

Bruce Jacob is a full Professor of Electrical & Computer Engineering at the University of Maryland and is honored as a Keystone Professor in the University's Clark School of Engineering. Since joining the University in 1997, he has helped secure over \$48M in funding for projects on various aspects of computer-systems design, for an average of \$2.5M per year. He currently designs computer-system architectures and computer memory-system architectures for both industry and government, national and international, focusing on highly efficient designs at the High-Performance Computing level, as well as at the high-performance embedded-systems level. For instance, he helped Micron design their new Hybrid Memory Cube DRAM architecture, he redesigned Cray's memory controller for their Black Widow memory system, he helped Northrop Grumman design a system interconnect for their experimental ultra-low-power datacenter, he designed a high-performance memory system for the 1024-core Teraflux chip funded by the European Commission, and he currently collaborates with researchers at the Department of Energy on the design of their next-generation supercomputers.

Recognized internationally as a leading expert on computer memory systems, Jacob founded the annual *International Symposium on Memory Systems* and is routinely invited to give keynote speeches and high-level briefings on the topic of memory systems around the world. He has been the keynote speaker at meetings including *EMS*, *MODSIM*, *SAMOS*, and *Computing Frontiers*. In 2007, he was one of fifteen members of academia and industry invited to brief a National Academies panel on all aspects of computing, resulting in the highly-cited NRC exascale report *The Future of Computing Performance—Game Over or Next Level?* In 2012, he was one of twenty members of academia and industry asked to brief the Secretary of Energy, Steven Chu, on the state of computing and its relation to the Department of Energy's long-term plan to reach exascale-class computer-system performance by the year 2018. In 2016, he was one of a dozen members of academia and industry invited to participate with DOE in creating a roadmap for computer science and applied mathematics research at DOE in the coming decades.

Jacob has been decorated six times as a Clark School "Rainmaker" (renamed "Research Leader" in 2006) for his research program at Maryland, the award recognizing the top researchers and fundraisers in the A. James Clark School of Engineering. He has written two textbooks on computer memory systems and over seventy articles on memory systems, computer design, embedded systems, operating system design, astrophysics, and algorithmic composition. His body of research has been cited over 4000 times, with an h-index of 30. He holds a patent in memory-systems design and three patents in the circuit design of electric guitars—in 2009, the electric guitars were featured on Washington DC local television and radio stations; in articles appearing in *The Washington Post*, *Los Angeles Times*, and *The Chronicle of Higher Education*; and on National Public Radio (Jacob and his graduate student were interviewed by Robert Siegel on *All Things Considered* on July 10, 2009).

In addition to his academic credentials, Jacob has significant industry experience. Between college and graduate school, he worked in the start-up industry in Boston for two different telecommunications companies, serving as a software engineer at Boston Technology and then as the chief engineer and system architect at Priority Call Management. Both of these start-up companies were successful—in particular, Priority Call Management, for which Jacob designed and developed the product's system-level architecture, distributed middleware code, and object-oriented applications framework, was purchased for \$162M in the late 1990s.

Jacob brought his industrial design experience into the Maryland Engineering curriculum by way of his involvement in the complete redesign and transformation of the college-wide freshman design course *ENES 100: Introduction to Engineering Design*, in his development of a set of *Start-Up 101* courses within the ECE Department, and in his recent development and teaching of *ENEE 447: Operating Systems*, in which he uses portable multicore hardware, the Raspberry Pi, to teach operating systems to Computer Engineering students. His signature teaching technique is extremely hands-on, using real-world examples to teach important and complex topics through challenging design & implementation projects.

As Director of the Computer Engineering program from 2007 until his sabbatical in 2010, he was charged by his department chair with revamping the CE curriculum and increasing the program's visibility and enrollment. In response, Jacob organized a team of nearly fifty people—including faculty, then-current students, and recent graduates of the program—to revise the curriculum, and he then actively promoted the new curriculum by giving talks on the program and recruiting students at high schools in both the Baltimore and Washington DC areas. The revised curriculum now forms the core of the undergraduate Computer Engineering degree program, and the number of applications to the program increased 25% the year after the changes were made.