EMPLOYMENT

Employment Opportunities

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Job Title: Mixed-Signal Image Sensor Designer
State: Massachusetts
City: Lexington
Description: Group 87 — Advanced Imaging Technology

The Advanced Imaging Technology Group develops innovative silicon-based focal-plane technologies for both DoD and scientific applications, such as astronomy, remote sensing, and adaptive optics. These novel focal planes address DoD mission requirements that drive specialized architectures (such as: multiple or very high-speed image samples, time-of-arrival imaging, or noise-less image stabilization) or highly optimized device design and processing to achieve high quantum-efficiency and/or very low noise. Scientific research examples include the design, fabrication, and testing of world-class CCD imaging devices used in a variety of high-end scientific applications (for example, focal planes for the Chandra X-ray telescope and other pre-eminent astronomical observatories); demonstration of silicon-based photon-counting detector arrays, and development of 3D-integrated active-pixel sensors. The group has expertise in device/IC design, fabrication, custom packaging, and camera control and readout electronics.

These focal planes are fabricated in Lincoln Laboratory’s Microelectronics Laboratory – a 200-mm silicon wafer facility with programs in large-format charge-coupled devices, avalanche photodiode arrays, high-performance CMOS active pixel sensors, deep-submicron digital and mixed-signal SOI-CMOS, three-dimensionally stacked circuits, as well as MEMS-based RF switches, mirrors, and optical waveguides. The facility supports full-flow bulk and SOI-CMOS circuit fabrication, including specialized processes for oxide-bonded and back-illuminated sensors. Projects range from new device concept design and implementation to construction of custom silicon imaging, mixed-signal and digital integrated circuits.

An individual is needed to lead the development of silicon integrated circuit designs, with a particular focus on CCD and active-pixel imaging focal plane applications. Desired skills include a broad understanding of digital, analog and mixed-signal integrated circuit design and an ability to explore particular design problems in depth. Candidates who have a track record of making significant individual contributions within the context of a team-oriented design project are preferred. A strong working knowledge of mixed-signal circuitry testing methods and tools is essential. Experience with industrial-strength CAD tools and design methodologies for full-custom integrated circuit design, especially at the transistor level, is preferred. Will be responsible for the design and evaluation of CCD and/or CMOS image sensors, including analog building blocks and control circuits. Additional responsibilities include design simulation, documentation, detailed characterization, and close collaboration with other designers, device engineers, fabrication specialists, and testing and packaging engineers. Devices are typically used in large-scale demonstration systems, so ability to achieve results on schedule is also of paramount importance.

Education:
PhD in Electrical Engineering, applied experimental physics, or other appropriate field. In lieu of a PhD, MS candidates must have at least five years of relevant experience in full-custom mixed-signal integrated circuit design and a strong understanding of related circuit theory, visible and/or infrared imaging technology, and semiconductor device physics.

Desired Skills:
A strong practical background in integrated circuit design, preferably related to sensor or detector electronics, is essential. Hands-on experience in testing and characterization of mixed-signal integrated circuits and experience with computer simulation for design development are essential. Strong analytical skills, excellent presentation and written skills, and the ability to work as part of a team are all essential. An interest in quickly learning new skills relevant to emerging technologies and design approaches being developed in the Group is essential. Knowledge of charge-coupled devices, avalanche photodiodes, CMOS active pixel sensors, or silicon-on-insulator (SOI) CMOS circuit technology is highly desirable.

Strong familiarity with EDA tools for transistor-level full custom integrated circuit design is required. A strong background in using Cadence and/or Mentor Graphics IC EDA tools is preferred. Proficiency with a high-level interactive data-analysis package such as MATLAB or IDL is desirable.
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