

**ENS Paris-Saclay, Institut d'Alembert – DER N. Tesla – Joint Seminar,
6th September 2022 at 10h Amphi Simondon, 1B26 South-West Building**



**« The application of microscale systems on enhancing
bioenergy production based on microorganisms »**

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Topic of the conference :

Production of bioenergy using microorganisms have been studied intensively in the past decade because microorganisms have great potential in simultaneous production of biofuels and high-value products. For example, microalgae extracts contain lipids and pigments, and these can be further valorized into biodiesel and antioxidant additives. However, the production of microalgae biomass and their cellular contents strongly depends on the kind of microalgae, the cultivation condition, and the stress for inducing the accumulation of specific molecules. Conventional analysis for the cellular components of microalgae are complex and timeconsuming, making the optimization of cultivation strategy challenging and prolonged. Therefore, rapid and high-throughput platforms for assessing the quality of microbial products are in great needs. This presentation introduces the applications of microsystems in enhancing the bioenergy production using microalgae and microbial fuel cells. To expedite the enhancement of microalgal lipid production, microscale techniques for rapid screening of microalgae strains and cultivation conditions are developed and applied on the production of microalgal lipid using wastewater. The possibility of using electrorotation to measure the lipid contents in microalgae single cells is also explored under the collaboration with Prof. Bruno Le Pioufle. The enhancement of energy harvesting efficiency from microbial fuels cells is also accomplished by using a laminar flow based microfluidic assay. The improved combinations of bacteria strains and wastewater compositions are obtained in 2 hr and the Coulombic efficiency can be increased to as high as 250%.

Biography of H.Y. Wang :

Professor Hsiang-Yu (Angie) Wang is devoted to the development of microfluidic systems and high-throughput analysis for applied microbiology applications. She has published more than 40 papers in renowned and high-impact journals and her work has been cited for more than 1000 times. During her assistant and associate professorship, she has been working with several top researchers in the areas of bioenergy and biorefinery to develop optical or microfluidic techniques for rapid detection and selection of micro organisms and operation parameters. Her research group has also developed micro-scale or lab-scale detection platforms for accessing the information of energy producing processes in a timely manner. Her academic achievements have led to the award of “The Rising Star of Engineering School at National Cheng Kung University in 2013.