

## **CLEAN, EFFICIENT AND SUSTAINABLE ENERGY CONVERSION FOR DATA CENTERS**

### **ABSTRACT**

Alternative energy technologies such as fuel cells, solar power, and wind power have the potential to significantly increase energy sustainability for future IT needs such as data centers. Renewable fuels derived from waste streams or produced from energy crops will play an important role since they can be produced continuously as part of the sustainable energy portfolio. The uncontrollability and intermittent availability of wind and solar power require sustainable energy storage and dispatchable power generating technologies, such as fuel cells, to meet the continuous and dynamic demands of IT infrastructure. The current talk will address the dynamics of energy and power systems with particular emphasis upon recent work that UC Irvine has accomplished with Microsoft to investigate sustainable powering of servers and complete data centers with fuel cells. Experimental and theoretical investigation of highly efficient direct DC powering of servers from fuel cells has been demonstrated. Efficiency improvements and emissions reductions have been proven possible with renewable power and fuel cell technology.

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Research Interests: advanced and alternative energy systems development, electrochemical conversion devices and systems, dynamic simulation and control, turbulent reacting flows, chemical kinetics, and electrochemical reactions with concurrent heat, mass and momentum transfer

