# ABSTRACT

Jet impingement cooling is considered to be one of the better techniques of achieving an especially high heat transfer improvement and hence is employed in several engineering applications. Various ribs shapes mounted on the target surfaces can be used to achieve high thermal performance.

In the present investigation, the fluid flow, heat transfer, and entropy generation for the confined slot-jet impinging have been numerically and experimentally investigated. Three various shapes of the ribs, namely; wing, oval, and flat ribs, which installed on the impinging target plate are used. The effects of different parameters such as rib shape, heights of rib, the spacing between the stagnation point and the rib, jet Reynolds number on the heat transfer and flow fields have been presented and discussed. Validations of the numerical results with previous investigations available in the literature have been conducted and a good agreement between the results is noted. On the other hand, the numerical results have been compared with the experimental data, and good concords are achieved.

Results indicated that the average Nusselt number, pressure drop, and average total entropy generation increases when jet Reynolds number increases, rib height increases, and the spacing between the stagnation point and the rib location decreases. While the performance evaluation criteria increased with increasing rib height. It was found that the peak values of the average Nusselt number enhancement around 90.01, 74.16, and 65.34% for the wing, oval and flat ribs at rib height of 2 mm, rib location 10 mm and jet Reynolds number of 4000, 4000, and 3000, respectively. While the best performance evaluation criteria up to 1.682 which provided by the wing ribs at the rib location of 10 mm, rib height of 2 mm, and jet Reynolds number of 3000.