Transverse Quark Spin Effects in Azimuthal Asymmetries in SIDIS and Drell Yan LEONARD GAMBERG, Penn State Berks — The connection between quark orbital angular momentum and final state interaction for transversely polarized quarks in unpolarized hadrons suggests significant $\cos 2\phi$ azimuthal asymmetries in pion production in semi-inclusive deep inelastic scattering (SIDIS) ($e\,p \to e'\,X\,\pi$) and in di-lepton production in Drell Yan ($p\,\bar{p} \to \ell^+\,\ell^-\,X$) scattering. When transverse momentum of the reaction, P_T is on the order of or less than $\Lambda_{\rm qcd}$, that is where $P_T \sim k_T$, where k_T is intrinsic transverse quark momentum, these effects are characterized in term of naive time reversal odd (so called T-odd) transverse momentum dependent (TMD) parton distribution and fragmentation functions. At these moderate transverse momentum scales we estimate the size of the $\cos 2\phi$ azimuthal asymmetry in SIDIS and Drell Yan scattering in the parton spectator framework. In the former case we consider this so called "Boer-Mulders" effect for a proposed experiment at the upgraded CLAS-12 GeV detector at Jefferson LAB. In the latter case we consider this asymmetry for proton anti-proton experiments at JPARC and GSI.