

May 2017

Imaging Tech Pulse is a special edition newsletter from Photonics Media and PCO-TECH Inc. covering key developments in imaging technology.



A Faster Single-Pixel Camera for Lensless Imaging

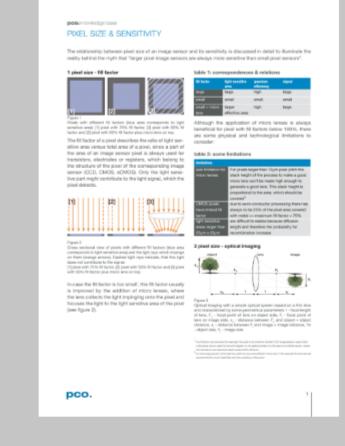
Researchers at Rice University built a camera that could produce 2D images using only a single light sensor rather than the millions of light sensors found in a commodity camera. However, that single-pixel camera needed thousands of exposures to produce a fairly clear image. Now, the Massachusetts Institute of Technology (MIT) Media Lab has improved the Rice idea and developed a new technique that makes image acquisition using compressed sensing 50 times as efficient, reducing the number of exposure from thousands to only dozens.





PROMOTED PCO-TECH Inc. The Relationship Between Pixel Size And Sensitivity

What is the relationship between an image sensor's pixel size and its sensitivity? How exactly does this define the quality of an image? These are regularly asked questions in the field of scientific imaging. PCO looks to debunk the myth that "large pixel image sensors are always more sensitive than small pixel sensors." Download PCO's knowledge base article "PIXEL SIZE & SENSITIVITY" to learn more!



Download

FLIM Delivers Intracellular Images Based on Differences Fluorescence lifetime imaging microscopy (FLIM) enables researchers in the life

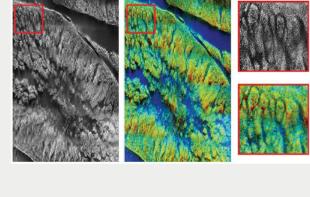
sciences to get information from live specimens about interactions on the molecular scale. The technique captures the differences in the excited state decay rate from a fluorescent sample, rather than relying on the concentration of a fluorophore. Since imaging does not derive from the intensity of a signal, the technique lessens the impact of photon scattering in thick layers of sample and is generally considered more robust than intensity-based methods.











Ultrafast Camera Developed for Drones, Autonomous Vehicles

An ultrafast high-contrast camera developed in Singapore could help self-driving cars and drones "see" better in adverse road and weather conditions. The smart camera, created by a team of scientists from Nanyang Technological University (NTU), can record the slightest of movements and objects in real-time, even when blinded by bright light or in complete darkness. The new camera records changes in light intensity between scenes at nanosecond intervals, much faster than conventional video, and stores the images in a smaller data format as well.

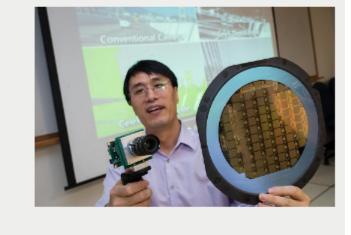












No labelled bacteria, red and

Lighting up the Lungs to Detect Disease A novel imaging tool that rapidly diagnoses bacterial lung infections could help

physicians customize antibiotic treatment for patients in intensive care units. Currently, diagnosing bacterial infections relies on a slow process of detection followed by biopsy and lab-based culture growth — procedures that are prone to contamination and can result in late treatment. The bedside technology, known as Proteus, uses LEDs and miniaturized optical fibers to enable the clinician to enter, image and sense the distal regions of patients' lungs. Read Article



Scenarios







CAOS Smart Camera Captures Targets in Extreme Contrast

extreme scene contrast pixel light intensity information using time-frequency coding of selected agile pixels. Imaging electromagnetic radiation is of fundamental importance to a number of fields, from medicine and the biological sciences, to security and defense. Often, demanding contrast imaging scenarios arise that call for a high instantaneous linear dynamic range (HDR) — in certain cases reaching 190 decibels (dB) — and the ability to achieve extremely low interpixel crosstalk.

A new camera technology working in unison with CMOS sensors smartly extracts

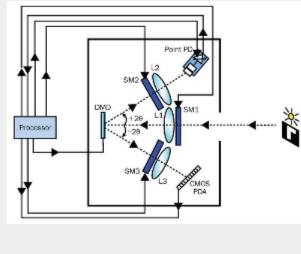












With labelled bacteria, red With labelled bacteria, red

Camera A moth's eye is the inspiration behind the technology that allows a new NASA-

Moth's Eye Inspires Design and Applications of NASA

developed camera to create images of astronomical objects with far greater sensitivity than was previously possible. When magnified, a moth's eye contains a very fine array of small tapered cylindrical protuberances whose job is to reduce reflection. This allows the moth to absorb light making night navigation possible. The same absorber technology concept, when applied to a far-infrared absorber, results in a silicon structure containing thousands of tightly packed, micromachined spikes or cylindrical protuberances no taller than a grain of sand.











