Special Issue

Advancements in Computational Imaging and Optical Computing

Message from the Guest Editor

Computational imaging is an emerging field that seeks to push the fundamental limits in imaging systems by integrating optics and computation. These new-generation imaging systems embed computers as part of the imaging system, where optical setup and post-processing algorithms are designed simultaneously. On the other hand, recent advances in optical computing, such as all-optical neural networks, provide promising alternatives to enable highly efficient "computing" at the speed of light using only optical and photonic components. Such novel optical computing devices promise to significantly reduce power, bandwidth, and size and enable "edge computing" directly on systems. Furthermore, the amount of information that can be extracted from these images is tremendous. As a cross-disciplinary research topic, computational imaging has evolved far beyond simply imaging, drawing interests from expertise in optical physics, signal processing, computer science, and machine learning, with broad applications in bioimaging, physical science, and industrial inspection.

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