result shown in Fig. 11, by maximizing the number of sampling channels, the IMS's spectral imaging performance is demonstrated even in this extreme case. Note that many biomedical imaging problems are emerging which require fine spectral sampling over a broadband range such as in vascular imaging [27], retinal imaging [28] and oral cancer diagnostics [29]. The IMS technique with its full spectral sampling capacity will have an edge in those applications because parallel acquisition enables both real-time 2D imaging (for qualitative feedback) and spectral detection (for quantitative assessment) simultaneously. Another fact that may help diminish the trade-off between the number of spectral channels and an individual channel's SNR is the recent development of low-noise detector arrays, such as the sCMOS camera [30], whose readout noise is less than 2 electrons (close to EMCCD performance) even at very high frame rate (30 fps). Incorporation of such cameras into IMS will significantly increase single channel's SNR (until the system is shot-noise limited), and whole system's frame rate.

In summary, high-sampling IMS is an important spectral imaging modality developed for hyperspectral microscopy. It can capture 3D (x, y, λ) datacubes and in effect provide 60 spectral images via a single snapshot. The acquisition and display of a full-resolution datacube can be simultaneous, as the re-mapping procedure involves only a simple numerical operation. The spectral imaging results in a biological specimen demonstrate that IMS has significant potential to open up new areas of investigation in real-time bio-imaging applications.

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