

## **Microbial ecology of engineered anaerobic bioreactor systems**

**Lutgarde Raskin**

**University of Michigan, USA**

Microbial resource management or ecological engineering can be defined as the process of designing and operating bioreactors to foster the development of microbial communities that can accommodate the desired functional processes. When applied to anaerobic digestion, microbial resource management aims to control and steer the capabilities of complex anaerobic microbial communities to meet water quality standards and maximize biogas production in the most economical and environmentally sustainable way possible. While environmental engineers have been practicing microbial resource management since they began operating anaerobic bioreactors, the application of molecular biology and microbial ecology tools has tremendously changed our capabilities to rationally practice microbial resource management. This presentation will cover some examples of how “conventional” molecular biology tools have improved the understanding and operation of anaerobic digestion processes. High throughput DNA sequencing methods targeting specific genes, as well as metagenomics and metatranscriptomics are beginning to be applied to engineered anaerobic bioreactor systems. Examples of such applications will be presented with a focus on integration with process measurements to improve system performance.