

with the same energetic attitude that he applied to his research, whether they involved an issue in turbulent Russian politics or a development of the local computer network. He taught students to treasure the time they devoted to research.

Belinicher was open and optimistic, and generously shared his energy and vigor. He was a bright, talented theorist who pursued the deepest and most complicated problems in physics. He was full of plans for the future when the terrible accident ended his life. His family, friends, and colleagues have suffered a great loss.

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WILLIAM MCCULLOUGH MACDONALD

William McCullough MacDonald

William McCullough MacDonald, a versatile and distinguished theoretical physicist, educator, and administrator, died on 19 September 2001 under hospice care near his home in Potomac, Maryland. He lived his last 18 months valiantly struggling with Lou Gehrig's disease.

Bill was born on 25 November 1927 in Salem, Ohio, and grew up in nearby Canfield. His administrative skills became apparent when he was young: He worked summers for a local dairy company and eventually was promoted to manager of the company store.

In 1950, Bill graduated from the University of Pittsburgh, where he received his BS in mathematics and physics. In 1955, he earned his PhD in physics at Princeton University under the guidance of Eugene Wigner with a study of isotopic spin in light nuclei.

Bill carried out early research at the US Bureau of Mines in Pittsburgh, Pennsylvania; Los Alamos Scientific Laboratory; Princeton's Project Matterhorn; Nuclear Development Associates in White Plains, New York; and the University of California Radiation Laboratory (now the Lawrence Berkeley National Laboratory). He was a visiting lecturer at the University of Wisconsin in 1955 and then joined the physics faculty of the University of Maryland, College Park, in 1956. He became a full professor there in 1963. During sabbatical leaves, he was a visiting scientist at the Labora-

toire Joliot-Curie (now the Institut de Physique Nucléaire d'Orsay); the UK Atomic Energy Research Establishment in Harwell; and the National Bureau of Standards (now NIST) in Gaithersburg, Maryland.

Bill was a pioneer in nuclear, plasma, and space physics. In the 1950s, he studied isotopic spin in light nuclei and demonstrated the theoretical inconsistency between the beta decay of nuclei and μ mesons. This work helped lay the foundation for Nicola Cabibbo's theory of beta decay, which, along with isospin, is essential to the present standard model of particle physics. Subsequently, in the 1960s, Bill formulated and applied the shell model of nuclear reactions, and developed the theory of fine structures in nuclear reactions.

Bill's foundational work with Marshall Rosenbluth and David Judd on classical transport theory is included in *The Physical Review: The First Hundred Years—A Selection of Seminal Papers and Commentaries* (American Institute of Physics, 1995). In space physics, as a consultant to Lockheed Missiles and Space Company in Palo Alto, California, Bill worked with Martin Walt over the period 1956–65 on analyzing particles trapped in Earth's magnetic field and showed that the electrons in the Van Allen radiation belts could not be accounted for by the decay of cosmic-ray albedo neutrons. His predictions for low-altitude electron lifetimes were tested in 1962, when the Starfish nuclear detonation injected relativistic electrons into Earth's magnetosphere, and were found to agree with the Starfish experiment.

Bill also made notable administrative contributions. In 1967, he initi-

ated the University of Maryland's theoretical nuclear physics research group, guiding it to its present national stature. He led the group aggressively into the use of workstation research computation. He also championed large-scale computation by his early proposal for national supercomputing centers, and played a key role on the NSF committee, whose 1980 recommendations led to the establishment of five national supercomputer centers. In 1987, Bill served as the NSF program director for theoretical physics.

Bill was an especially enthusiastic and dedicated teacher. His graduate and undergraduate students found in him a mentor and friend. A leader in the use of computers in research, he likewise was an advocate of, and a leader in, the use of computers in instruction. He was a codirector of the NSF-supported consortium for upper-level physics software (CUPS) program, which published nine books of computer simulations for classroom use. He coauthored a 10th book—a manual providing the common computer framework for the work of the 27 widely dispersed consortium members.

Bill's application of computers to teaching and learning emphasized both numerical and symbolic computation. During the fall of 1995, he was a visiting scholar at Wolfram Research Inc in Champaign, Illinois. When *Mathematica*® first became available, he sought it out and developed physics courses based on its use. Over the next dozen years, his continued innovations were highly regarded throughout the education community and became a model for many other *Mathematica*-based educational technology projects. In 1997, Bill became a professor emeritus at the University of Maryland.

Bill was active in the civic and religious communities, and had a special concern for the poor. The University of Maryland community will long honor Bill's memory. Those who worked with him will cherish his enthusiastic and generous spirit. His Maryland colleagues treasure his contributions to their institutional structure, especially his legacy of a democratic plan of organization for the operation of the physics department. At NSF he is remembered both as an effective colleague and a staunch advocate and vigorous defender of the field of theoretical physics.

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