Pratik Nimbalkar

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EDUCATION

- **Georgia Institute of Technology** **Atlanta, GA**
  Doctor of Philosophy in Materials Science & Engineering *August 2018-Present*
  GPA: 3.89/4.0
- **College of Engineering, Pune (COEP)** **Pune, India**
  Bachelor of Technology (B. Tech.) in Metallurgy & Materials Science *August 2013 - May 2017*
  GPA: 8.94/10

SKILLS

- **Design and Simulation:** Solidworks, Pro Engineer, ANSYS
- **Fabrication & Processing:** Photolithography, Sputtering, Reactive Ion Etching, Electroless/electrolytic plating
- **Characterization & testing:** XPS, SEM, TEM, XRD, UV-Vis, FTIR, Shadow moiré, Reliability testing (HAST, TCT)
- **Miscellaneous:** Microsoft Office, AutoCAD, LaTex, Origin

RESEARCH EXPERIENCE

- **Graduate Research Assistant** **Atlanta, GA**
  Packaging Research Center, Georgia Institute of Technology *August 2018-Present*
  Advisors- Prof. Rao Tummala, Prof. Madhavan Swaminathan

  2.5D Glass interposer for High Performance Computing
  - Working on 2.5D Glass interposers as alternative to Si interposers. The proposed glass interposer package has lower R & C losses, higher bandwidth (225 IO/mm/layer), relatively large body size (2000 mm^2) and lower cost. Tunable CTE of glass enables to achieve better thermomechanical reliability without an intermediate package substrate.

  Design & Demonstration of electrical and mechanical reliability of 1-micron RDL
  - Working on 1-micron multilayer polymer RDL for ultra-high bandwidth (>2 Tbps) computing applications. Polymer RDL with ultralow-k (D_k<2.5) polymer dielectrics, high IO density (>500 IO/mm/layer), high aspect ratio (>1.5) and enhanced electrical and mechanical reliability.
- **Research Intern** **Singapore**
  NUS Nanoscience & Nanotechnology Institute (NUSNNI) *June 2017 - September 2017*
  - Studied metal-to-insulator transition in VO_2 polymorph thin films for applications in electrical switching.
  - A, B & M phases were synthesized using Pulsed Laser Deposition (PLD). Vanadium and Oxygen arrival rates were controlled by varying laser frequency and oxygen pressure respectively to obtain desired VO_2 phase
  - Characterization using XRD, Raman spectroscopy & XRR and studied electrical and transport properties.
- **Research Intern** **Pune, India**
  National Chemical Laboratory (NCL), Physical & Materials Chemistry Division *December 2015 - May 2017*
  - Worked on water-based Magnetite (Fe_3O_4) Nanofluids for heat transfer applications.
  - Studied effects of various surfactants and ceramic coatings in order to maximize the heat transfer characteristics. Effects of variation of concentration, magnetic field and temperature were also studied.
- **Research Assistant** **Pune, India**
  College of Engineering, Pune *January 2016 -May 2017*

- Developed Polycarbonate/Graphene nanocomposites for EMI shielding. Low cost, high EMI shielding nanocomposites were prepared by a facile solution method followed by hot-compaction.
- Achieved commercial criteria of EMI shielding effectiveness 35 dB at a very low graphene volume fraction (<0.037) with 0.413 S/m electrical conductivity.

WORK EXPERIENCE

- **COEP Satellite Project** *March 2015 – December 2016*
  - Worked on developing a nanosatellite with an aim to demonstrate orbit maneuvering using solar sail.
  - Worked in 'structure subsystem' that deals with structural design, materials selection & treatment, deployment mechanisms, vibration & thermal simulations, testing and fabrication of satellite.
  - Led structure subsystem involving a team of seven students during my senior year.

PUBLICATIONS

- **Pratik Nimbalkar**, Fuhan Liu, Atom Watanabe…Madhavan Swaminathan & Rao Tummala. Fabrication and reliability demonstration of 5µm redistribution layer using low-stress dielectric dry film, 2020 IEEE 70th Electronic Components and Technology Conference (ECTC), pp. 62-67.
- Fuhan Liu, Rui Zhang, Bartlet H. DeProspo, Shreya Dwarakanath, **Pratik Nimbalkar**…Rao R. Tummala & Madhavan Swaminathan. Advances in High Performance RDL Technologies for Enabling IO Density of 500 IOs/mm/layer and 8-µm IO Pitch Using Low-k Dielectrics, 2020 IEEE 70th Electronic Components and Technology Conference (ECTC), pp. 1132-1139.
- Rao Tummala, Bartlet Deprospo, Shreya Dwarakanath, Siddharth Ravichandran**, Pratik Nimbalkar**, Nithin Nedumthakady & Madhavan Swaminathan. Glass Panel Packaging, as the Most Leading-Edge Packaging: Technologies and Applications, 2020 Pan Pacific Microelectronics Symposium (Pan Pacific)
- Shreya Dwarakanath, Kimiyuki Kanno, **Pratik Nimbalkar**, Mohanalingam Kathaperumal, Raj Pulugurtha, Rao R. Tummala & Madhavan Swaminathan. Dielectric materials for next-generation high-performance computing needs, (submitted)
- **Pratik Nimbalkar**, Amit Korde, R.K. Goyal. Electromagnetic interference shielding of PC/GNP nanocomposites in X-band, Materials Chemistry and Physics, vol 206 (2018) 251-258.

PRESENTATIONS

- Oral presentation: Fabrication and reliability demonstration of 5µm redistribution layer using low-stress dielectric dry film, 2020 IEEE 70th Electronic Components and Technology Conference (ECTC), June 2020.
- Poster & Oral presentation: 2.5D Glass Interposer: Application Test vehicles, November Industry Advisory Board (IAB) meeting, Atlanta, GA, November 2019.
- Poster Presentation: Design & Demonstration of 2.5D Glass Interposer with 2-micron multilayer RDL, Poster, May Industry Advisory Board (IAB) meeting, Atlanta, GA, May 2019.

HONORS & AWARDS

- **Recipient of J. N. Tata Endowment Scholarship** *2018*
  Awarded to outstanding Indian students pursuing higher education abroad
- **Gandhian Young Technological Innovation Award** *2017*
  Awarded for 'Swayam'- a passively stabilized student satellite