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Infrared technology has made tremendous advances over the years, with sensitivity approaching fundamental limits achieved over a broad range of wavelengths. This sensitivity has come in many cases at the expense of substantial cooling of the infrared detector or sensor array. At very long wavelengths cooling occurs down to even $\sim$28 μm. Even at LWIR wavelengths in the 10 μm to 15 μm range, cooling to $\sim$80 K to 40 K was necessary, especially for some lower photon flux levels corresponding to dimmer scenes and objects. When the performance limit is relaxed for brighter backgrounds and objects of interest, new detector architectures involving materials less exotic than HgCdTe and Si:As may be considered.

Many of the papers in this special section of *Optical Engineering* respond to those opportunities by utilizing alternative detector materials and architectures. One paper in particular by Suh and Suh describes the incorporation of PbSe on silicon substrates, and novel ways to process the PbSe deposition with various pressures of iodine for dramatic effects on the surface morphology. High-resolution images showed the stages of recrystallization and the changes of surface morphology that may be achieved.

Another paper by Fathipour and Mohseni describes a highly sensitive short-wave infrared ranging detector architecture with gain and near unity excess noise factor, involving a compelling electron injection process, opening the door to new lidar performance opportunities.

This collection of eight research articles captures the exciting developments taking place in the field of infrared sensors. We hope that this special section will lead to further progress in the years to come.

Arvind D'Souza has a PhD in condensed matter physics from The Ohio State University. He has 31 years of experience working in the field of infrared and visible detectors. He is a DRS Technical Fellow. Prior to joining DRS, he was a Boeing Technical Fellow and the lead engineer in the device characterization laboratory at the Rockwell Electro-Optical Center, measuring and modeling electrical and optical properties of HgCdTe detectors. He is the vice-chair of the Military Sensing Symposium Detector committee and co-chair for the SPIE conference on Infrared Sensors, Devices, and Applications. He has two patents, has authored/co-authored 100 papers, and is the primary author of the chapter "HgCdTe Infrared Detectors" in the *Handbook of Thin Film Devices* (Academic Press, 2000).

Paul D. LeVan is a senior physicist and currently is a branch technical advisor in the Air Force Research Laboratory. He previously led the space focal plane array group in the Space Vehicles Directorate, overseeing the development and demonstration of state-of-the-art infrared focal plane arrays for space applications by the Air Force and the Department of Defense. In his previous position as astrophysicist with the passive sensors branch, his achievements included the export of infrared detectors to the European Space Agency's Infrared Space Observatory (ISO), participating in the definition and procurement of infrared sensors for the Air Force Advanced Electro Optical System (AMOS upgrade), and sponsoring the development of new-technology infrared focal plane arrays that image simultaneously in two wavebands. He is the author of two U.S. patents, has published over 25 refereed journal articles and over 70 technical articles, and frequently presents invited talks and serves on conference committees of SPIE symposia. In addition to being a Fellow of SPIE, he was a member of the American Astronomical Society since 1982.