

## DUAL FREQUENCY COMB METHANE LEAK DETECTION AT OPERATIONAL OIL AND GAS FACILITIES

GREGORY B RIEKER, SEAN COBURN, CAROLINE ALDEN, ROBERT WRIGHT, *Department of Mechanical Engineering, University of Colorado Boulder, Boulder, CO, USA*; ALEX RYBCHUK, *Department of Mechanical Engineering, University of Colorado, Boulder, CO, USA*; KULDEEP PRASAD, *Fire Research Division, NIST, Gaithersburg, MD, USA*; KEVIN C COSSEL, ESTHER BAUMANN, IAN CODDINGTON, *Applied Physics Division, NIST, Boulder, CO, USA*.

We recently demonstrated a field-deployed dual frequency comb laser spectrometer capable of locating and sizing methane sources down to 1.6 grams/minute (which is equivalent to approximately one quarter of the human breathing rate) from a distance of 1 km. The system couples open-path methane concentration measurements over long distances together with wind information in a Bayesian inversion framework to locate sources within the monitoring region. We are now applying the technology for leak detection at operational oil and gas facilities. We will discuss the evolution of the project from laboratory proof-of-concept to controlled field testing to initial implementation in an industrial setting. We will also discuss the challenges of field deployment in real environments, which include remotely operating stabilized mode-locked frequency combs and maintaining a sensing network through rain, snow, and fog.