

Breakthrough Technologies for Sustainable Agriculture,
Land, Drought and Rural Development
Sponsor: State University of New York at Stony Brook

The course was moderated by Dr. Nay Htun and presented by Dr. Martin Schoonen, Dr. Teng-Feng Wong, Dr. Benjamin Chu, and Dr. Benjamin Hsiao, all from SUNY- Stony Brook. The course introduced some transformational technologies for water purification methods which cut across disciplines and have wide application potentials. Their research was motivated by their concern for the global shortage of freshwater to meet the needs of rapidly growing population.

Dr. Schoonen explained how the continuous use of fossil fuels has had such adverse environmental impacts as acidification of rains and subsequent soil and water contamination. Some important consequences of acid rains were calcium soil depletion and aluminum water contamination. Instead of insufficient 'end-of-pipe' technologies, he advocated for new types of pre-combustion mitigation technologies. Alternative acidification mitigation methods included sequestration and isolation of sulfur from fossil fuel.

Dr. Wong addressed novel approaches to identifying fresh- and sea-water intrusions. Intrusion of saline water caused by over-pumping from coastal wells could be further worsened by climate change. There were several methods to measure saline water discharge and the use of integrated means of measurements was suggested as useful.

Dr. Chu turned the discussion towards breakthrough technologies being introduced for water purification. The newly developed water filtration technologies using nano-fibers, were illustrated to be cost-effective, durable, flexible and widely applicable. The new design increased filtration speeds and efficiency up to 120 times, leading to significant saving on time, energy, or pressure required.

Dr. Hsiao focused on the core material for such membranes—nano-fibers—and their production properties and advantages over more traditional woven and non-woven membranes that had been traditionally used. Dr. Hsiao also explained how fiber diameter could be controlled, improving further filtration efficiency.