Image correlation methods provide a new window of analysis for measurement of protein-protein interactions and macromolecular transport properties from fluorescence microscopy images of living cells. These approaches are based on space and time correlation analysis of fluctuations in fluorescence intensity within images recorded as a time series on a laser scanning or TIRF microscope. We recently introduced spatio-temporal image correlation spectroscopy (STICS) which measures vectors of protein flux in cells based on the calculation of a spatial correlation function as a function of time from an image time series. Here we will describe the application of new extensions of STICS and its two color extension, spatio-temporal image cross-correlation spectroscopy (STICCS), for measuring transport and interaction maps of the adhesion related macromolecules alpha5, alpha6, alpha L-integrins, alpha-actinin, paxillin, talin, vinculin, and actin within, or associated with the basal membrane in living U2OS and CHO cells plated on a variety of extracellular matrix substrates including fibronectin, laminin and ICAM. By judicious application of filtering in k-space, we are able to separate correlation contributions from macroscopic objects and fluorescent molecules to reveal their dynamics and interactions in the vicinity of adhesions. As well, by fitting the space-time correlation functions with a bivariate Gaussian, we reveal directionally confined diffusive and flow transport along the axis of the focal adhesions. We will show other potential applications of the method to measure actin cytoskeleton dynamics in neuron growth cones and simultaneously measure adhesion protein transport and force maps with STICS and traction force microscopy. Finally we will also highlight recent advances we have made with a new form of reciprocal (k-) space ICS, called kICS, that allows us to measure unbiased transport coefficients of fluorescently labeled membrane proteins even if there is complex probe photophysics (such as nanoparticle emission blinking).