MANOJKUMAR LOKANATHAN, M.Sc.

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OBJECTIVE

- Full time position with focus on thermal/microfluidics/energy systems

SUMMARY

- Research experience in microfluidics, thermal management, two-phase flow and micro/nanofabrication.
- Comfortable with experiments, analysis and numerical simulations
- 7 journal articles (2 under review), 3 conference proceedings

SKILLS & EXPERTISE

MATLAB, Python, FLUENT, ANSYS ICEM, CATIA, NX, EES, OriginPro, LabVIEW, Image processing, Data acquisition, Data analytics, Optical diagnosis, High-speed imaging, High voltage dielectrophoresis (DEP), Electro-wetting on dielectrics (EWOD), Microchannel fluidics, Microscopy, Thin-film coating (spin coating), UV curing coating, Wet-chemical etching, plasma etching, 3-D print fabrication & laser-cut fabrication, Photolithography, Machining, Troubleshooting, Environmental scanning electron microscopy (ESEM), Surfactants

EDUCATION

PhD in Mechanical Engineering (specialization in Thermal Fluid Sciences) **Aug16 – Present**

- The University of Texas at Austin

Master of Science in Mechanical Engineering **Jan15 – May16**

- Purdue University

Bachelor of Science in Mechanical Engineering **Aug09 – Dec13**

- Purdue University
  - Minor in Economics & Computer Graphics Technology

RESEARCH EXPERIENCE

Ph.D., UT Austin, USA **Jan17 – Present**

T**itle of expected PhD dissertation**: Wettability control of water droplets through surface engineering, surfactants & electrowetting

- Analyzed wettability alteration of water and oil droplets via passive (surface engineering, surfactants) and active (electrowetting) techniques
- Conducted experiments and modeled (MATLAB) dielectrophoresis in a 3-liquid configuration.
  - Collaboration with Prof. Bonnecaze (UT Austin – CPE)
- Quantified enhanced wettability achieved via the use of surfactants and electrowetting
  - Collaboration with Prof. Mohanty (UT Austin – PGE)
- Investigating electrocoalescence of water droplets in alkane with interdigitated ITO electrodes
  - Studying effects of interfacial tension, viscosity, inertia, and system capacitance on droplet-droplet interaction
  - Culmination of photolithography, plasma etching, emulsion chemistry, surfactant wettability, dielectrophoresis and image processing techniques

Another significant project during PhD dissertation: Understanding the impact of nanocomposite polymeric encapsulants on packaging of power electronics modules

- Running thermal simulations of power electronic module through UT Austin's supercomputer (TACC)
- Machine learning analysis of simulation data to understand thermal effect of nanocomposite encapsulants
- Lifetime modeling of electronics modules by coupling electrical, thermal and mechanical parameters

M.Sc., Purdue University, USA **Jan15 – Jul16**

- Analytically modelled flow transition criteria for vertical downward two-phase flow
- Model is crucial to predict loss of coolant accident (LOCA) scenarios in high pressure nuclear power plants
- Achieved 20% higher accuracy with new model as compared to literature

B.Sc., Purdue University, USA **Aug12 – Dec13**

- Designed a water heater that used recycled water; attained 10% higher efficiency than conventional system
- Calibrated thermocouples & pressure transducers for the data acquisition (DAQ) system in LabVIEW
- Designed & optimized a compressor model for a CO_2 refrigerant system using MATLAB

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PROFESSIONAL EXPERIENCE

Research & Development Intern, Pattern Bioscience, Inc., USA **Nov20 – Mar21**
- Researched surface & emulsion chemistry effects on droplet distribution in microchannel cells
- Improved droplet distribution by understanding curing intensity and thermal effects
- Built a holistic, data analytics approach in quantifying the effects of surfactants on droplet emulsion stability

Reliability Intern, Magnetation, Inc., USA **Mar14 – Nov14**
- Carried out calibration of electrical and automation hardware for a mining plant start-up
- Performed safety checks and mechanical cold commissioning of mining plant

