Presently available methods for detecting biomolecules are primarily based on measuring “analog” signals—the higher or lower the concentration, the higher or lower the signal, respectively. Digital measurements, based on counting single molecules, enable extremely high sensitivity because low background signals can be readily distinguished from the high digital signals making for a much lower limit of detection.

We have developed a method that allows us to measure the concentration of proteins more than a thousand times lower than ELISAs. The method also allows us to observe the behavior of individual enzyme molecules. Both fundamental enzymology studies as well as the application to new diagnostic tests will be described.