ABSTRACT
State-of-the-art performance for object detection, object classification and activity recognition requires curation of large datasets which are necessary to make deep networks with tens of millions of parameters able to generalize. However, data of this scale is not available for many applications, especially in the infrared (IR) spectrum. For example, thermal IR is particularly difficult because the visible-spectrum convolutional networks are ill adapted to low-level spectral differences and many transfer learning algorithms will not improve accuracy. In this talk, we present Coupled-Instances Domain Adaptation (CIDA), which performs domain adaptation of a pre-trained convolutional network from a large source domain to a limited data target domain, by utilizing a small number of instances captured simultaneously in both domains. We collected a dataset of coupled instances of visible and thermal infrared of 98 subjects under various poses, designed for the training requirements of CIDA. We applied CIDA to the problem of cross-spectrum facial identification, where we achieved state-of-the-art performance in matching thermal infrared facial images to a visible mugshot gallery.

BIOGRAPHY
Dr. Joel Douglas has focused his career on bringing together teams to solve extremely hard problems in statistical estimation, inference, and control, including data analytics and video and image exploitation. He is co-founder of Systems & Technology Research, a small agile company whose mission is to solve important national security problems by developing and applying advanced technology. Previously, he was with ALPHATECH and BAE Systems, where he was Director of the Computer Vision Group. Dr. Douglas received his PhD and SM from MIT, and his BS from CMU.