

Department of Chemical and Environmental Engineering

2014—2015 Seminar Series

Friday, April 24, 2015

9:10—10:00 AM

WCH 205/206



Dionysios Dionysiou

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Environmental Engineering
and Science Program
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Harmful Algal Blooms in Lakes and Rivers and their Impact in Drinking Water Quality: The need for Effective Treatment of Cyanotoxins

In this presentation, Professor Dionysiou will overview the problem of Harmful Algal Blooms (HABs) with respect to water quality when such blooms are associated with the formation of cyanotoxins. Discussion will be provided on the properties of cyanotoxins and their effects associated with acute toxicity. Prof. Dionysiou will present new technologies developed and tested in his group for the effective breakdown of cyanotoxins in source water that is intended for use as drinking water. Emphasis will be given on UV and Solar-based Advanced Oxidation Processes (AOPs) such as TiO_2 -based photocatalysis (UV and visible) (i.e., a heterogeneous AOP) and UV/ H_2O_2 process (i.e., a homogeneous AOP) that have shown effectiveness to destroy several cyanotoxins. The role of water quality parameters such as pH, natural organic matter, alkalinity, metal content, and turbidity will be discussed. Moreover, relations will be drawn on how things learned from engineering treatment systems can be used to gather information on the fate of such toxins in aquatic systems. Prof. Dionysiou will also discuss some of his on-going work on the removal of nutrients from water inflow to lakes as well as on detection of cyanotoxins in situ in the source water using nanosensors. Overall, this presentation will be an overview that links aspects of nutrient input control to the lakes to minimize formation of HABs, sensing and quantification of cyanotoxins in source water, and effective treatment of cyanotoxins with advanced technologies to produce clean and safe drinking water.

BioSketch: Dr. Dionysios (Dion) D. Dionysiou is currently a Professor of Environmental Engineering and Science Program at the University of Cincinnati. He teaches courses and performs research in the areas of drinking water quality and treatment, advanced unit operations for water treatment, advanced oxidation technologies and nanotechnologies, and physical-chemical processes for water quality control. He has received funding from NSF, US EPA, NASA, NOAA/CICEET, USGS, USDA, and DuPont. He is currently one of the editors of *Chemical Engineering Journal*, Editor of the *Journal of Advanced Oxidation Technologies*, and Special Issue Editor of the *Journal of Environmental Engineering* (ASCE). He is a member of the Editorial Boards of several other journals. Dr. Dionysiou is the author or co-author of over 200 refereed journal publications, over 90 conference proceedings, 20 book chapter publications, 20 editorials, and more than 450 presentations. He is currently co-editing three books on water reuse, harmful algal blooms, and photocatalysis. Dr. Dionysiou's work received over 7,500 citations with an H factor of 50.