Quantification and characterization of dynamical interdependence between multidimensional systems provide a useful insight on complex systems. In real life, the feature of interdependency or coupling might be nonlinear and non-stationary, which makes classical linear methods such as correlation coefficient and coherency unsuitable for this purpose. In this talk, we propose a novel measurement, called correntropy coefficient, to detect nonlinear interdependencies between simultaneously recorded time series based on reproducing kernel Hilbert space (RKHS). The original time series are nonlinearly transformed into a high-dimensional RKHS, where the correntropy coefficient essentially computes the cosine of angle between transformed vectors. Experiments on simulated data and real electroencephalogram (EEG) data suggest that correntropy coefficient is able to effectively detect nonlinear coupling between interacting systems and is sensitive to time-dependent change of underlying dynamics. The measurement is also found fairly robust to noise.