Dale Sayers joined the North Carolina State University physics department faculty in 1976, where he initiated a broad research program and collaborated with colleagues to study numerous far-reaching topics. Throughout his professional life, Professor Sayers’ intellect and curiosity benefited a host of scientific colleagues. His personal integrity, humor, and comfortable communicative style permeated his life from teaching college freshmen to heading world-renowned research teams until his untimely passing in 2004. The Sayers Lectures honor both his memory and his many contributions to North Carolina State University and the scientific community.

Phase-change memory (PCM), which uses a reversible transformation of the atomic structure of certain semiconductor alloys between a glassy and a crystalline phase, is now being actively developed by many semiconductor device manufacturers. Although the underlying phenomenon was reported more than 40 years ago, many fundamental aspects of PCM devices have become clear only recently, in part because of new structural information about both the glassy and crystalline states provided by the XAFS techniques pioneered by Dale Sayers. This talk will describe our current understanding of PCM devices and the progress toward commercialization of this new nonvolatile memory technology.