George P. Smith
MU Curators Distinguished Professor Emeritus of Biological Sciences

George P. Smith joined the faculty of the College of Arts and Science in the Division of Biological Sciences at the University of Missouri in 1975. He was tenured and promoted to associate professor in 1981 and promoted to full professor in 1990. The University of Missouri Board of Curators appointed him a Curators Distinguished Professor in 2000. He became a professor emeritus in 2015.

The common thread of Smith's research program is the generation of genetic diversity, first related to the problem of antibody diversity, then to the generation of repeated sequences in DNA, and then to combinatorial chemistry as applied to biology. At MU, he began to study the assembly of filamentous bacterial viruses (phage). His initial interest was in designing a more efficient and safe DNA cloning vector. That work led to stunning advances built around his invention of "phage display," a technique in which sequences of DNA are cloned into the gene for phage surface proteins so that the cloned sequence is "displayed" on the surface of the phage. This allowed phages displaying peptides that bind a target molecule to be selected from huge phage-display libraries to be selected using simple affinity purification procedures, even when that phage is exceedingly rare in the total phage population. This was an early demonstration of the power of combinatorial chemistry in a biological context. Today, phage display is used in thousands of laboratories worldwide as the basis for a wide range of experiments, such as determination of protein function, selection of peptides with new functions, and evolution of specific antibodies in the test tube. Several therapeutic antibodies were developed with the aid of phage display.

Smith authored/coauthored more than 50 articles in top scientific journals, including four in *Science*, one in *Nature*, and one in the *Proceedings of the National Academy of Sciences*. Five of his articles have been cited over 500 times, and two over 1,700 times. His 1985 *Science* paper, Searching For Peptide Ligands With An Epitope Library, has been cited more than 2,030 times. His publication record also includes the book *The Variation and Adaptive Expression of Antibodies* (Harvard Press, 1973), based on his Ph.D. thesis on the origin of the diversity of antibodies. His research was supported through grants from the National Institutes of Health, National Cancer Institute, Centers for Disease Control and Prevention, the Army Research Office and the University of Missouri. Smith received 75 invitations to present his research at universities as well as at national and international meetings. He organized a bacteriophage meeting a phage display conference at Cold Spring Harbor Laboratories and also was a guest lecturer at the 2004-2006 and 2008-2009 CSHL Course on Phage Display. He served as editor of the journal *Protein Engineering* for seven years. The American Society of Microbiology selected Smith for its 2007 Promega Biotechnology Research Award. In 2018, he was awarded the Nobel Prize for chemistry for his work in "phage display of peptides and antibodies."

Over the course of his 40-year career, Smith has been a valuable contributor to the university. He secured funding for and co-implemented a six-year, NSF-funded undergraduate training program, PRISM: Mathematics in Life Sciences (MLS), aimed at recruiting mathematically talented undergraduates into the STEM disciplines and at better integrating mathematics into the STEM curriculum.

Smith trained six postdoctoral fellows, graduated six doctoral students and six master's students. He taught undergraduate courses and/or labs on general biology, general genetics, basic genetics I and II, molecular genetics, molecular biology, introduction to cell biology as well as senior seminars on biological issues in third world diseases and biological perspectives on influenza. He taught graduate-level courses on nucleic acids, cell biology and molecular genetics. As a teacher, he was well known for his hands-on learning approaches and the critical thinking skills he instilled in students.

Smith was born in Norwalk, Connecticut, in 1941. Growing up, he was captivated by the natural world, especially animals. That interest continued through adolescence and into adulthood. Before going to college in 1959, he was an exchange student in England where he learned to play cricket and rugby (not very well). As an undergraduate at Haverford College in the early ‘60s, he witnessed the working out the genetic code, and his senior project focused on molecular immunology. He received his bachelor of arts degree in biology from Haverford in 1963, and after a year as a high school teacher and laboratory technician, went on to earn a Ph.D. in bacteriology and immunology from Harvard University in 1970. After a postdoctoral fellowship with Oliver Smithies at the University of Wisconsin, he joined the faculty at MU in 1975.

Smith, a founding member of the Columbia Chorale, lives in Columbia with his wife, Marjorie Sable, professor emerita and director emerita of the MU School of Social Work. They have two sons.