



Research Assignment - 2009

Title of research assignment

Advanced IFAS-EBPR Process - Monitoring of performance and population analysis

Principal Investigator April Z. Gu

Title Assistant Professor

College/Department Civil and Environmental Engineering

Email april@coe.neu.edu

Office address 431 Snell Engineering

Office phone 617.373.3631

Lab address 408 and 54 Snell Engineering

Lab phone 617.373.3786

Research abstract

Recently, there has been increasing demand to achieve very low effluent total phosphorus and total nitrogen due to more stringent discharge limits imposed on wastewater treatment plants in US. Biological nutrient removal (BNR) process is still the most commonly applied technology for removing nitrogen and phosphorus from municipal wastewater.

The overall objective of the proposed research is to investigate the feasibility, and efficiency of using an IFAS (Integrated Fixed Film Activated Sludge) system for nutrient removal in wastewater treatment. The specific aims include.

1. Evaluate the phosphorus removal capacity of the system conducting P up-take and release test with both the fixed-film media and the suspended activated sludge from a lab-scale IFAS-BNR plant;
2. Identify and quantify the PAOs populations and their distribution on the fixed-film (media) and in the suspended activated sludge using molecular techniques such as fluorescent in situ hybridization (FISH).

Research activities/experience

The RET/YSP will be able to learn how a wastewater treatment plant work, they will be able to learn about nutrients and C cycles in nature and in wastewater system. They will also get familiar with parameters that affects removal efficiency in full scale application.

They will learn how to prepare solution and determine the nutrient requirement for living cells.

They will familiarize with techniques used to identify and quantify microorganisms present in

The Northeastern University Research Experiences for Teachers Program

c/o The Center for STEM Education · 360 Huntington Avenue, 940 Renaissance Park · Boston, MA 02115
tel: 617.373.2036 · fax: 617.373.7084 · <http://www.ret.neu.edu>

the systems, like the use of staining and molecular techniques.

Expectations of RET

The RET/YS fellow is expected to be diligent, responsible and consistent. Ability to learn to operate delicate instrument such as microscope is a plus.

Special skills or interests that would help a RET participant with this assignment (i.e., an interest in physics, experience with specific laboratory equipment, etc.)

Interests in environmental Engineering and Biology, as well as hands on experience on running biological reactor and variuos molecular techniques. Experiences with microscope and chemistry lab is a plus.

Lab safety/issues unique to this laboratory. A general Lab Safety Overview will be presented by Environment Health and Safety to both RET and YSP participants prior to the beginning of lab assignments.

Collected chemical waste, wear lab coat and gloves

Suggested literature to be reviewed prior to beginning this research assignment.

www.coe.neu.edu/~clee; Joel L. Swerdlow, Nature's Rx, National Geographic Magazine, April 2000

Research/Lab Summer Hours	9:00 a.m. – 4:00 p.m.	<input type="checkbox"/> Monday through Thursday		
		<input checked="" type="checkbox"/> Monday through Friday		
Scheduled Research/Lab Meetings	11:00 a.m. – 12:00 p.m.	<input type="checkbox"/> Daily	<input type="checkbox"/> Wednesday	<input type="checkbox"/> To be determined
		<input checked="" type="checkbox"/> Monday	<input type="checkbox"/> Thursday	
		<input type="checkbox"/> Tuesday	<input type="checkbox"/> Friday	

Lab/research project URL

<http://www1.coe.neu.edu/~april/Best.htm>

Research/Lab Supervisor	Annalisa Onnis-Hayden		
	Email aonnis@coe.neu.edu	Phone	617.373.2445
Research/Lab Assistant	Nehreen Majed		
	Email nmajed@coe.neu.edu	Phone	617.373.3786
Research/Lab Assistant	Carla Cherchi		
	Email ccherchi@coe.neu.edu	Phone	617.373.3991