Carnegie Mellon University
STEINBRENNER INSTITUTE
for Environmental Education & Research

Steinbrenner Institute Announces the 2011-2012 Doctoral Fellows

The Steinbrenner Institute is pleased to announce our new class of Graduate Research Fellows for 2011-2012. There are four new Steinbrenner Institute Graduate Fellows and one new Steinbrenner Institute Robert W. Dunlap Graduate Research Fellow. The fellows will be exploring research topics that are in alignment with the strategic interests of the Steinbrenner Institute and our affiliated faculty and centers.

Ahmed Abdulla*, Graduate Student, Engineering and Public Policy
**Steinbrenner Institute Robert W. Dunlap Graduate Research Fellow*
Project Team: Inês Azevedo (PI-EPP); Granger Morgan (Co-PI- EPP)
Topic: "Investigating the Economic Viability of Small, Modular Nuclear Reactors"

"SMRs represent one of the more promising innovations in the field of non-fossil fuel energy research. They have the capacity to instigate a paradigm shift that may resonate well beyond the nuclear industry itself. According to the Survey of Emerging Nuclear Energy States, thirty-four countries aspire to join the club of nuclear energy states. The IMF classifies all but two of these - Israel and Italy - as emergent (or developing) economies. These countries will contend with challenges that developed countries do not need to address: poor electricity transmission infrastructures, high risk political environments that make larger plants too tempting a target for attack, and poor liquidity that makes financing a large nuclear power plant virtually impossible. These countries' development is inevitable, and so is the fact that economic growth will increasingly emanate from these energy-hungry societies. As this transition takes place, it is imperative to look towards establishing electricity production portfolios that rely less on fossil fuels and more on nuclear power and renewable technologies."

Wayne Chuang,Chemical Engineering
Project Team: Neil Donahue (PI); Allen Robinson (CO-PI)
Topic: "Characterization and Aging of Black Carbon Particles"

"Particles containing BC are notable because they are thought to have especially severe health effects and because unlike most fine particles they absorb visible light (thus the moniker "black").Consequently, while most particles in the atmosphere increase reflection of sunlight to space (causing planetary cooling), BC can enhance absorption of sunlight (causing planetary warming). This project sits at the intersection of research in CAPS and the Center for the Environmental Implications of Nanotechnology (CEINT). It addresses key issues of sustainability via health effects and climate science - by better understanding the behavior of BC particles in the atmosphere we will be able to inform policy makers seeking to address these critical issues."

Steinbrenner Institute Announces the 2011-2012 Doctoral Fellows

...continued from previous page

Arvind Murali Mohan, Civil and Environmental Engineering
Project Team: Kelvin B. Gregory (PI-CEE)
Topic: "Determining the Microbial Impacts on the Fate of Radionuclides in Flowback Water from Hydraulic Fracturing of the Marcellus Shale"

"Public concern has recently emerged over the presence of naturally occurring radioactive material (NORM) in flowback and produced water from hydraulic fracturing of the Marcellus Shale for natural gas production. Flowback water is a complex mixture of high-strength salts, metals, hydrocarbons, and radionuclides that return from the deep subsurface following hydraulic fracturing and is impounded at the surface prior to reuse or disposal. The overarching goals of this study are to provide the natural gas developers and their regulators with timely and new information about radioactivity in their industry and guide the development of water management strategies that enable the harvesting of natural gas resources while protecting our other natural resources."

Wee-Liat Ong, Mechanical Engineering
Project Team: Jonathan A. Malen (PI) and Alan J. H. McGaughey (CO-PI)
Topic: "Enabling Greener Solar Cells, Automobiles, and Devices Through Hybrid Organic-Inorganic Thermoelectric Materials"

"Vast quantities of heat generated by solar panels, fossil-fuel powered automobiles, and electronic devices go to waste. By recovering this waste heat through thermoelectric energy conversion, energy demand and pollution can be reduced. My research will elucidate the thermal transport mechanisms in nanocrystal superlattices (NCSLs), a promising new class of organic-inorganic hybrid materials. Advanced thermoelectric materials will make efficient and cost-effective waste heat recovery solutions a reality. Reclaiming this thermal energy will set off a chain of beneficial environment outcomes including zero waste heat pollution, reduced usage of ozone-depleting coolants, and less greenhouse gas and water pollutant emission."

Congratulations to all of the Steinbrenner Doctoral Fellowship recipients and best wishes for a productive year of research!