# University of Maryland Energy Research Center (UMERC) Overview

***September 18, 2007***

**Presentation at the Woodrow Wilson Center**
for the Global Energy Initiative

***University of Maryland, College Park, USA***

# UMERC Overview

- **UMERC established officially Fall 2006**
- **Collaboration led by School of Engineering but crossing all disciplines including Physics, Chemistry, Life Sciences, Public Policy, Agriculture and Natural Resources, and Economics**
- **UMERC mission is to develop and integrate research programs in energy science and technology with a special focus on *forward looking approaches for alternative energy generation and storage*.**
- **UMERC promotes inter-disciplinary efforts for breakthroughs toward a sustainable energy future.**
- **UMERC provides leadership in energy technology and policy research for Maryland, the DC area, and the nation.**

# UMERC Current Activities

- **Designation as a University Research Center with internal seed funds**
  - 2 seed projects in advanced concepts for solid oxide and PEM fuel cells
  - 2 seed projects in solar-based $H_2$ generation
  - seed project in enhancing yields for cellulosic ethanol
  - seed project in novel materials for thermoelectrics
- **Hiring search for new faculty members: 2 senior and 2 junior.**
  - 1st hire: Prof. C. Wang – expertise in Li-ion batteries and alkaline fuel cells
- **New energy research fellowships for graduate students**
- **Hosting "Transforming Energy Lecture Series"**
  - Recent: *Hydrogen from Sunlight and Water,* John Turner – NREL
    *Energy Systems for A Carbon Constrained World*, Geo Richards – NETL
- **Large research collaboration with the UAE Petroleum Institute**
  - Research topics include solid oxide fuel cells with $CO_2$ capture and solar-driven cooling, waste heat recovery
- **Energy Systems Engineering curriculum established for grad students.**

# UMERC Topical Focus

- **Fuel cell systems and electrochemical energy storage**
  - Profs. Eichhorn, Jackson, Kofinas, Lee, Takeuchi, Walker, Wang, Zachariah
- **Advanced solar energy conversion and fuels from biological processes**
  - *Solar materials and processes:*

    Profs. Adomaitis, Dagenais, Ehrman, Radermacher, Williams
  - *Biological processes for fuel production*

    Profs. Gupta, Hutcheson, Kohn, Wang
- **Next generation nuclear reactors and processes (for electricity & fuels)**
  - *Next generation nuclear reactors*

    Profs. Modarres, Mosleh, Pertmer, Al-Sheikly, Severinsky
  - *Fusion as the ultimate energy source*

    Profs. Antonsen, Dorland, O'Shea
- **Small-scale power systems (for electronics & propulsion)**
  - Profs. Cadou, Ghodssi, Kofinas, Yang
- **Energy end-use efficiency, policy, and economics**
  - Profs. Radermacher, Fetter, Gabriel, Hultman, Ruth, Steinbruner