

## HEAT TRANSFER SIMULATIONS FOR A 3D PRINTED HEAT EXCHANGER

RECEP KAHRAMAN, GAVIN TABOR

*College of Engineering, Mathematics and Physical Sciences, University of Exeter, UK*

In an automotive fuel cell system, the heat exchanger is an important factor affecting the size, weight and cost of the overall system. Therefore, CFD multiphase calculations are necessary to predict its optimum performance. Simulations including condensation and conjugate heat transfer in various complex geometries are presented here.

The developed model is used to predict the heat transfer and fluid flow behaviour of the 3D printed heat exchanger. The volume of fluid (VOF) approach is chosen to describe the two-phase flow characteristics. The model is implemented in OpenFOAM and the heat transfer coefficient is calculated for the condensing heat exchanger. Moreover, conjugate heat transfer simulations, capturing wall heat conduction, are presented. Experiments are performed by HiETA Technologies and the results are validated against the obtained data. The results are in a good agreement with the experimental data.