GENOMICS

Single-cell structural variations

Sanders, A. D. et al. *Nat. Biotechnol.* https://doi.org/10.1038/s41587-019-0366-x (2019).

Somatic structural variations (SVs) underlie diseases such as cancer. While analysis of bulk DNA sequencing data allows SV detection, single-cell sequencing has the potential to characterize somatic SVs at higher resolution. Despite this conceptual appeal, various technical difficulties must be overcome. Strand-seq is a method that enables chromosome-length haplotype phasing of single nucleotide polymorphisms. Taking advantage of data generated by Strand-seq, Sanders et al. developed scTRIP, a computational approach for identifying SVs in single cells. scTRIP detects and distinguishes different SV classes by their characteristic diagnostic footprints and enables detection of complex DNA rearrangements consisting of adjacent SVs on the same haplotype. The authors used scTRIP to discover SVs in transformed retinal pigment epithelium cells and leukemic samples. The tool not only reveals abundant SV classes such as translocations and inversions, but also complex DNA rearrangements such as breakage–fusion–bridge cycles. *LT**

https://doi.org/10.1038/s41592-020-0787-y

NEUROSCIENCE

A multiplexable miniscope

De Groot, A. et al. *Elife* **9**, e49987 (2020).

Miniature microscopes are available in a variety of versions, both commercially and custom-built. De Groot et al. add an especially lightweight and versatile option. With a weight of just 1.6 grams, the so-called NINscope has a small footprint, comes with an on-board accelerometer and can drive an LED for optogenetic stimulation. Despite the trimmed-down design, the scope's high image quality allowed extraction of neuronal activity from GCaMP6f-expressing neurons in the cortex and cerebellum. During imaging, mouse behavior can be monitored with the accelerometer. The small footprint and low weight of the NINscope even allowed the placement of two miniscopes on one mouse without impairment of behavior. Therefore, the researchers could conduct dual-region imaging in freely behaving mice, which they demonstrated for the cerebellum and the cortex or for both hemispheres of the visual cortex. *NV*

https://doi.org/10.1038/s41592-020-0788-x

MICROSCOPY

Smart rotation for better SPIM

He, J. & Huisken, J. *Nat. Commun.* **11**, 150 (2020).

Selective plane illumination microscopy (SPIM) uses light sheets to illuminate samples and has proven exceptionally useful for imaging developing embryos and larger samples, such as cleared tissues. However, SPIM image quality can be affected by optical aberrations, especially when imaging thick samples. One strategy for improving 3D images is collecting multiple views of the same specimen and merging them, which yields more complete coverage of the sample. He and Huisken developed an alternative approach to improve sample coverage called smart rotation. Smart rotation works on the fly to optimize imaging views and automate sample rotation, which maximizes sample coverage while limiting overall imaging. Automating smart rotation required development of custom microscope control tools, including software for rapidly processing image data and communicating the optimal view to the microscope. The authors directly compared multiview imaging with smart-rotation-based imaging of zebrafish embryos and showed that their workflow offers better coverage with fewer views. *RS*

https://doi.org/10.1038/s41592-020-0789-9

MICROSCOPY

Say goodbye to sCMOS noise

Mandracchia, B. et al. *Nat. Commun.* **11**, 94 (2020).

Scientific CMOS (sCMOS) cameras have quickly gained popularity among microscopists as these cameras offer fast, sensitive and high-resolution detection over a large field of view. However, sCMOS sensors have different sources of noise from those based on charged-coupled devices, and this noise can cause problems, especially for quantitative imaging. Mandracchia et al. have developed an algorithmic approach called automatic correction of sCMOS-related noise (ACsN) for reducing common noise sources. ACsN works by combining camera calibration, noise estimation and sparse filtering to correct relevant noise sources while preserving fine details of the image. The researchers show that their approach works with a variety of CMOS cameras. They also demonstrated improved results on biological samples imaged by several modalities, including widefield, light sheet, light field and localization microscopy. *RS*

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