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台灣大學應用力學研究所
演 講 公 告

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主 講 人： 葉旻鑫助理教授
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講　　題：開發永續能源收集器與儲能元件應用於新型自供電系統：
從基礎研究至實務應用

主 持 人： 周佳靚助理教授

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☆☆ 歡迎聽講，敬請張貼 ☆☆

Developing Sustainable Energy Harvesters and Storage Devices for Emerging Self-powered Systems: from Fundamental Research to Practical Applications

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With rapid development of portable electronic devices and systems, mandatory requirements of portable, lightweight, and significantly sustainable power sources have attracted huge attention. Li-ion batteries or other energy storage devices are commonly used as a stable power supply for driving these electronic devices with small-scale energy consumption at the μW to mW level. Nevertheless, in modern personal electronics, batteries are usually the largest or heaviest component in the whole device, and moreover, the crucial problem of batteries is their limited lifetime and thus their need to be charged or replaced frequently. To conquer this problem, self-powered systems as integrated by an energy harvester and an energy storage device has been proposed and developed to simultaneously harvest and store ambient energy in the form of electricity, which opens potentials for sustainable and maintenance-free applications. Based on the coupling effect of contact electrification and electrostatic induction, triboelectric nanogenerators (TENGs) have recently been shown to be renewable and sustainable power generators for converting ambient mechanical energy into electricity. In the past few years, the output power density of TENGs has been drastically increased through several advanced material optimizations and structural design adaptations. Moreover, compared to conventional electromagnetic generators (EMGs), TENGs have the advantages of simple fabrication, reasonable robustness, and low cost, indicating their higher potential for integration with other functional devices for practical applications. By incorporating TENGs as the power supply, various types of self-powered systems have been successfully realized, such as wireless sensor networks, electrochemical reactions, chemical sensors, etc.