Piyush Kulkarni

Graduate Student

Vestal, NY

LinkedIn

Education

SUNY Binghamton University,
Binghamton, NY
PhD Candidate,
Mechanical Engineering
Current

Arizona State University
Tempe, AZ
M.S in Mechanical Engineering
2018

Birla Institute of Technology and Science, Pilani – Goa Campus
Goa, India
B.E(Hons.) in Mechanical Engineering
2014

Research Interests

- Thermal interface materials
- Non-destructive testing using thermal characterization
- Thermal management for semiconductor/electronics packages
- Nano/Micro scale Heat transfer
- Additive Manufacturing
- Mechanical Product Design

Thermal-Mechanical Engineer

I am a mechanical engineer with an expertise in thermal management in semiconductor and electronic packages, non-destructive testing using experimental techniques in heat transfer and fluid flow. I have experience in additive manufacturing and mechanical product design testing using experimental and numerical techniques.

Work Experience

SUNY Binghamton University, Binghamton, NY
Graduate Research Assistant June 2022 - Current

- Optimization of reflow process for Indium-Silver alloy solder TIM (TIM0/TIM1) using an inline vacuum chamber (in Collaboration with Advanced Process Labs, Universal Instruments Corporation.)
- Reliability study of Indium based solder for TIM0/TIM1 application under temperature cycling(in Collaboration with Advanced Process Labs, Universal Instruments Corporation.).
- IR image-based imaging for stability/reliability analysis of TIM-1 polymer materials.
- Spatial thermal conductivity analysis of 3D printed aluminum using Frequency Domain Thermo-reflectance (FDTR).
- Investigation of interfacial thermal properties of 3d printed and conventionally deposited silicide.
- Prediction of junction temperature using semiconductor packages through modulated heating in computational elements.

SUNY Binghamton University, Binghamton, NY
Teaching Assistant August 2020 - May 2022

- Assisting faculty and students with coursework, assignments and examinations and projects in Heat Transfer, Mechanical engineering design and Additive manufacturing.

SUNY Binghamton University, Binghamton, NY
Graduate Research Assistant January 2020 - August 2020

- Nondestructive techniques to infer effective thermal conductivity and junction temperature in semiconductor packages.
- Thermal characterization of Li-ion battery cathode(in-situ and ex-situ) using Frequency Domain Thermo-reflectance (FDTR).
- Thermal Flash Diffusivity based testing of 3d printed composite polymer materials with metal fillers.

Hardware Tools

- CVD Sputtering
- Frequency Domain Thermoreflectance
- Scanning Acoustic Microscope
- Thermal Flash Diffusivity
- Tranient Hotwire
- X-Ray Imager/CT scanner
- CVD E-beam/Thermal Evaporation
- Differential Scanning Calorimetry
- Rapid thermal Processing/Annealing
- Shadow Moiré
- Battery Construction and Operation
- Laser Powder bed Fusion printing
- Mechanical Shear Tester
- Mechanical Tensile Tester
- Microtome Polisher
- Optical profilometer
- Thermo-Gravimetric analysis
- Ion Etching/Milling
- Powder size analyzer
- Scanning Electron Microscope
- Microtome polishing
- Ion milling polishing

Arizona State University, Tempe, AZ
Graduate Service Assistant August 2017 - May 2018

- Assisting faculty and students with general coursework, assignments and examinations for MATLAB training.
- Interact with 150 students regarding user defined inputs and data file handling concepts.

Bitmapper Integration Technologies Pvt. Ltd., Pune, IN
Mechanical Design Engineer, June 2014 - June 2016

- Designed high performance electronics packaging solutions for thermal, structural and EMI/EMC.
- Implemented use of two resistance thermal modeling by block and plate method as per JESD 15-3 standard in ANSYS for thermal simulation improving accuracy by 5% for electronic product enclosures.
- Contributed to project planning and management initiative with use of planned, limited optimization, DFMEA analysis cycles to save 5% time for design phase.

Tata Toyo Radiators Ltd.(Tata Auto Comp Pvt. Ltd.), Pune, IN
Mechanical Intern, June 2013-December 2013

- Assisted in the deployment of alternative material usage for sheet metal components in radiators for automobile, electric generator to reduce costs by 3-5%
- Conducted PPAP tests for sheet metal and pressure die casting components at vendor sites and collaborated results with Quality, Operations and Design department.

Mormugao Port Trust, Goa, IN
Mechanical Intern, May 2012-July 2012

Participating in analysis of controls system built for the internal transport of raw material from stored location to the ship, that is the conveyor belt system for internal transport of iron ore.

Publications(Google Scholar)

- Azizi, Arad, Fatemeh Hejripour, Jacob A. Goodman, Piyush A. Kulkarni, Xiaobo Chen, Guangwen Zhou, and Scott N. Schiffres. "Process-Dependent Anisotropic Thermal Conductivity of Laser Powder Bed Fusion AlSi10Mg: Impact of Microstructure and Aluminum-Silicon Interfaces." *Rapid Prototyping Journal* 29, no. 6 (June 2, 2023): 1109–20.https://doi.org/10.1108/RPJ-09-2022-0290.

Software Tools Used

Strategic Planning ● Problem Solving ● Data Analysis ● Communication ● Leadership ● Collaboration

Profit & Loss ● Project Planning ● Project Management ● Research & Development ● Process Control

Statistical Analysis ● Manufacturing ● Thermal Testing ● Cross-functional Team ● Engineering

- Kulkarni, Piyush, Zechen Zhang, Fatemeh Hejripour Rafsanjani, Je-Young Chang, Bahgat Sammakia, and Scott Schiffres. “Non-Destructive Evaluation of Thermal Interface Materials Using Modulated Heating of Selective Cores.” In *2022 21st IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (iTherm)*, 1–6. San Diego, CA, USA: IEEE, 2022. https://doi.org/10.1109/iTherm54085.2022.9899581.
- Zhang, Zechen, Piyush A Kulkarni, Matthias Daeumer, Ahmad Gharaibeh, Je-Young Chang, Bahgat Sammakia, and Scott Schiffres. “Spatial Thermal Conductivity Variation of Particulate-Filled Thermal Interface Materials.” In *2022 21st IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (iTherm)*, 1–7. San Diego, CA, USA: IEEE, 2022. https://doi.org/10.1109/iTherm54085.2022.9899581.
- P. A. Kulkarni, K.P. Shete, S. Jogdankar, R.S. Patil, “Effect of Barrel Wall Fin of the Cyclone Separator on Fluid Dynamic Characteristics”,5th International and 41st National Conference on Fluid Mechanics and Fluid Power, Indian Institute of Technology Kanpur, India,12th December – 14th December 2014.
- K.P. Shete, P. A. Kulkarni, R.S. Patil, “Computational Studies on Effects of Novel Geometries of Distributor Plates on Fluid Dynamics Characteristics of Circulating Fluidized Bed Riser”, 5th International and 41st National Conference on Fluid Mechanics and Fluid Power, Indian Institute of Technology Kanpur, India,12th December – 14th December 2014.
- R. Jain, M. Dasar, P.A. Kulkarni, R. S. Patil, “Investigation on Fluid Dynamic Characteristics of Square Barrel Wall Fins on Efficiency of a Cyclone Separator”, 5th International Conference on Advances in Energy Research, Indian Institute of Technology Bombay, India,15th December – 17th December 2015.