Dong Liu

Assistant Professor, Ph.D.

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Professional Preparation

Tsinghua University, China	Thermal Engineering	B. S.	1996
Tsinghua University, China	Thermal Engineering	M. S.	1999
Purdue University	Mechanical Engineering	Ph.D.	2006

Appointments

Assistant Professor, University of Houston	2007-present
Post-doctoral Research Associate, Purdue University	2006-2007

Journal Publications (*student)

1. Li, D., Wu, G. S., Wang, W., Wang, Y. D., Liu, D., Zhang, D. C., Chen, C. F., Peterson, G. P., and Yang, R. G., Monolithic silicon-nanowire coatings for enhancing flow boiling heat transfer in microchannels, Nano Letter, in revision, (2012)
2. Vangala, K., Ameer, F., Salomon, G., Le, V., Lewis, E., Yu, L. Y.*, Liu, D. and Zhang, D., Studying protein and gold nanoparticle interaction using organothiols as molecular probes, Journal of Physical Chemistry, 116(5): 3645-3652, (2012)
3. Yu, L. Y.*, Liu, D., and Botz, F., Laminar convective heat transfer of alumina-Polyalphaolefin nanofluids containing spherical and non-spherical nanoparticles, Experimental Thermal and Fluid Science, 37(2): 72-83, (2012)
4. Sur, A.*, and Liu, D., Adiabatic air-water two-phase flow in circular microchannels, Int. J. Thermal Sciences, 53(3): 18-34, (2012)
5. Ansar, S, Haputhanthri, R., Edmonds, B., Liu, D., Yu, L. Y.*, Sygula, A. and Zhang, D., Determination of the binding affinity, packing, and conformation of thiolate and thione ligands on gold nanoparticles, Journal of Physical Chemistry, 115(3): 653-660 (2011).
6. Liu, D., and Yu, L. Y.*, Single-phase thermal transport of nanofluids in a minichannel, Journal of Heat Transfer, 133(3): 031009 (2011).
7. Liu, D., and Garimella, S. V., Microfluidic pumping based on traveling-wave dielectrophoresis, Nanoscale and Microscale Thermophysical Engineering, 13(2):109-133 (2009).
8. Garimella, S. V., and Liu, D., Microscale thermal transport and electromechanical microfluidic actuation, Journal of Enhanced Heat Transfer, 16(3):1-30 (2009).
9. Liu, D., and Garimella, S. V., Flow boiling heat transfer in microchannels, Journal of Heat Transfer, 129(10):1321-1331 (2007).
10. Garimella, S. V., Singhal, V., and Liu, D., On-chip thermal management with microchannel heat sinks and integrated micropumps, Proceedings of the IEEE, (invited paper), 94(8):1534-1548 (2006).
11. Liu, D., Lee, P. S., and Garimella, S. V., Prediction of the onset of nucleate boiling in microchannel flow, International Journal of Heat Mass Transfer, 48(25):5134-5149 (2005).

12. Liu, D., Lee, P. S., and Garimella, S. V., Nucleate boiling in microchannels, Journal of Heat Transfer, 127(8):803 (2005).
13. Liu, D., Garimella, S. V., and Wereley, S. T., Infrared micro-particle velocimetry in silicon-based microdevices, Experiments in Fluids, 38(3):385-392 (2005).
14. Lee, P. S., Garimella, S. V., and Liu, D., Investigation of heat transfer in rectangular microchannels, International Journal of Heat Mass Transfer, 48(9):1688-1704 (2005).
15. Liu, D., and Garimella, S. V., Analysis and optimization of the thermal performance of microchannel heat sinks, International Journal of Numerical Methods for Heat and Fluid Flow, 15(1):7-26 (2005).
16. Liu, D., and Garimella, S. V., Investigation of fluid flow in microchannels, AIAA Journal of Thermophysics and Heat Transfer, 18(1):65-72 (2004).
17. Peng, X. F., Liu, D., and Lee, D. J., Dynamic characteristics of microscale boiling, Heat and Mass Transfer, 37:81-86 (2001).
18. Peng, X. F., Liu, D., Lee, D. J., Yan, Y., and Wang, B. X., Cluster dynamics and fictitious boiling in microchannels, International Journal of Heat Mass Transfer, 43(23):4259-4266 (2000).

Paper Submitted/in Preparation

1. He, G. L., and Liu, D., Coupled electrohydrodynamic-dielectrophoretic pumping of colloidal suspensions in a microchannel, submitted to Int. J. Micro- Nanoscale Thermal Fluid Transport Phenomena, (2012)
2. Chen, F., He, G. L., Liu, D., Liu, L., and Song, Y., Dynamics of a single boiling bubble in a DC electric field, to be submitted to Experimental Thermal Fluid Science, (2012)
3. Sur, A., and Liu, D., Experimental and numerical investigation of two-phase patterns in a cross-junction microfluidic chip, to be submitted to Microfluidics Nanofluidics, (2011)
4. Chen, F., Sur, A., and Liu, D., Comparison of droplet and bubble dynamics on hydrophobic and hydrophilic surfaces, Langmuir, (2011)

Book

Liu, D., and Garimella, S. V., *Thermal Transport in Microchannels: Single-Phase and Two-Phase Fluid Flow and Heat Transfer*, ISBN: 3639117034, VDM Verlag, 2009.

