Shrink Polymer M/NEMS: Manufacturing from Micro to Nano

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Polymer shrinkage becomes a new approach to do lithography and generate smaller structures by reforming larger pre-patterned structures. The facile polymer fabrication approach by embossing and thermoplastic shrinkage aims to do lithography in a nanoscale or reduce the feature size and dramatically increase the aspect ratio of imprinted microstructures. The shrinkage capability of embossed microstructures is reserved by molding at low temperatures for less cycle time. Embossed patterns are activated for shrinkage by removing projected structures and heating at higher temperatures. The final structures are defined with the shape of removed materials before shrinking polymer materials. Both two- and three-dimensional embossed structures were successfully shrunk into much smaller scale. This polymer-shrinking process brings a new way to extend the fabrication capability of polymer embossing process. This talk will present shrink polymer for nanolithography, high-aspect-ratio microstructures, and biosensors for medical applications.

Biography:

Tianhong Cui is currently the Distinguished McKnight University Professor at the University of Minnesota. He is a Professor in Mechanical Engineering and an Affiliate Senior Member in Department of Electrical Engineering and Department of Biomedical Engineering. He is a Distinguished Visiting Fellow of the Royal Academy of Engineering in UK. He is a Fellow of American Society of Mechanical Engineering (ASME).

His research area is MEMS. He has more than 310 archived publications in scientific journals and prestigious conferences. He received awards including the STA & NEDO Fellowships in Japan, the Alexander von Humboldt Fellowship in Germany, the Research Foundation Award from Louisiana Tech University, the Richard & Barbara Endowed Chair and the Distinguished McKnight University Professorship from the University of Minnesota, the Distinguished Visiting Professorships from University of Paris East, the Distinguished Visiting Fellowship from the Royal Academy of Engineering in UK, the Outstanding Editor Award from Nature Publishing Group, and numerous best paper awards. He is the founding Executive Editor-in-Chief for Nature journal, Microsystems & Nanoengineering. He is also serving as the founding Editor-in-Chief for the first AAAS/Science Partner Journal titled Research.