



國立臺灣大學  
生物產業機電工程學系  
Bio-Industrial Mechatronics Engineering

## 邀請演講

講題

### **High Throughput Microfluidic Systems for Accelerating Next-Generation Algal Biofuel Development**

時間：2016/11/17 (四) 上午 10:20—下午 12:10

地點：臺灣大學知武館四樓 401 演講廳

講者：Professor Arum Han

現職：Dept. Electrical and Computer Engineering  
& Dept. Biomedical Engineering

Texas A&M University, College Station, TX, USA

(詳細相關經歷請見系網公告)

敬邀

歡迎全系師生蒞臨聽講



# 台灣大學生物產業機電工程系 國際學術演講



## High Throughput Microfluidic Systems for Accelerating Next-Generation Algal Biofuel Development

Professor Arum Han  
Dept. Electrical and Computer Engineering & Dept. Biomedical Engineering  
Texas A&M University, College Station, TX, USA

時間：10:30 am ~ 12:00 pm, Thursday, November 17<sup>th</sup>, 2016

地點：知武館 4樓演講廳

### **ABSTRACT**

Photosynthetic microorganisms such as microalgae have great potential to be the next-generation biofuel solution as they are capable of high oil production while utilizing minimal amounts of land and water. However for microalgae to become a viable future renewable energy solution, significant improvements in oil production and biomass growth have to be made through better algal strain development. Microfluidic technologies have the capability to accurately control extremely small amount of biological samples and reagents, and enable the concept of lab-on-a-chip systems by integrating several microfluidic functionalities onto a single chip. Two high-throughput photosynthetic organism screening/analyses microfluidic platforms will be presented. The photobioreactor microarray system that we developed utilizes arrays of microfluidically controlled on-chip dynamic light controllers and a cell culture array to screen and understand how different light exposure conditions such as light intensity and day/night cycles influence growth and oil production with single-cell resolution analysis capabilities. The second microfluidic system presented utilizes droplet microfluidics technology for ultra-high-throughput screening of engineered and mutagenized algal strains to identify strains with higher growth and oil production capabilities. We believe that microfluidic and lab-on-a-chip platforms can dramatically accelerate research and development in next-generation algae-based biofuels.

### **About Speaker:**

**Dr. Arum Han** is Professor in the Department of Electrical and Computer Engineering and also in the Department of Biomedical Engineering at Texas A&M University (USA). He joined Texas A&M University in 2005 as an Assistant Professor. He is also a faculty of Texas A&M Health Science Center and the Texas A&M Institute for Neuroscience. He received his Ph. D in electrical engineering from the Georgia Institute of Technology in 2005, his M.S. from the University of Cincinnati in 2000, and his B.S. from the Seoul National University in 1997, all in electrical engineering.

His research interests are in solving grand challenge problems in the broad areas of health and energy through the use of micro/nano systems technologies. He has co-authored more than 80 peer-reviewed publications and has received funding from the Bill and Melinda Gates Foundation, NIH, NSF, DTRA, USDA, U.S. Army Corp of Engineers, QNRF, and several other international sponsors and private companies. He serves as the editorial board member of the journal PLoS ONE and as an associate editor for the journal Biomedical Microdevices.

He is a Texas A&M Engineering Experiment Station (TEES) Fellow, Eugene Webb Faculty Fellow of Texas A&M University, recipient of the Engineering Genesis Award for Multidisciplinary Research from Texas A&M University, recipient of the E. D. Brockett Professorship Award, and recipient of the Dean of Engineering Excellence Award.

**Note:** Prof. Han 將於當天下午 (2-3pm)，在農機館第一會議室舉行 TAMU 的求學座談討論，歡迎同學參加，有興趣者請洽：陳林祈教授 ([chenlinchi@ntu.edu.tw](mailto:chenlinchi@ntu.edu.tw)) 或盧彥文教授 ([yenwenlu@ntu.edu.tw](mailto:yenwenlu@ntu.edu.tw))