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Advancing Molecular Imaging with Total-Body Positron Emission Tomography — ●SIMON R. CHERRY — University of California, Davis, USA

While positron emission tomography (PET) is widely regarded as the most sensitive whole-body assay for molecular targets and pathways in the human body, the diagnostic and quantitative performance of clinical and research studies are defined and limited by the limited counting statistics that can be obtained for an acceptable radiation

dose. In this presentation, we explore how total-body PET can shift this balance through improving the counting statistics by up to two orders of magnitude for a given radiation dose. Such an increase in sensitivity would have profound implications for the practice of PET in both clinical research and diagnostic settings through very rapid imaging, imaging near background radiation levels, or vastly improved image quality at current dose levels. The technological and methodological innovations needed to produce this step-change in performance will be discussed, and some of the remaining challenges to the field will be identified.