College of Engineering
Department of
Mechanical & Industrial Engineering

# The Sidney E. Fuchs Seminar Series

3:00-4:00pm, Friday, February 24th, 2017
Frank H. Walk Design Presentation Room

## Methane Emissions from United States Natural Gas Gathering Compressor Stations and Processing Plants


by Anthony J. Marchese*

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Facility-level methane emissions measurements were conducted using a new dual tracer gas technique at 130 natural gas gathering facilities and processing plants in 13 U.S. states. The results from the field campaign were combined with state and national facility databases in a Monte Carlo simulation to estimate methane emissions from U.S. natural gas gathering and processing operations. Total annual methane emissions of 2,421 (+245/-237) Gg were estimated for all U.S. gathering and processing operations, representing a methane loss rate of 0.47% (±0.05%) when normalized by annual methane production. The largest source of methane emissions from gathering and processing operations were attributed to normal operation of gathering facilities (1,697 +189/-185 Gg) and these emissions were eight times that of previous EPA Greenhouse Gas Inventory (GHGI) estimates. The methane emissions from processing plants (506 +55/-52 Gg) were 40% lower than previous GHGI estimates but a factor of three higher than that reported under the EPA Greenhouse Gas Reporting Program (GHGRP). In April 2016, the EPA GHGI was updated based directly on the results of this study, which effectively added over 1500 Gg of annual methane emissions to the inventory. With these updates to the EPA GHGI, gathering operations are now estimated to account for 27% of all methane emissions from natural gas supply chain.


* Anthony J. Marchese is the Associate Dean for Academic and Student Affairs, Director of the Engines and Energy Conversion Laboratory and Professor of Mechanical Engineering in the College of Engineering at Colorado State University. Marchese holds a Ph.D. in Mechanical and Aerospace Engineering from Princeton University and B.S. and M.S. degrees from Rensselaer Polytechnic Institute. His research areas include internal combustion engines, alternative fuels, combustion, chemical kinetics, methane emissions and biomass cookstoves. He is on the editorial board for the journal Algal Research and was the Principal Investigator on a $1.9 Million study organized by the Environmental Defense Fund aimed at quantifying the total emissions of methane from the gathering and processing sector of the natural gas supply chain. He has previously held positions at Rowan University, United Technologies Research Center in East Hartford, CT and NASA Glenn Research Center in Cleveland, OH. In 2001, he was named a Carnegie Scholar by the Carnegie Foundation for the Advancement of Teaching and in 2004 he was awarded the ASEE Kauffman Outstanding Entrepreneurship Educator Award.