

## JOINT DIRECTED RESEARCH AND DEVELOPMENT PROJECTS INITIATED IN 2008 AND 2009

### 2008

1. Jeffrey Becker: Survey of fungal component of the gut microbiome; LDRD Project: Host genetic diversity as a variable selection environment for the gut microbiome, Elissa J. Chesler.
2. Qiang He: Linkage between soil microbial activities in the rhizosphere and functional characteristics of dissolved organic matter; LDRD project: Carbon drivers of the microbe-switchgrass rhizosphere interface, Christopher Warren Schadt.
3. Bin Hu: Development of highly efficient organic white electroluminescence for solid-state lighting; LDRD Project: Revolutionary method for increasing efficiency of white-light quantum-dot LEDs, Chad E. Duty.
4. Mike Langston: High-performance computational tools for systems genetic analysis; LDRD Project: Host genetic diversity as a variable selection environment for the gut microbiome, Elissa J. Chesler.
5. Norman Mannella: Doping control of epitaxial  $\text{TiO}_x$  and  $\text{TiO}_2$  thin film hetero-structures for photo-electrochemical solar energy conservation; LDRD Project: Bandgap narrowing of oxide semiconductors using non-compensated n-p Co-doping for enhanced solar energy utilization, Zhenyu Zhang.
6. Janice Musfeldt: Investigating the physical properties of magnetic nanoparticles; LDRD Project: Neutron scattering study of magnetic and spin dynamic behavior in amine-stabilized transition metal and transition metal oxide nanoparticles, Andrew Christianson.
7. Jennifer Schweitzer: Plant-soil feedbacks impact carbon, nitrogen, and phosphorus cycling: impacts of biofuel crops?; LDRD Project: Carbon drivers of the microbe-switchgrass rhizosphere interface, Christopher Warren Schadt.
8. Liem Tran: Cross-scale interactions and ecological system dynamics: pattern-process relationships through space and time; LDRD Project: Scale-dependent metrics for bioenergy: land-nutrient-water interactions under future energy scenarios, Virginia H. Dale. (2008 only)

### 2009

1. Itamar Arel: A semi-supervised learning system using deep belief networks for multi-modal medical data analytics; LDRD Project: Data analytics for medicine using semi-supervised learning (DAMSEL), Barbara Beckerman.
2. Michael Best: Synthesis and assembly of geometrically defined building blocks for dynamic covalent synthesis of robust higher order organic frameworks; LDRD Project: Controlled hierarchical self-assembly of robust organic architectures, Benjamin Hay and Radu Custelcean.
3. Jon Camden: Rationally designed nanofabricated SERS substrates for ultra-sensitive detection: probing surface chemistry in mesoporous carbon electrodes; LDRD Project: Understanding interfacial electrochemical phenomena in advanced energy storage capacitors using spectroscopy and modeling, Kevin Shuford.
4. Aimée Classen and Nathan Sanders: Developing a systems biology approach for linking genetic and environmental constraints to primary productivity — can patterns scale to the field?; LDRD Project: Developing a systems biology approach for linking genetic and environmental constraints to primary productivity in model and nonmodel species, David Weston.
5. Michael Gilchrist: Integrating models of protein translation and gene fixation with experimental data in the archaeal system: *Ignicoccus-Nanoarchaeum*; LDRD Project: A systems biology approach to study metabolic and energetic interdependencies in the *Ignicoccus-Nanoarchaeum* system, Mircea Podar.
6. Arthur Ruggles: Molten salt cooled high temperature pebble bed reactor; LDRD Project: Investigation of molten salt thermal performance in pebble beds using unique heating techniques, Graydon Yoder.
7. Glenn Tootle: Adaptation of water resource systems to climate change through weather modification; LDRD Project: Uncertainty assessment and reduction for climate extremes and climate change impacts, Auroop Ganguly.
8. Zhili Zhang: Active control of surface plasmonics for nanoscale diagnostics; LDRD Project: Active control of surface plasmonics with ferroelectricity, Jian Shen.