

Research Development Fund – FY17 Cover Page Template

SUBMISSION DEADLINE: February 15, 2017 at 12 noon CDT to rdf@tamu.edu

(All cover pages will be posted for the campus community to view at <http://rdf.tamu.edu/abstracts>)

Application Title: Advanced Nano-patterning and Substrate Development Capabilities at AggieFab Nanofabrication Cleanroom

Lead contact for RDF Application:

Name: Arum Han

Department: Electrical and Computer Engineering

Email address: arum.han@ece.tamu.edu

Phone number: 979-845-9686

Key Participating Units: Engineering (Biomedical engineering, Chemical engineering, Electrical and computer engineering, Material Science and Engineering, Mechanical engineering), Science (Chemistry, Physics),

Anticipated Request Amount (\$): \$2,100,000

Executive summary of the intended application to utilize Research Development Funds.

The application will be focused on the modernization and augmentation of AggieFab, the shared user nano fabrication facility that is currently available to all A&M investigators and currently used by more than 35 PIs and 70 researchers. The goal of this application is to acquire advanced nano-patterning capabilities and substrate development capabilities at the AggieFab Nanofabrication Facility. On the patterning capability improvement side, we propose to acquire a maskless lithography system for 2D/3D pattern generation at the microscale, a double-sided mask aligner to generate patterns on both sides of a substrate, and a photoplotter to supplement these capabilities and lower the cost of operation. Micro/nano patterning is at the core of any fabrication process, whether at nano-meter scale or micro-meter scale, thus at the core of any cleanroom fabrication facility. The work using these instruments cannot be outsourced as these processes are a part of a series of micro/nano fabrication processes that have to occur inside a clean environment through a serial, but iterative processes. On the substrate development side, we propose to acquire a wafer bonder, a chemical/mechanical polishing tool, and an interferometer to analyze the developed substrates. Advanced multi-layer substrates are at the core of developing next-generation semiconductor, photonics devices, optical systems, biosensor systems just to name a few. However this capability currently do not exist on campus, nor anywhere else in Texas. We expect the addition of these instruments will greatly increase the user base of the facility on campus, who have been abandoning this line of research due to lack of on-campus instruments in this area.