ABSTRACT: Heat transfer and drag on vehicles traveling at supersonic and hypersonic speeds is a strong function of state of the boundary layer. Determining the state of the boundary layer, be it laminar, unstable/transitional, or turbulent can be difficult in the challenging testing environments typical of high-speed wind tunnels. In this talk, we will discuss two research efforts towards this end. In the first, a novel application of focused laser differential interferometry (FLDI) was used to measure incipient instability waves at previously inaccessible high-enthalpy hypersonic conditions. The FLDI results are compared to linear-stability calculations. In the second research effort, krypton tagging velocimetry (KTV) is used to make non-intrusive measurements of velocity profiles in a high-speed underexpanded jet and in a supersonic turbulent boundary layer.

BIO: Nick is an Assistant Professor in the Mechanical Engineering Department at the Stevens Institute of Technology in Hoboken, New Jersey. He received his BS in Mechanical Engineering from SUNY Binghamton in 2008, then received his MS and PhD degrees from Caltech in 2009 and 2013. Prior to becoming an Assistant Professor at Stevens he was a PostDoc at Caltech (2013), a Visiting Assistant Professor at Stevens (2013-2014), and an Air Force Summer Faculty Fellow at AEDC White Oak (2014, 2015). His research focuses on thermo/fluids with applications in high-speed shear flows and biomass conversion.

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