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Obituary: Philip J. Davis

With deep sorrow, we announce the passing of Philip J. Davis on March 14, 2018, at the age of 95. Phil was one of the founding fathers of SIAM and a prolific contributor to *SIAM News*; he was an innovative mathematician, an inspiring teacher, an entertaining and wide-ranging author, and a profound thinker on the nature and significance of mathematics.



Phil was born in Lawrence, Mass., on January 2, 1923. He majored in mathematics at Harvard College and graduated in 1943. In 1940, he met Hadassah Finkelstein—a student at Radcliffe College—at an anti-Lindbergh rally in Boston. They were married on their joint 21st birthday: January 2, 1944. For the remainder of World War II, Phil worked for the National Advisory Committee for Aeronautics in Langley Field, Va., performing mathematical calculations on dangerous instabilities in flight. He returned to Harvard after the war and earned his Ph.D. in 1950 under the supervision of Ralph Boas, Jr. He then remained at Harvard for several more years, conducting postdoctoral research with Stefan Bergman and Joseph Walsh.

From 1954 to 1963, Phil worked in the Numerical Analysis division at the National Bureau of Standards (now the National Institute of Standards and Technology). Along with colleague Phil Rabinowitz, he carried out numerical computations on the SEAC, a first-generation electronic computer; they were awarded the mock title “Heroes of the SEAC” for writing a program for Gaussian integration that ran correctly on the first trial. Phil played a prominent role in writing and

planning the *Handbook of Mathematical Functions*, also known as “the big red book,” and authored the chapter on the Gamma function.

In 1963, Phil moved to Brown University as a faculty member in the Division of Applied Mathematics, and remained there for the rest of his life. He was a popular and entertaining lecturer, enlivening his classes with striking physical demonstrations, a sharp sense of humor, and a gift for storytelling. Together with colleague Charlie Strauss, he created one of the first courses on computer graphics. After his retirement, Phil continued to deliver an annual lecture on mathematical topics every Thanksgiving. His magnetic charm and conversational brilliance, combined with Hadassah’s hospitality and warmth, brought them many close friends among faculty and students at Brown.

In 2004, Phil took part in the SIAM project to collect oral histories of applied mathematics. He interviewed colleagues such as Walter Gautschi, Paul Garabedian, and Eugene Isaacson. Phil was also a prolific author; his bibliography includes 22 books, 52 technical papers, 92 essays, and 185 book reviews, most of which were published in *SIAM News*. He received the Chauvenet Prize in 1963 for a paper on the history of the Gamma function and the Paul R. Halmos-Lester R. Ford Award in 1982 for his paper about mathematical coincidences.

In his early years, Phil’s books were focused mostly on technical mathematics. Selected titles include the following:

We first met Phil on the famous fifth day of the International Congress on Mathematical Education in Budapest during the summer of 1988. Phil, jet-lagged, had slept in and was late for his opening lecture on “Applied Mathematics as Social Contract.” A huge audience waited respectfully. Then Phil appeared, his wild hair upraised, apologizing — with his special unforgettable blend of highly knowledgeable mathematician, wise old man, and brilliant youthful performer! From that day on our personal friendship grew, as did our admiration for his and Hadassah’s human warmth and insight. We were lucky to enjoy Phil’s inspiring friendship for many years. — Sussi and Bernhelm Booss-Bavnbek, Copenhagen, Denmark

*I heard many of Phil’s stories in the best possible way — told by Phil himself over coffee or dinner, at conferences, and most recently in his office at Brown. What a storyteller he was! Anyone who dips into any of his books will immediately agree. I’m a longstanding fan of Phil’s writing. He drew on his extensive knowledge and interest in math but also philosophy, literature, art, and so much more. The arrival of those essays lit up my days as the editor of *SIAM News*, and many readers wrote in to say that his articles were the first thing they turned to upon receiving a new issue. I wish I could have had more conversations with him. — Gail Corbett, former managing editor of *SIAM News**

*My first encounter with Phil was in a numerical analysis class he taught when I was a graduate student at Brown. He was a wonderful teacher. What set Phil apart from other applied mathematicians was his interest in and ability to communicate mathematics to a wide audience. I witnessed this when I attended his annual “holiday lecture” at Brown. Towards the end of the first term, Phil would give an afternoon talk that was partly a public lecture. These talks covered a wide variety of topics, showing his interest not only in mathematics and history but also cultural and philosophical subjects related to our discipline, such as philosophy, history of science, and pedagogy. This interest was evident in the many articles that Phil later wrote for *SIAM News*. We at SIAM will miss those great contributions, but will cherish those he left behind. — Jim Crowley, executive director of SIAM*

I was one of Phil’s early Ph.D. students at Brown. Phil was a special guy, easygoing and friendly. I liked his sense of humor. I once asked him if he did any physical exercise, and he said that whenever he had an urge to exercise, he would lie down until the urge went away. I do not know of anyone who was a better expositor of mathematics than Phil. May he rest in

Interpolation and Approximation (1963); *The Mathematics of Matrices: A First Book on Matrix Theory and Linear Algebra* (1965) (he always preferred the phrase “matrix theory” to “linear algebra”); *The Schwarz Function and its Applications* (1974); *Methods of Numerical Integration*, coauthored with Phil Rabinowitz (1975); *Circulant Matrices* (1979); and *Spirals: From Theodorus to Chaos* (1993).

