

Modeling Methane Emissions from Oil and Gas- SYSE 580A8  
Instructor: Dr. Anna Hodshire  
Tuesdays/Thursdays 3-4:15 PM, Powerhouse Classroom & Online  
Inventory (365 days)

Flight - ~2 mins

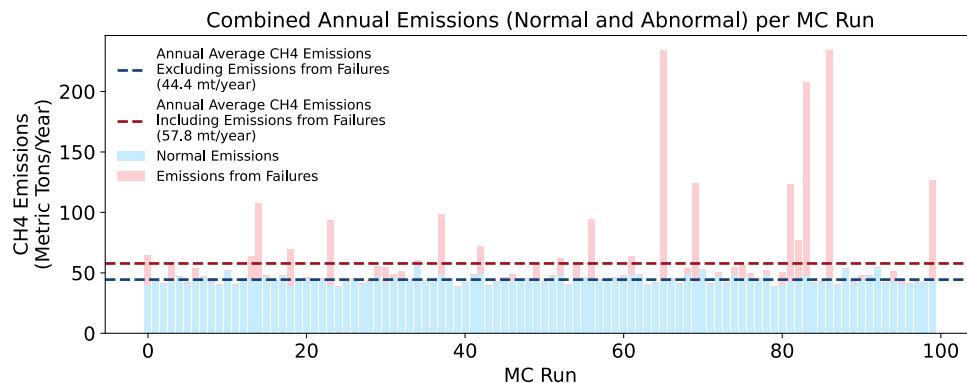
Modern-day measurements of emissions occur at brief instances in time, while regulatory inventories and global models demand annual estimates.

How do we reconcile these two time frames?

**What/why:** Methane emissions from the oil and gas (O&G) supply chain contributes ~1/3 of total anthropogenic methane emissions, but traditional emission factor-based inventory methods are insufficient to account for changing emissions in the face of regulatory and societal pressures. This course focuses on understanding causes and types of emissions, measurement methods, and state-of-the-art modeling practices for O&G production and midstream (everything that happens before gas is distributed for transportation or use).

**Practical:** First, students will build dispersion models to understand atmospheric transport of pollutants. Then, students build stochastic models to learn practical statistical methods for simulating random processes that lead to atmospheric emissions of pollutants, such as equipment failures at O&G facilities.

*While the course focuses on O&G, the concepts taught are broadly applicable to modeling atmospheric emissions of any medium- to long-lived gaseous pollutant.*



*Emissions from individual oil and gas facilities include small, often known and reported leaks and large, stochastic and infrequent unreported leaks from equipment failures. Monte Carlo (MC) iterations capture this variability, leading to more accurate ranges of possible emissions.*

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<https://www.online.colostate.edu/courses/SYSE/SYSE580A8.dot?Term=Fall+2024> (online) or  
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