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臺灣大學應用力學研究所
演 講 公 告

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講　　題：Advanced bio-inspired fluid flow actuators

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☆☆ 歡 迎 聽 講 ，敬 請 張 貼 ☆☆

Advanced bio-inspired fluid flow actuators

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Impingement heat and/or mass transfer on exposed walls have been widely studied in the past. Because of very high heat/mass transfer, there are many applications in cooling, heating, and drying technologies. Despite the ability of steady impinging jets, further enhancement can be possible by a utilization of flow pulsatile effects. Synthetic jets (SJs) or the oscillating suction/blowing flows are typical fluid flows that are created from periodic pulsation. Note that pulsating fluid jets can be frequently observed in nature. Namely, the jetting process is used by various underwater creatures to generate thrust for their locomotion, e.g. jellyfish and cephalopods (squids, octopuses, and cuttlefish). However, practically all technical SJAs used rigid nozzles with constant cross-sectional areas. On the other hand the tissues of the living creatures are flexible and adjustable.

Several variants of SJAs were designed and some of them used flexible and temporally variable nozzles. The performance was experimentally tested by means of various methods including jet momentum flux measurement using a precision scale, hot-wire anemometry, phase-locked visualization, optical measurements of oscillating nozzle lips, and particle image velocimetry (PIV). The results demonstrate abilities of the bio-inspired SJAs with temporally variable nozzles because these actuators can obtain higher parameters in comparison with similar SJAs with rigid nozzles.