Biographical Sketch
PROFESSOR K. KOMVOPOULOS

Kyriakos Komvopoulos has been in the faculty of the Department of Mechanical Engineering at the University of California at Berkeley since 1989. He is internationally known for pioneering research in surface nanosciences and nanoengineering with important implications in several emerging technologies including communications, microelectronics, information storage, and biotechnology.

Professor Komvopoulos' research has been at the interfaces of mechanical and electrical engineering, surface physics and chemistry, and bioengineering, and is characterized by the interdisciplinary nature and combination of analytical and experimental techniques used to obtain insight into complex surface interaction phenomena. His research relies on the integration of fundamentals from mechanics, materials science, surface physical chemistry, and bioengineering and spans a broad range of length scales, from the mesoscopic down to the atomic and the molecular levels.

Early research of Professor Komvopoulos was on contact deformation processes occurring at submicron scales, new friction theories of surfaces interacting in the presence of physicochemically adsorbed monolayers, surface plasticity and fracture of contacting solid bodies, acoustic emission in surface sliding and machining, synthesis and characterization of ultrathin diamond and amorphous carbon films, adhesion (stiction) forces in miniaturized electromechanical systems, and rheological behavior of boundary films.

Over the past two decades, Professor Komvopoulos broadened his research activities, branching into the exploration of various surface microprobe techniques for atomic and molecular level surface analysis, deposition of nanometer-thin and smooth diamond films, self-assembled organic monolayers for reducing adhesion between silicon devices, ultrathin (a few atomic layers) and ultrasmooth amorphous carbon films synthesized by cathodic vacuum arc deposition (with applications in lenses, hard disks for magnetic recording, and stents), plasma-assisted surface treatment of biopolymers used in total joint replacements and catheters for minimally invasive treatment of diseased arteries, shape-memory thin films for retina disks and artery stents, infrared-visible sum frequency generation vibrational spectroscopy for *in situ* studies of entropy-driven molecular rearrangement at various biopolymer surfaces because of in-plane and out-of-plane stretching and aging effects, and, more recently, plasma-assisted polymer surface functionalization for controlled adhesion and growth of cells, protein secretion due to mechanotransduction in articular cartilage, and cell mechanics.

Professor Komvopoulos research is documented in more than 275 publications in various archival journals and peer-reviewed conference proceedings and 11 US patents. He has presented more than 180 lectures and research papers at conferences, universities, national laboratories, and various industries, and has supervised the research and dissertations of 21 PhD and 20 MS graduate students. He is a Fellow of both ASME and STLE and recipient of several prestigious awards, including NSF Presidential Young Investigator Award (1989-1996), IBM Faculty

Development Award (1990-1992), Berkeley Engineering Fund Award (1989-1990), ASME B. L. Newkirk Award (1988), and NSF Engineering Initiation Award (1987).

Professor Komvopoulos is the founder and director of the *Surface Mechanics and Tribology Laboratory* (1989), which in 2008 was split into two laboratories, *Surface Sciences and Engineering Laboratory* (SSEL) and *Computational Surface Mechanics Laboratory* (CSML), due to the growth of his interdisciplinary research programs. Professor Komvopoulos also holds a Faculty Scientist appointment at the Materials Sciences Division of the Lawrence Berkeley National Laboratory. His near-term research plans include emphasis on nanostructure material synthesis, nanoscale contact electromechanics, multi-functional nanoprobes and surface templates, self-adapting surfaces and interfaces, bioassays and biomimetic surfaces, nanoscale manufacturing methods, mechanics of biological surfaces, biomimetic materials, and scaffolds.

At UC Berkeley, Professor Komvopoulos teaches both undergraduate and graduate courses on *Mechanical Behavior of Materials*, *Fracture Mechanics*, *Fatigue*, and *Tribology*. He is also involved in the Nanosciences and Nanoengineering Graduate Program at UC Berkeley. Among his future teaching plans is the development of a graduate course on *Nanoscale Physics and Mechanics of Surfaces and Interfaces* and a specialized course *Surface Biomechanics* for graduate students in the Colleges of Engineering and Chemistry.

Professor Komvopoulos serves as research advisor to several graduate and mentor of undergraduate students in the Colleges of Engineering and Chemistry at UC Berkeley. In addition to teaching and research, he also devotes significant time to administration duties at the Department, College, and University system-wide levels. His most recent committee service includes University-wide Committee of Faculty Welfare, Assembly Representative for the Berkeley Campus, Divisional Council, Educational Technology, Courses of Instruction, and Graduate Study.