

Who's there and what are they doing?
Molecular Methods in Environmental Microbiology

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Environmental microbiology and microbial ecology have enjoyed a 'research renaissance' in the last two decades. This resurgence has largely been fueled by the development and application of molecular (RNA- and DNA-based) methods to determine: microbial community structure (types and numbers of 'species', levels of members of phylogenetic groups), microbial diversity, and microbial function in environmental systems. This talk will focus on several methods for answering the questions "Who's there? How many? What are they doing?" in natural and engineered systems. The methods will include: (1) oligonucleotide probing (e.g., quantitative membrane hybridizations, fluorescence in situ hybridization [FISH]); (2) DNA fingerprinting methods (e.g., Denaturing Gradient Gel Electrophoresis, Terminal Restriction Fragment Length Polymorphism), and (3) Structure-function analyses (e.g., Stable Isotope Probing). A novel method developed at our laboratory at NC State University called 'Sequential mRNA FISH- Flow cytometry' (SmRFF) will also be discussed. The talk will focus on two applications in environmental engineering: nitrogen removal from wastewater and filamentous bulking in activated sludge.

About the Speaker:

Dr. Francis L. de los Reyes III has been on the faculty at North Carolina State University since 2000. He received a 2001 National Science Foundation CAREER Award ('the most prestigious science and education award in the US given to young faculty') for his research and education efforts in environmental biotechnology. His research is focused on developing and using molecular microbial ecology tools in environmental engineering, particularly in biological waste treatment. He has been principal or co-principal investigator on research projects (more than \$3.3 M in funding) funded by the NSF, EPA, USDA, DOE, and private companies. He received a BS Agricultural Engineering (magna cum laude) from the University of the Philippines at Los Banos in 1990, MS Civil Engineering from Iowa State University in 1994, and PhD Environmental Engineering from the University of Illinois at Urbana-Champaign in 2000.