laboratory. Therefore, in 1958, having completed all requirements for a Ph.D. except for a thesis, Bill accepted a position in the Central Radio Propagation Laboratory at NBS-Boulder working with the French physicist, Roger M. Gallet. Bill's assignment was the development of numerical methods and com-

puter programs for global mapping and forecasting of ionospheric characteristics needed for long-distance radio communication. This project had recently become feasible due to the advent of high-speed computers and the availability of ionospheric data from a worldwide network of sounding stations created for the International Geophysical Year (IGY, 1957–58).

The year 1963 was a time of transition. The work on numerical ionospheric mapping by Bill and Roger Gallet was accepted by the CRPL for the production of its monthly predictions used by radio communicators including all branches of the U.S. armed services and the International Telecommunications Union. In August Bill received a Ph.D. in Mathematics from Vanderbilt with help from Professor Wolfgang J. Thron at the University of Colorado at Boulder (UCB) who suggested a suitable thesis project in the analytic theory of continued fractions. Bill also accepted a one-year visiting assistant professorship in the UCB Mathematics Department. During 1963–64 Wolf Thron organized a research seminar on continued fractions with Bill and Arne Magnus from UCB and visiting professor Haakon Waadeland from the University of Trondheim, Norway. That year marked the beginning of long-term collaboration among the members of the seminar. In later years Olav Njåstad and Lisa Lorentzen from the University of Trondheim joined them. Not only did the mathematicians become close friends as well as colleagues, their spouses and children also became part of the extended "family."

From working as a mathematics instructor at Vanderbilt, Bill discovered that he truly enjoyed teaching and wanted to make that his lifetime vocation. Therefore when an offer came in 1964, he accepted an assistant professorship in the Engineering Mathematics Department at UCB. Two years later, the two mathematics departments merged and Bill remained on that faculty until his retirement in December 1996. From 1964 until 1974, in addition to teaching, working as a graduate thesis advisor and actively participating in the continued fraction seminar with Magnus and Thron, Bill continued to work on numerical mapping as a consultant with the federal laboratories in Boulder: NBS, the Environmental Science Services Administration (which later became NOAA) and the Institute for Telecommunication Science. Numerical mapping was applied in other fields, including astronomy, and major advances were made in ionospheric mapping and forecasting. In

February 1965 Bill and Roger Gallet flew to Washington, D.C., to receive the Department of Commerce gold medal for their joint work on ionospheric mapping.

By 1972 a renewed interest had occurred in the analytic theory of continued fractions. This was due in part to the advent of computers and the resulting importance of the algorithmic character of continued fractions. It was also due to the close connection between continued fractions and Padé approximants and their applications in theoretical physics and chemistry. Thus with support from the Air Force Office of Scientific Research, Bill and Wolf Thron organized on the University of Colorado campus the first international conference on these and related topics. This gathering and many similar conferences and workshops during the following three decades have contributed to collaboration, cooperation and free exchange of ideas among many workers with different viewpoints.

Through collaborations involving Bill, Wolf Thron, Olav Njåstad and Haakon Waadeland, the Thron continued fractions were employed in developing the theory of strong moment problems (both Stieltjes and Hamburger), orthogonal Laurent polynomial sequences, strong Gaussian quadrature, and the representation of analytic functions. Beginning in fall 1984 the Perron-Caratheodory continued fractions were introduced and in the ensuing years an intimate relationship was established with the trigonometric moment problem, Szego polynomials, Caratheodory functions, Wiener-Levinson filters and frequency analysis problems.

In 1980 Bill and Wolf Thron published the book, *Continued Fractions: Analytic Theory and Applications* as Volume 11 in the Encyclopedia of Mathematics and Its Applications (Gian-Carlo Rota, ed.), Addison-Wesley. Bill is currently working on another book, *Handbook of Continued Fractions*, with Cathy Bonan-Hamada, Annie Cuyt, Vigdis Peterson, Brigitte Verdonk and Haakon Waadeland. Bill served as chair of the UCB Mathematics Department from 1987 to 1990, during which time he contributed to the conception and design of the new mathematics building, the Mathematics Module program, and the Center for Number Theory. Since 1990 he has edited the Mathematics Department newsletter, *Prime Bits*, that is distributed to 2500 math alums and friends of the department. With the help of *Prime Bits* and the generosity of many donors, Bill established an endowment in the

University of Colorado Foundation for the Mathematics Department Kempner Colloquium series.

Bill feels profound gratitude for the students, faculty colleagues and collaborators with whom he has been privileged to work, and especially for the graduate students for whom he has served as thesis advisor.

Supervision of Graduate Student Theses by William B. Jones

1968 - Robert I. Snell (Ph.D.) *Some convergence criteria for continued fractions based on the nested set property.*

1968 - Garney Hardy (M.A.) *Accelerating the convergence of Fourier series.*

1971 - David A. Field (Ph.D.) *Uniform convergence and truncation error estimates for continued fractions* $K(1/b_n)$.

1974 - Michael A. Gallucci (M.S.) *Best interpolating rational functions.*

1978 - Walter M. Reid (Ph.D.) *Uniform convergence and truncation error estimates for continued fractions* $K(a_n/1)$.

1984 - Christopher Baltus (Ph.D.) *Limit-periodic continued fractions: value regions and truncation error bounds.*

1988 - Sandra Clement Cooper (Ph.D.) *Continued fraction solutions of Riccati differential equations.*

1988 - Nancy Jean Wyshinski (M.S.) *Approximations for a family of Stieltjes transforms associated with the two-point Padé table.*

1991 - Nancy Jean Wyshinski (Ph.D.) *Asymptotic properties of polynomials satisfying three-term recurrence relations.*

1994 - Catherine M. Bonan-Hamada (Ph.D.) *Orthogonal Laurent polynomials and indeterminant strong Stieltjes moment problems.*

1995 - Cathleen M. Craviotto (Ph.D.) *Computation of special functions by continued fraction Padé approximants.*

1997 - Brian A. Hagler (Ph.D.) *A transformation of orthogonal polynomial sequences into orthogonal Laurent polynomial sequences.*

1999 - Guoxiang Shen (Ph.D.) *Strong moment problems and asymptotics of Stieltjes continued fractions.*

Publications of William B. Jones

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