Nanopore-based detection, utilising size tunable nanopores, has been developed for accurate multi-parameter measurement of a wide range of naturally-occurring and synthetic micro- and nano-sized vesicle types. The technique measures the resistive pulses that occur when particles pass through a size-tunable nanopore due to the application of an electric field and pressure, transiently disrupting current flow through the pore. Interrogation of these signals allows rapid and accurate determination of the concentration (particles/mL), size distribution, aggregation levels, and relative surface charge distribution of particles under physiologically relevant conditions. Nanopore-based detection provides increased sensitivity compared to current methods for vesicle analysis, such as flow-cytometry, which are limited in their ability to accurately detect sub-micron sized particles. The ability to individually analyse each particle also addresses the shortcomings of ensemble systems, such as dynamic light-scattering, and of static systems using electron microscopy. The approach has been applied for accurate characterisation of a wide variety of vesicle types including drug delivery particles (liposomes) and biologically-occurring vesicles, such as exosomes and microparticles.