Book Chapters

1. Liu, D., and Garimella, S. V., "Electromechanical Actuation of Nanofluids", in *Nanoparticles: Synthesis, Characterization and Applications*, Ramesh S. Chaughule (ed.), American Scientific Publishers, 2009.
2. Liu, D., and Garimella, S. V., "Cooling Techniques for Electronic Devices", (in review), in *Encyclopedia of Life Support Systems* (EOLSS), EOLSS Publishers, 2012.

Conference Publications

1. Yu, L. Y., and Liu, D., A study of thermal transport of nanofluids and their suitability for electronic cooling (invited), *International Microelectronics and Packaging Society (IMAP) Advanced Technology Workship on Thermal Management*, Palo Alto, California, 2011.
2. Yu, L. Y., Liu, D., and Botz, F., Laminar convective heat transfer of alumina-Polyalphaolefin nanofluids containing spherical and non-spherical nanoparticles, *ASME 2011 Pacific Rim Technical Conference & Exposition on Packaging and Integration of Electronic and Photonic Systems (InterPACK)*, Portland, Oregon, 2011.
3. He, G. L., and Liu, D., Coupled electrohydrodynamic-dielectrophoretic pumping of colloidal suspensions in a microchannel, *9th International Conference on Nanochannels, Microchannels, and Minichannels*, Edmonton, Canada, 2011.
4. Sur, A., and Liu, D., Adiabatic air-water two-phase flow in circular, *9th International Conference on Nanochannels, Microchannels, and Minichannels*, Edmonton, Canada, 2011.
5. Liu, D., and Yu, L. Y., Experimental investigation of single-phase convective heat transfer of nanofluids in a minichannel, *14th International Heat Transfer Conference*, Washington, D. C., 2010.
6. Sur, A., and Liu, D., Experimental and numerical investigation of two-phase patterns in a cross-junction microfluidic chip, *8th International Conference on Nanochannels, Microchannels, and Minichannels*, Montreal, Canada, 2010.
7. Yu, L. Y., and Liu, D., Single-phase thermal transport of nanofluids in a minichannel, *ASME International Mechanical Engineering Congress and Exposition*, Orlando, Florida, 2009.
8. Liu, D., and Sur, A., Two-phase flow with surfactants in a microchannel, *ASME Summer Heat Transfer Conference*, San Francisco, California, 2009.
9. Liu, D., and Garimella, S. V., Microfluidic pumping based on dielectrophoresis for thermal management of microelectronics, *11th Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems* (ITHERM), Orlando, Florida, 2008.
10. Garimella, S. V. and Liu, D., Microscale thermal transport and electromechanical microfluidic actuation, (Keynote), *19th National and 8th ISHMT-ASME Heat and Mass Transfer Conference*, Hyderabad, India, 2008.
11. Liu, D., and Garimella, S. V., Flow boiling in a microchannel heat sink, *ASME International Mechanical Engineering Congress and Exposition*, Orlando, Florida, 2005.
12. Liu, D., Lee, P. S., and Garimella, S. V., Nucleate boiling in microchannels, Photogallery in *ASME International Mechanical Engineering Congress and Exposition*, Anaheim, California, 2004.
13. Liu, D., Garimella, S. V., and Wereley, S. T., Infrared micro-particle velocimetry of fluid flow in silicon-based microdevices, *ASME Heat Transfer/Fluids Engineering Summer Conference*, Charlotte, North Carolina, 2004.
14. Singhal, V., Liu, D., and Garimella, S. V., Analysis of pumping requirements for microchannel cooling systems, *International Electronic Packaging Technical Conference and Exhibition*, Maui, Hawaii, 2003.
15. Liu, D. and Garimella, S. V., Optimization of the thermal performance of microchannel heat sinks, *International Electronic Packaging Technical Conference and Exhibition*, Maui, Hawaii, 2003.
16. Liu, D., and Garimella, S. V., Experimental investigation of fluid flow in microchannels, *the 8th AIAA/ASME Thermophysics and Heat Transfer Conference*, St. Louis, Missouri, June 2002.

