The perfect spin-momentum locking on the surface of three-dimensional (3D) topological insulators leads to enhancement of current-driven nonequilibrium spin density and thereby induced field-like spin-orbit torque (SOT) in lateral topological-insulator/ferromagnet (TI/F) heterostructures (where injected current flows parallel to the interface). However, very recent experiments have also observed large antidamping SOT whose theoretical explanation remains under scrutiny. This talk will overview recent theoretical approaches to SOT in TI/F heterostructures, while emphasizing the role of evanescent wavefunctions in generating antidamping SOT, 3D nature of spin and charge transport in these devices, and first-principles description of hybridization and proximity effects at their interfaces which can assist in finding optimal materials combinations. Additional insights into these phenomena and the potential of TI/F interfaces for spintronic applications is provided by studying spin-to-charge conversion when magnetization of the F layer is brought into precession, or tunneling anisotropic magnetoresistance and the corresponding SOT in vertical TI/F heterostructures.

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**Wednesday, September 21, 4:30 pm | 136 Jorgensen Hall**
**Refreshments at 4:15 in Jorgensen Atrium**