# SE&T Colloquium Series-Fall 2018

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| Speaker | Dr. Monayem Mazumder<br>Department of Mechanical Engineering |
| Title | ***Enhancement of Gas Pumping and Heat Transfer in a Square Channel by an EHD Gas Pump*** |
| Abstract | Former studies have shown that electric field in the form of corona wind can be used for gas pumping and heat transfer enhancement. In this study, fluid flow inside a channel by an electrohydrodynamic (EHD) gas pump is critically examined through experimental measurement and numerical simulations. First, the EHD induced flow of the pump with three different sizes of grounded electrode configurations: 0.5-inch, 1-inch, and 2-inch wide respectively is calculated for a wide range of operating voltages starting from the corona threshold voltage up to 28 kV. Subsequently, the numerical results are compared with the experimental data to validate the computational model. According to the findings, the EHD gas pump can produce and sustain gas flows with a maximum velocity of 3.4 m/s and its maximum performance of 24 L/s/W is better than conventional cooling fan. These three configurations are also investigated for their effectiveness in the enhancement of heat transfer. The influence of electric field on the flow and temperature fields is also examined for a wide range of Reynolds numbers. The Reynolds numbers considered in this study varies in a range between 100 and 2000. At Re = 100, a maximum increase of 250% in the Nusselt number is achieved. The thermal hydraulic performance parameter, (Nu/Nu0)/(f/f0), is always greater than unity. These results reveal that EHD technique has a great potential for many engineering applications, particularly for thermal management. |
| Date | Tuesday, October 2 |
| Time | 4:10-5:00pm |
| Place | Pioneer 240 |
| | Refreshments will be served at 4:00pm. |