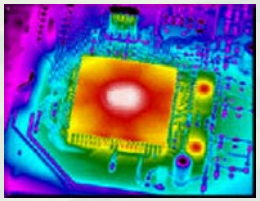


Single-Phase Microchannel Heat Sinks

Faculty: S. V. Garimella **Students: P. S. Lee & D. Liu**

Objective

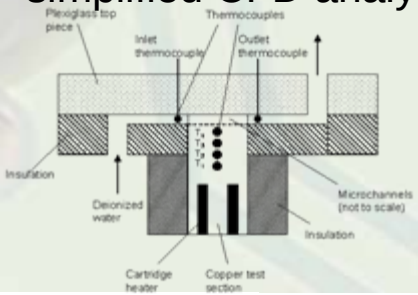
Map single-phase pressure drop and heat transfer behavior in microchannels, and assess the validity of conventional theory in predicting microchannel transport

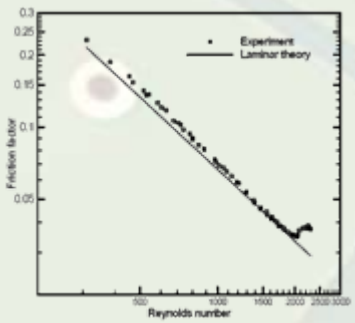
Impact

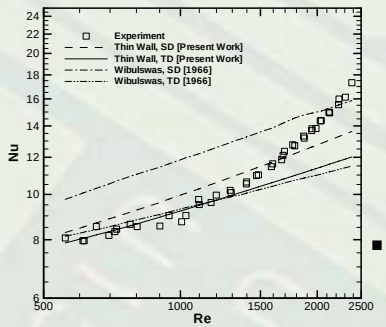
- Showed that a conventional analysis approach is applicable if the entrance and boundary conditions are correctly matched
- Developed generalized Nusselt number correlations for laminar thermally developing flow for predicting heat transfer performance in rectangular microchannels
- Devised a passive mean of modulating flow in microchannels which can lead to significant local heat transfer enhancement

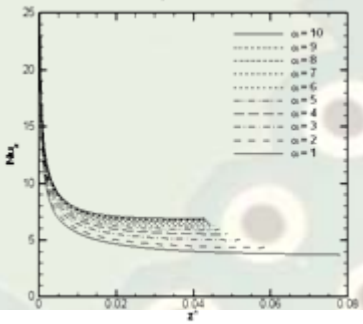
Approach

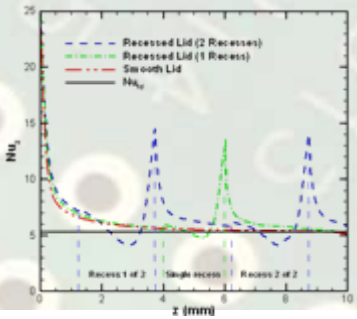
- Careful and systematic experimental investigations
- Full 3D conjugate and simplified CFD analyses











Selected Publications

- D. Liu and S. V. Garimella, *AIAA J. Thermophys. Heat Transfer* **18**:65-72, 2004.
- P. S. Lee, S. V. Garimella and D. Liu, *Int. J. Heat Mass Transfer* **48**:1688-1704, 2005.
- P. S. Lee and S. V. Garimella, *ASME IMECE*, IMECE2005-79562, 2005.
- P. S. Lee and S. V. Garimella, *Int. J. Heat Mass Transfer* **49**:3060-3067, 2006.

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