

MS and PhD Openings in Panat Lab, Carnegie Mellon University, Pittsburgh PA

Panat Lab in the Department of Mechanical Engineering at CMU has several MS and PhD positions open for fall 2017. More information about the positions is provided below:

- a) **Sensors:** We are seeking highly motivated MS candidates with ME or MatSci background to carry out research on 3-D printed sensors for extreme environments. Printing of functional nanoparticles at a scale of microns has opened up several unique possibilities of making high performance physical and chemical sensors to detect strain, temperature, gases etc. This project involves the fabrication and performance evaluation of such sensor devices for temperatures up to several hundred degrees Celsius. In addition, we will also explore the fabrication of antenna structures to enable wireless transmission capabilities for such devices. Any prior research experience in sensors and/or fabrication is a plus. Prior experience in characterization tools such as scanning electron microscopy, impedance spectroscopy, physical/chemical vapor deposition, and electrochemistry are also a plus.

- b) **Microscale 3-D Printing for Structural and Biological Applications:** We are seeking highly motivated MS and PhD candidates in the area of microscale additive manufacturing. Panat lab has recently mimicked the natural process of the formation of 'Desert Roses' to develop a breakthrough additive manufacturing method that can make 3-D hierarchical materials with structural control over several orders of magnitudes. The projects involve exploring the scientific principles and applications of such additive methods for energy conversion and storage (Li-ion batteries), structural materials, biological materials, and topologically optimized materials. Candidates with a strong background in manufacturing and solid mechanics will be considered. A working knowledge of material science is a strong plus. We use several material characterization techniques such as SEM, TEM, EDX, impedance spectroscopy, and XRD. Prior experience or working knowledge of these techniques is also a plus.

Applicants should send a full CV via email to Professor Rahul Panat (rpanat(at)andrew.cmu.edu).

About Panat Lab: Research in Panat lab is focused on using the knowledge of material behavior and mechanics to design novel manufacturing methods for various applications. The research has three primary thrust areas, namely, microscale additive manufacturing, flexible and printed microelectronics, and advanced energy materials. The research aims to enhance the fundamental scientific knowledge and create engineering breakthroughs in several important applications. Research will enable 'designer' materials that can have unusual mechanical properties such as high strength but ultra-low weight and are highly desirable for structural applications. The research will also help realize high performance high temperature sensors and improved energy storage solutions. Lastly, the research will help enable low-cost wearable devices such as bio-patches and robotic skin.

Links:

- 1) <https://www.meche.engineering.cmu.edu/faculty/panat.html>
- 2) Lab: <https://advancedmanufacturing.us/>