Sergeant (Active Battalion), Singapore Armed Forces, Singapore **Jan07 – Nov08**
- Selected to undergo a leadership-training course with the Infantry Specialist Training School
- Managed a team of 30 people of diverse cultures, ethnicity, religion and skill sets

TEACHING EXPERIENCE

Teaching Assistant, UT Austin **Aug16 – Dec18**
- Held discussion and review sessions for undergraduate Heat Transfer course (150 students)

ACADEMIC ACTIVITIES

Graduate Engineering Council, UT Austin
- President **Apr19 – Apr20**
- Activities Director, Financial Director **Aug17 – Aug19**

EXCHANGE PROGRAMS

University Research Internship, Shanghai Jiao Tong University, China **June12 – Aug12**
- Gained knowledge on Chinese culture and country

SENSE Summer Program, Technical University of Braunschweig, Germany **June11 – Aug11**
- Completed courses in German language and culture, and vehicle dynamics

AWARDS & COMMUNITY SERVICES

- Recipient of Philip C. & Linda L. Lewis Foundation Graduation Fellowship in Mechanical Engineering (2020)
- Committee Chair of Diversity, Equity & Inclusion committee (2019-2020)
- Recipient of Professional Development Award, ASME IMECE conference, Salt Lake City, UT (2019)
- Recipient of Professional Development Award, ASME IMECE conference, Pittsburgh, PA (2018)
- Graduate Engineering Council in *Introduce a Girl to Engineering Day/Explore UT* (2018, 2019) - Participation

PUBLICATIONS

- Journal Papers

J1. **Lokanathan, M**. & Hibiki, T., 2016. Flow regime, void fraction and interfacial area transport and characteristics of co-current downward two-phase flow. *Nuclear Engineering and Design*, 307, pp. 39–63.

J2. **Lokanathan, M**. & Hibiki, T., 2017. Flow regime transition criteria for co-current downward two-phase flow. *Progress in Nuclear Energy*, 103, pp. 165–175.

J3. **Lokanathan, M.**, Wikramanayake E. & Bahadur V., 2019. Scalably manufactured textured surfaces for controlling wettability in oil-water systems. *Materials Research Express*, 6, 046507.

J4. **Lokanathan, M**., Himanshu, S., Mostafa, S., Mohanty, K. & Bahadur, V., 2020. Comparing electrowettability and surfactants as tools for wettability enhancement on a hydrophobic surface. *Colloids & Surfaces A: Physiochemical & Engineering Aspects*, 124155.

J5. **Lokanathan,** M., Acharya, P., Ouroua, A., Strank, S., Hebner, R. & Bahadur, V., 2020. Review of nanocomposite dielectric materials with high thermal conductivity. *Proceedings of IEEE* (under review).

J6. Acharya, P., **Lokanathan**, M., Ouroua, A., Hebner, R., Strank, S. & Bahadur, V., 2021. Machine learning -based predictions of benefits of high thermal conductivity encapsulation materials for power electronics packaging. ASME Journal of Electronic Packaging (under review)

• Conference Papers

C1. **Lokanathan, M**., Wikramanayake, E., Bonnecaze, R. & Bahadur, V., 2018. Dielectrophoretic control of a droplet at the interface of two liquids in a three-liquid system. *Proceedings of the ASME 2018 International Mechanical Engineering Congress & Exposition.*

C2. **Lokanathan, M**., Himanshu, S., Mostafa, S., Mohanty, K. & Bahadur, V., 2019. Comparing electrowettability and surfactants as tools for wettability enhancement on a hydrophobic surface. *Proceedings of the ASME 2019 International Mechanical Engineering Congress & Exposition*.

C3. Acharya, P., **Lokanathan, M**. & Bahadur, V., 2020 Assessing the impact of novel polymers and thermal management in a power electronics module using machine learning approaches. *ITherm 2021*

• Other publications

J7. Bahadur, V., Ouroua, A., Acharya, P., **Lokanathan, M.**, Strank, S. & Hebner, R., 2020. New materials for emerging electrical environments – workshop report. *IEEE Electrical & Insulation Magazine*, 36, pp. 61-63.