Materials and Device Challenges for Next Generation LIDARS

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The past decade has seen considerable experimental development of LIDAR (Light Detection and Ranging) systems for autonomous vehicles, but these have all been based upon conventional, readily available components that are far too costly and obtrusive for anything but experimental development, demonstration and verification. The new wave of dramatically different technology for related facial recognition and need to produce similar integrated, far lower cost and high volume systems has created an exciting research and development effort to meet this challenge. My group has worked on a broad range of applicable materials and device technologies to address these challenges. I will describe work on new materials to produce eye-safe VCSEL arrays, photon management in photodiodes and metamaterials that could provide the needed foundation for these exciting new imaging and ranging systems.

James Harris is the James and Ellenor Chesebrough Professor of Electrical Engineering, Applied Physics and Materials Science at Stanford University. He received B.S., M.S. and Ph.D. degrees in Electrical Engineering from Stanford University, Stanford, CA in 1964, 1965 and 1969, respectively. In 1969, he joined the Rockwell International Science Center where he was a key contributor to MBE and heterojunction devices. In 1982, he joined the Solid-State Electronics Laboratory, Stanford University as Professor of Electrical Engineering. His current research interests are in the physics and application of ultra-small structures and novel materials to new photonic devices. He has supervised over 130 PhD students and has over 1100 publications in these areas. Dr. Harris is a Member of the National Academy of Engineering, a Fellow of IEEE, the American Physical Society, Optical Society of America and Materials Research Society. He received the 2000 IEEE Morris N. Liebmann Award, the 2000 International Compound Semiconductor Conference Welker Medal, an IEEE Third Millennium Medal an Alexander von Humboldt Senior Research Prize in 1998, the International MBE Conference MBE Innovator Award in 2008, the 2013 SRC Aristotle Award for graduate student training and mentoring and International MBE Conference Al Cho Award in 2014.