Abstract:
Carbon fiber reinforced plastic (CFRP) composites have a variety of engineering applications. But they usually have poor machinability and are classified as hard-to-machine materials. Industries are always under tremendous pressure to meet the ever-increasing demand for lower cost and better quality of the products made from CFRP composites.

Drilling is a very important machining process for CFRP composites. Compared to the other reported methods on drilling on CFRP composites, rotary ultrasonic machining (RUM) shows superior performance. RUM is a non-traditional machining process that combines the material removal mechanisms of diamond grinding and ultrasonic machining. It is a relatively low-cost and environment-benign process that easily fits in the infrastructure of the traditional machining environment. Other advantages of this process include high machining accuracy, superior surface finish, high material removal rate, low tool pressure, and low tool wear rate.

Experimental and theoretical investigations on RUM of CFRP composites will be presented in this seminar. In the first part, background information and introduction to RUM will be given. Then in the second part, two experimental investigations (including feasibility study and using cold air as coolant) will be discussed. Finally, a predictive cutting force model in RUM of CFRP composites will be presented.

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