

ALL ARE WELCOME

Ph.D. Seminar Talk 1

Title: **Experimental Investigation of Film Cooling Micro-Holes Machined on Aerospace Alloy using Femtosecond Laser Drilling Method**

Speaker: **Mr. Sunil Kumar (ME20D030)**

Ph.D. Research Scholar for the Department of Mechanical Engineering, IIT Madras.

Date and Time: **13-05-2026 @ 2:00 PM**

Venue: **Room No. 363, Conference Room, NAC-II &**

Link: <https://meet.google.com/eit-umae-dro>

Abstract

Micro-holes play an important role in enhancing the efficiency of gas turbines in the aerospace industry. This study focused on the fabrication of micro holes vertical to the substrate surface and at acute angles using the femtosecond laser annular drilling method. Various laser scanning modules such as horizontal scanning, vertical scanning and erode pattern scanning modules are employed in this work to machine the good quality holes at different laser processing parameters in Nickel based superalloy plates of thickness 0.5 mm, 0.68 mm and 0.9 mm. The geometrical quality characteristics such as taper angle, roundness, elliptical roundness and surface roughness is measured for all the machined features. Moreover, the surface morphology at hole entrance, exit and at the internal hole walls are assessed by using scanning electron microscope and three - dimensional hole evolution profiles are taken from laser confocal microscope. The findings of this study will provide the new prospective of laser drilling and develop the fundamental understanding of femtosecond laser drilling process.