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# Algorithm to Eliminate Pixel Dependent Inhomogeneous Camera Noise from Microscopy Images

**An algorithm has been developed to eliminate pixel-dependent noise in CMOS camera microscopy images, enabling reliable quantitative studies while improving imaging speed and efficiency.**

Scientific complementary metal oxide semiconductor (sCMOS) cameras have gained increasing popularity in microscopy developments for biological sciences due to its advances in imaging speed, field of view, and effective quantum efficiency. Unfortunately, its enhanced imaging speed introduces pixel-dependent readout noise, introducing biases and imaging artifact if left untreated. Currently, no algorithm exists for treating pixel-dependent noise/readout noise from microscopy images.

Purdue University researchers have developed an algorithm that eliminates pixel-dependent noise/readout noise from microscopy images, restoring it to results seen with an ideal camera, making it possible to perform quantitative studies. Using an sCMOS camera, researchers achieved higher speed and quantum efficiency for scientific research. This technology allows for broad adaption of sCMOS cameras in scientific fields, improving temporal resolution and field of view available by 1 to 2 orders of magnitude.

This technology can also be applied to correct the common Poisson and readout noise from microscopy data and is applicable to generic imaging applications where a cutoff frequency exists.

**Advantages**:

-Eliminates sCMOS pixel-dependent noise from microscopy images, restoring it to results seen with an ideal camera

-Improves temporal resolution and field of view available by 1 to 2 orders of magnitude

-Reduces cost

**Technology ID**

2017-HUAN-67790

**Category**

Artificial Intelligence & Machine Learning/AI-Integrated Imaging Systems & Industrial Vision and Inspection
Materials Science & Nanotechnology/Nanomaterial Characterization & Imaging Tools
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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**View online**

-Improved speed, detection efficiency and chip size

-Works with any microscope system with CMOS camera technology

Potential Applications:

-Scientific research

-Industrial microscopic inspection

-CMOS cameras

**TRL:** 9

**Intellectual Property:**

Provisional-Patent, 2017-01-30, United States | PCT-Patent, 2018-01-29, WO | NATL-Patent, 2019-07-23, United States | NATL-Patent, 2019-08-30, Republic of Korea | NATL-Patent, N/A, Japan

**Keywords:** sCMOS cameras, microscopy, pixel-dependent noise, readout noise, noise elimination algorithm, quantitative studies, temporal resolution, field of view, CMOS camera technology, imaging speed