David Wilson Henderson

February 23, 1939 – December 20, 2018

David Henderson passed away on December 20, 2018 in Wilmington, Delaware, after being struck by a vehicle the previous day. He was 79 years old.

David was born in Walla Walla, Washington to Reverend William H. Henderson and Kathleen Wilson Henderson. After several moves in his youth, he graduated from Ames High School in Iowa in 1957. He earned degrees in Physics, Philosophy and Mathematics from Swarthmore College in 1961. David added Mathematics as a late major at the suggestion of a professor who pointed out to him that his true passion was geometry. David’s first mathematics research paper on the geometry of Venn diagrams with more than four classes (an unsolved problem until then) evolved from a college course on the philosophy of logic during his senior year at Swarthmore. He went on to earn a Ph.D. in Mathematics at the University of Wisconsin in 1964 under the direction of R.H. Bing. His thesis, titled “Extensions of Dehn’s Lemma and the loop theorem”, was closely related to his discovery of an error in a widely publicized “proof” of the Poincaré Conjecture, one of the great 20th century problems in geometry, finally solved in the early 2000s. He
spent two postdoctoral years at the Institute for Advanced Study in Princeton. During this time David produced a notable example in dimension theory - an infinite-dimensional compact metrizable space with the property that every proper closed subset has dimension zero or infinity. In 1965, David solved a famous problem known in the Soviet Union as “Problema Tumarkina” and in Poland as “Problem Mazurkiewicza” – he constructed an example of an infinite-dimensional continuum (compact connected metric space) with no positive-dimensional sub-continua (or sub-compacta). He was asked to present this result in a special session of the 1966 International Congress of Mathematicians in Moscow.

In fall of 1966, David Henderson joined the Cornell Math Department. Here he became interested in infinite-dimensional topology as it relates to analysis and shifted his focus to infinite-dimensional vector spaces and the manifolds modeled on them. David published 37 research papers and the books Differential Geometry, a Geometric Introduction and Experiencing Geometry – Euclidean and Non-Euclidean with history (3rd edition with Daina Taimina). At the time of his death he was working on 4th edition. David had typeset all his and Daina’s books, something he really enjoyed doing. David retired from Cornell in 2012 after teaching here 46 years.

In the 1970s, David’s interests turned to Math Education. He joined the field of Graduate Education and over the next four decades he played a central role in supervising some 40 theses. He also directed the Teacher Education program for secondary school teachers. His steadfast efforts in this area over the decades were recognized by Ithaca High School Math teachers who placed a plaque in the Math Department with David’s photo and the inscription “The IHS Math Department honors the memory of Cornell Professor David Henderson. He inspired us and influenced what we teach and how we teach it. We are deeply grateful.”

With Leonard Silver he started a Calculus sequence with exam tutorials in which students worked at their own pace and took exams when they felt they were ready. While this experiment was short-lived, it resulted in the creation of the Math Support Center (MSC)
in 1979. The MSC, staffed by undergraduate tutors, is a place where students can drop in to get assistance in basic math classes. It continues to function today and is a very popular. Over the years, David developed many courses, the calculus tutorial class, courses aimed at math majors, some at students interested in Math Education, and some at those in the Biological and Social Sciences. He also developed Math Explorations, a course accessible to all students. David thought geometrically, often bringing visual aids to class such as a globe or surface of negative curvature. He continued his work in Math Education (or as he called it, *Educational Mathematics*) well into his retirement, often speaking at and organizing conferences.

In 2005, he accepted an invitation to join the core curriculum development team of the Algebra Project. This initiative helps ensure that all students learn the mathematics they need to enter college and not require remedial courses. In 2011, David joined a project to develop and research coherent curricula for K-5 mathematics and science. He wrote the geometry curriculum for this project. In 2016, he joined a research project “Function Learning Progressions,” affiliated with both the Algebra Project and the nonprofit Educational Testing Service.

David took his mission of education to far flung places, taking extended visits to Moscow and Warsaw in the 1970s, Birzeit University in Palestine in 1980 and the Hebrew University in Jerusalem where he organized joint seminars for Jewish and Palestinian mathematicians. In 1995, one year after the first free elections, he gave multiple workshops at mathematical meetings across South Africa. He participated in two International Commission of Mathematics Instruction Studies in 1995 (Italy) and 1998 (Singapore). In 2000, he was a Fulbright Scholar in the University of Latvia in Riga, Latvia, and visited Tartu University, Estonia.

Since his childhood, David loved nature and tried to be outdoors as much as he could. His children fondly remember family camping trips and long car trips across United States and in Europe. David had excellent carpentry skills, he loved building things himself and
always had some ongoing project at home. He loved music, playing piano and travel. Despite physical limitations due to his health, he travelled to Brazil and to Latvia at the age of 79 and was planning a trip to Morocco in 2019. He is survived by his siblings William (Bill) Henderson, Stephen Henderson and Marjorie Ogilvie; his wife Daina Taimina, his children Keith Henderson, Rebecca Wynne, Lelde Taimina-Tzou and Linda Taimina and four grandchildren Lisa (Linden) and Abigail Henderson, Erin and Liam Wynne.

Written by Ravi Ramakrishna (chair), Robert Connelly, Peter Kahn, and Daina Taimina