Jack McDonald Blakely, Emeritus Professor of Materials Science and Engineering, died on October 29, 2021. He was 85 years old.

Jack was born in Dalry, Ayrshire, Scotland, on April 8, 1936, to Elizabeth McDonald and James Blakely and educated at Dalry High School and Glasgow University, where he received a Ph.D. in surface science in 1961. He emigrated to the U.S. with his bride, Nanette, in 1961 to take a two-year postdoctoral position at Harvard after which he was offered an assistant professorship at Cornell University. Jack began his career at Cornell in 1963 and he joined the recently created Department of Materials Science and Engineering that intended to integrate physics and chemistry with metallurgy.

In those early years at Cornell, Jack was one of a group of cross-campus and department faculty (Balluffi and Seidman come to mind) who focused on the diffusion of atomic species on single crystal surfaces, the study of the structure and geometry of atomic phase transitions of metallic surfaces, and the electronic properties of ionic surfaces. He and his students developed theoretical concepts
and experimental techniques in the study of surfaces such as low energy electron diffraction (LEED) and surface probes such as the Kelvin probe to study the atomic and electronic nature of surfaces.

As Jack’s career progressed, he turned his focus on the structure and composition of surfaces and the influence of the geometry and electrical character of surfaces on their function in electronics, corrosion and friction. He was one of the first to describe the formation of graphene on metal surfaces, showing the reversible 2D phase transition of carbon and the need to describe the surface composition as a surface phase transition.

Jack was adept at incorporating new methods of fabrication and characterization to advance surface science and to bring new insight to problems that had interested him from the beginning of his research career. In particular, the Blakely Group applied the techniques of scanning probe microscopy, glancing-incidence X-ray diffraction, and low-energy electron microscopy to develop a detailed picture about the formation and motion of atomic steps on nanostructured single-crystalline silicon. As satisfying as it was for him to deepen his expertise, Jack’s natural curiosity led him into collaborations where his knowledge of surface science could impact areas ranging from structure of glass surfaces to the growth of organic semiconductors.

Perhaps because of the way he was educated in Scotland, Jack developed warm and friendly relationships with his students; he treated his students as peers, and in the early days, he arranged for get-togethers on Friday evenings in Collegetown, where all kinds of topics, especially outside of the field of science, frequently turned to vigorous discussions on national and international news items of that time.

Jack authored or co-authored four textbooks, the most notable being “Surface Physics of Materials: Materials Science and Technology” which discussed transport of matter on surfaces, chemical analysis, adhesion and friction.
Jack was a Fellow of the Science and Engineering Research Council, the American Physical Society, the Institute of Physics, and the National Science Foundation. He was also a Guggenheim fellow and received the Kelvin Prize in Experimental Physics in 1960.

He took a number of sabbaticals including to Cambridge University, Argonne National Laboratory, Sandia National Laboratory, University of California at Berkeley and York University, and he served two terms as Chair of Cornell’s Department of Materials Science and Engineering, beginning in 1988 and then in 1997. As department chair, Jack recognized the importance of the Department of Materials Science and Engineering taking leadership in advanced materials, advocating for faculty excellence in areas such as organic electronics, polymers, and biomaterials. Jack fostered an accepting and supportive atmosphere within the department, mirroring the way that Jack and Nanette had personally welcomed and nurtured students, postdocs and junior faculty throughout their Cornell years.

Documenting Jack’s technical accomplishments is only a part of who he was as a human being. He was a creative, witty, and curious individual with many interests. Jack could recite poetry from memory, ranging from Robert Burns to bawdy ballads. He was an exceptional athlete, a lover of music, nature, dogs and cats, and a loving husband, father and grandfather. He learned to play soccer as a young child, and proudly represented “the rest of Scotland” team in their match against Glasgow High School at the famous Ibrox Stadium in 1953. He dedicated much of his time to coaching regional club and youth soccer teams, including at Cornell. Jack was a middle- and long-distance runner – few could keep up with his 6min/mile training pace at Barton Hall – and ran the Boston Marathon, among others, a number of times. Jack reunited with the violin playing of his youth while in his 40s and later expanded his musical interests to include the piano and mandolin.

Jack is survived by his wife of 61 years, Nanette, two daughters, Robin and Karen, and six grandchildren. He will be missed by his colleagues, students, and his family.

Written by Dieter Ast, Steven Danyluk, and Christopher Umbach