The Philippines continue to be a major player in the global microelectronics industry. However, a 2.5% decrease in export sales between April 2013 and April 2014 causes a major concern, not just for the local industry but also for the government, since electronic products account for almost half of the country’s exports. The Philippine semiconductor manufacturing sector must continue to be innovative to remain competitive, ensure investors’ confidence, and maintain its stature in the global market.

Value-adding processes such as plasma cleaning would make the Philippine electronics industry more attractive to investors. Plasma-based cleaning is a competitive candidate in surface treatment of micro- to nano-scale structures for microchip fabrication, semiconductor processing and packaging, optical industry applications, medical field devices, and many more because it allows removal of contaminants on the surface layer of the material without affecting the bulk properties of the material.

Realizing the potential of plasma cleaning technology, UPD, with support from USAID STRIDE, ventured to develop a dry, highly efficient, and environment-friendly cleaning process for the semiconductor industry for implementation in an “assembly-line” approach. This approach, as opposed to conventional batch processing, ensures and thereby improves product reliability and increases productivity.
During project implementation, the following were achieved:

- Fabrication of a plasma device that utilizes different gas admixtures such as argon, oxygen, and nitrogen to clean or etch surfaces, designed to hold 300 mm wafers and powered by a 13.56 MHz radio frequency power;
- Experimentation and examination of materials commonly used for microelectronic devices, such as copper and silicon, as well as polymeric surfaces such as polyethylene, polynamide, and polyvinyl chloride, and their properties of wettability, surface free energy, morphology, and adhesion strength with results indicating that plasma cleaning tuned surfaces of materials to desired properties; and
- Establishment of productive partnership or collaboration with UIUC.

**Milestones**

During project implementation, the following were achieved:

**Moving forward**

While Phase I focused on semiconductor process applications, alternative applications of the plasma device is being sought.