A fundamental challenge of biology is to understand and exploit the vast heterogeneity of cells, particularly how the spatial architecture of cells is linked to their identity and physiology. However, it is challenging to address the need because it is analogous to “Where’s Waldo (Wally in the UK and Walter in Germany)?” In this talk, I introduce a new type of technology known as “Image-Activated Cell Sorting” that performs real-time, intelligent, image-based sorting of cells at an unprecedented rate of >1000 cells per second (Nitta et al, Cell, 2018; Nitta et al, Nature Communications, 2020). This technology integrates high-throughput fluorescence microscopy, cell focusing, cell sorting, and deep learning on a hybrid software-hardware data-management infrastructure, enabling real-time automated operation for data acquisition, data processing, intelligent decision-making, and actuation. I show a new class of biological, medical, and pharmaceutical applications of the technology.