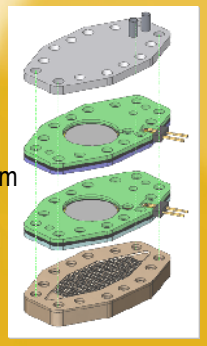
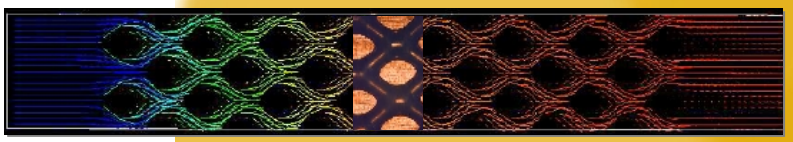
Autonomous Thermal Management System for Electronics Cooling

Technology Description:

- Self-contained liquid cooling module, including micropump
- Diamond-shaped micropin heatsink with very low thermal resistance
- Original fixed-valve piezoelectrically actuated micropump concept from Professor Fred Forster at UW
- Innovation in modifying valve geometry
- Innovation in manufacturing using PCE and flex circuit assembly

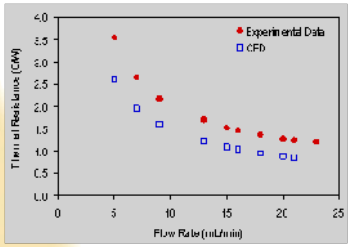


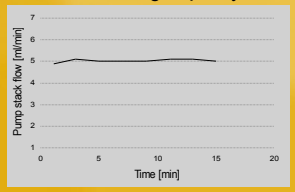


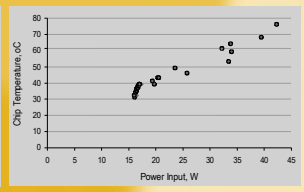
ng by Dr. David Rector, Pacific Northwest National Laboratory

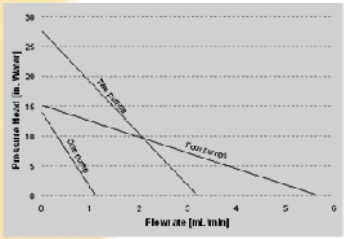
Proof and Validation:

- Low thermal resistance in single phase with low flow rate operation
- Pump flow rates of greater than 1 ml/min with 0.8-psi pressure head achieved, with total flow rate up to 6-ml/min
- Performance on P4 platform in single phase shown to work reliably and produced greater than 40-W of cooling capacity

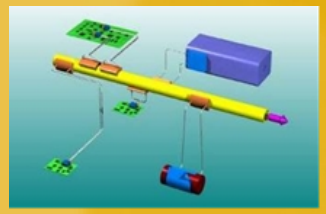








Value Proposition:



- Distributed cooling of discrete electronics
- Self-driven, active cooling system
- Independent component thermal control
- Miniaturized fully packaged drive electronics
- Compatible with variety of coolants (suspensions)
- High heat flux rate, greater than 40-W/cm^2 in single phase
- Extremely low power consumption rate for driving the micropump (<0.5-W at highest flow rate)
- Fully scaleable using a parallel arrangement
- Robust, reliable, and repeatable performance

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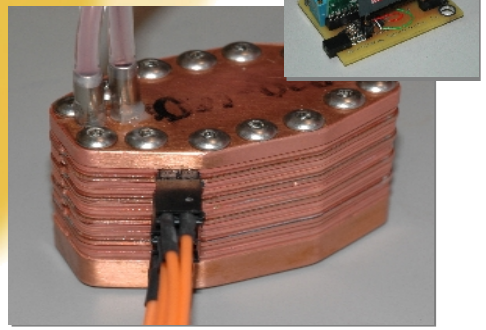
Status:

- Patent on micropump owned by UW and pending patent on manufacturing process
- Alpha prototype evaluated
- Seeking partnership for distributed cooling system integration and commercialization



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