The Department of Mechanical Engineering presents:

The Master's Thesis Defense of

Frank Rodriguez

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Fourier Representations with Sequentially-trained, Shallow Neural Networks for Real-time Odometry and Object Tracking

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Dr. Luat Vuong, Chairperson

Fourier-domain correlation approaches have been successful in a variety of image comparison approaches. However, these correlation approaches also lose performance when patterns, objects or scenes in images are distorted. Current Fourier correlation approaches also require high-power to produce accurate results. With our approach we utilize Fourier-domain preprocessing with shallow neural networks to infer the 3-D movement or position of the camera relative to an object or scene. This approach enables us to demonstrate potential for novel Fourier-plane cameras, which use sequential frames for visual odometry. We also propose a potential future study for a hybrid vision "event camera" system capable of position inference by using an optical encoder imaged in the Fourier-plane.