Later in life, Phil’s attention turned to the philosophy of mathematics in a broad sense. Among his most important works were two books with Reuben Hersh: *The Mathematical Experience* (1981), which won a National Book Award in Science, and *Descartes’ Dream: The World According to Mathematics* (1986). These two beautifully-written books expound an expansive view of mathematics, grounded in real-world applications but transcending far beyond them. Interwoven with the lives, experiences, and social interactions of mathematics practitioners, they are bright threads in the fabric of intellectual history, connecting us with thinkers of all ages.

Phil’s most influential essays—“Fidelity in Mathematical Discourse: Is One and One Really Two?” (1972) and “Visual Geometry, Computer Graphics, and Theorems of the Perceived Type” (1974)—similarly argue that mathematical knowledge and evidence are not limited to formal definitions and rigorous proofs, but rather can involve other forms of reasoning and apprehension. His later books in this genre—*Mathematical Encounters of the*

peace. — **Frank Deutsch**, Penn State University

I met Phil when I was 35 and he was 72. I’d seen a flyer advertising his seminar on “common sense and mathematics,” which I thought might speak to my then-job. I was out of my league in that seminar, but Phil took an interest in me and my work and we became fast friends. I’ve never understood why Phil—world-renowned and surrounded by mathematical cognoscenti—had any use for me, a mathematical nobody. But he became my biggest supporter as I moved into academia and left for California three years later. I visited him every year when I traveled back east — visits that always ended with his crushing, grandfatherly bear hug. Phil made me feel as if I were among a handful of the most special people in his life. The amazing thing is that he probably made a hundred other people feel this same way. — **Julie Gainsburg**, California State University, Northridge

*Phil was essential to my career in the philosophy of math. Collaboration with both him and Hadassah produced our 1981 prizewinner, *The Mathematical Experience*.* — **Reuben Hersh**, University of New Mexico

What I loved about Phil were all the conversations engendered by our shared love of math history and math philosophy. I argued endlessly with him about Platonism, which I embraced and he totally rejected. It was great fun to reconcile our divergent views on Henri Poincaré in our joint Notices of the American Mathematical Society paper—“Henri’s Crystal Ball”—and in “What Should a Mathematical Professional Know About Mathematics?” I miss his wide-ranging curiosity and insights so much. — **David Mumford**, Brown University

When Phil became my advisor in 1976, he stated the following “rules of conduct”: I was responsible for choosing the topic of my thesis, writing it, and defending it, and could expect no help from him. On the other hand, I could discuss with him any topic at any time. That felt like a level of freedom given to very few graduate students at the time. Often after such a talk, Phil would come up with a stack of copied material related to our discussion; it did not feel like contradiction of his last rule. I kept in touch with Phil up until the last two weeks before his departure. I miss him very much. — **Igor Najfeld**, University of Vermont

In 1975, Phil invited me to join him at a computer calculus short course he was teaching for college-level mathematics teachers, in which we delved into various aspects of “meta” mathematics. This workshop was also unforgettable because many of us watched the seventh game of the epic 1975 World

Second Kind (1997), *The Education of a Mathematician* (2000), *Mathematics and Common Sense: A Case of Creative Tension* (2006), and *Unity and Disunity and Other Mathematical Essays* (2015)—combine philosophy, history, biography, and personal reminiscences.

And then there were books that were just for fun. *The Thread: A Mathematical Yarn* (1983) is an entertaining account of his search for the origin of Pafnuty Tschebyscheff's unusual first name. *Thomas Gray: Philosopher Cat* (1988) and *Thomas Gray in Copenhagen: In Which the Philosopher Cat Meets the Ghost of Hans Christian Andersen* (1995) are academic fantasies about a cat. *Ancient*

Series between the Red Sox and the Cincinnati Reds. I associate that best of games with Phil. I also thoroughly enjoyed his wit and clever turns of phrase; two of my favorites were his disparaging "the holy trinity of definition, theorem, and proof" that neither of us believed was all there was to mathematics, and his "infinitesimals are the ghosts of departed quantities." How fitting that Phil should pass away on 3.14, the ultimate approximation. — Edwina L. Rissland, University of Massachusetts Amherst

As a senior at Harvard in 1977, I was writing my undergraduate thesis with Garrett Birkhoff when a surprising effect turned up on the computer. Birkhoff suggested I drive down to Brown and talk to Phil Davis. I did that, and had a wonderful encounter. Phil pulled a journal off his shelf, pointed out a relevant article, and told me to read it. It was in German. "You should learn German!" he advised. An encounter like that means a lot to a 21-year-old. Phil has been an inspiration for me as both the author of my favorite approximation theory book and a founding father of Fourier and Chebyshev technologies in numerical computation. — Nick Trefethen, University of Oxford



Phil Davis, age 14, works on Napoleon's Theorem in his family's kitchen during the winter of 1936. His father

Loons: Stories Pingree Told Me (2011), a memorial volume for Phil's friend David Pingree, is a collection of anecdotes about oddball intellectuals through the ages.

Phil was fond of the concrete details of history, biography, and mathematics. He disliked extreme abstraction and distrusted large, universal, intellectual schemes that claim to explain everything. He loved stories—long or short, pointed or meandering—and was a splendid raconteur. "Life," Phil often said, "is one story after another." We will miss his stories and his wisdom.

looks on and wonders what it's all about. This photo appears at the front of Phil's 1997 book, *Mathematical Encounters of the Second Kind*. Image courtesy of Birkhäuser.