Patent

Liu, D., and Garimella, S. V., Microfluidic Pumping based on Dielectrophoresis, U.S. patent application No. 12/194,913

Invited Presentations

Tsinghua University, Beijing, China, May 2011.
Beijing Jiaotong University, Beijing, China, May 2011.
Huawei Technologies, Plano, TX, October 2010.
University of Colorado, Boulder, Co, Dept. Mechanical Engineering, September 2010.
University of Texas, Depart. Material Science and Engineering, Arlington, TX, October 2008.
University of Houston, Dept. Mechanical Engineering, Houston, TX, April 2007.
Binghamton University, Dept. Mechanical Engineering, Binghamton, NY, April 2007.
Rutgers University, Dept. Mechanical Engineering and Aerospace, Piscataway, NJ, March 2007.
Stony Brook University, Dept. Mechanical Engineering, Stony Brook, NY, March 2007.
University of Missouri, Dept. Mechanical Engineering and Aerospace, Rolla, MO, March 2007.
University of Arizona, Dept. Aerospace and Mechanical Engineering, Tucson, AZ, April 2006.
University of Illinois, Dept. Mechanical and Industrial Engineering, Urbana Champaign, IL, Feb 2006.
Clemson University, Dept. of Mechanical Engineering, Clemson, SC, Feb 2006.
Purdue University, School of Mechanical Engineering, West Lafayette, IN, Nov 2005.

Teaching

MECE 4364 Heat Transfer
MECE 4371 Thermal Fluids Laboratory
MECE 6335 Heat Transfer with Phase Change
MECE 7397 Microscale Thermal Transport Phenomena

Service

Undergraduate Academic Affairs Committee, 2011-present
Faculty Search Committee for Thermal Science, 2011-present

Current Students

Leyuan Yu (Ph.D.), Guliang He (Ph.D.), Aritra Sur (Ph.D.), Feng Chen (Post-doctoral)
Vani Aparna Peri (M.S.), Ravi Teja (M.S.), Varad Gaikwad (M.S.)
Yu Deng (Undergraduate), Yang Sun (Undergraduate)

Affiliations

ASME

Proposal Review

1. DOE, Office of Workforce Development for Teachers and Scientists (WDTS), Office of Science, Graduate Fellowship Program, April, 2012.
2. NSF, Chemical Bioengineering, Environmental and Transport Systems (CBET), Dr. Theodore Bergman, April, 2009, Washington, DC.

3. American Institute of Biological Sciences (AIBS), external reviewer, "New Biomimetic Technology for "Just-In-Time" Delivery of Anti-Convulsants Following Traumatic Brain Injury", June, 2009.

Conference Organization

1. Session co-chair on "Microchannels and Heat Pipes II", ASME *2011 International Mechanical Engineering Congress & Exposition (IMECE)*, Denver, Colorado, 2011.
2. Session chair on "Interfacial Thermal Behavior at Micro/Nano Scales", *11th Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems* (ITHERM), Orlando, Florida, 2008.

Journal Review

Journal of Heat Transfer, International Journal of Heat and Mass Transfer, Experiments in Fluids, Journal of Micromechanics and Microengineering, Journal of Physics, Nanotechnology, Experimental Thermal and Fluid Science, Microfluidics and Nanofluidics, International Journal of Thermal Sciences, Heat Transfer Engineering, IEEE Transaction on Components and Packaging Technologies, International Journal of Refrigeration, Journal of Thermophysics and Heat Transfer, Journal of Enhanced Heat Transfer, Energy and Fuels, Journal of Biomicrofluidics, Journal of Thermal Science and Engineering Applications, ASHRAE Journal, Waste Management Research, Journal of Natural Gas Science and Engineering

Funded Research

1. Magnetic Directed Alignment of Injectable Neural Stem Cell Scaffold for Regeneration after Spinal Cord Injury, **PI** (Co-PIs: Q. L. Cao and L. Sun), CBET, National Science Foundation (NSF), $390,000 (2011-2014)
2. Magnetic Self-Assembly of Linear Chain Lattices of Neural Stem Cells Labeled with Magnetic Cationic Liposome for in vivo Spinal Cord Nerve Regeneration without Using Scaffold, **PI** (Co-PIs: Q. L. Cao and L. Sun), U. S. Army Medical Research and Material Command's Telemedicine and Advanced Technology Research Program (TATRC), Methodist Hospital Research Institute, $150,000 (2011-2013)
3. Study of Colloidal Electrohydrodynamics for Dielectrophoresis-Directed Fluidic Assembly of Nanostructures, **PI**, CMMI, National Science Foundation (NSF), $175,000, (2009-2012)
4. Design and Develop Magnetic Nanostructures for Multiplexing MRI Diagnostics, Co-PI (PI: L. Sun), Alliance for Nanohealth (ANH), $120,000 (2009-2012).
5. Electromechanical transport of nanofluids: microfluidic pumping and heat transfer enhancement, **PI**, (Co-PI: S. Garimella), NSF Cooling Technologies Research Center (CTRC), $80,000 (2008-2009).
6. Magnetically-Assisted Fabrication of Thin Film Nanocomposites with Tunable Thermal Conductivity as Thermal Interface Materials, **PI** (Co-PI: L. Sun), Texas Center for Superconductor at University of Houston (TcSUH), $20,000 (2008-2009).