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Ding-Shyue (Jerry) Yang

Principal Investigator
University of Houston

Jerry Yang has pioneered the use of time-resolved electron imaging to study materials. The assistant professor joined the UH faculty from Caltech in 2012 and used his initial Welch research grant to explore the behavior of molecules on the surface of solid materials, where they often act differently. His current Welch-supported research focuses on materials with unique phase transition properties.

"Today, our cell phones, PCs and electronic devices are packed with transistors using silicon-based architectures," Dr. Yang explains. "If we can make use of new materials with inherent switching properties, we could use these materials directly rather than relying on a structure to make them work. This would be a great bonus in industry's drive to make devices simultaneously smaller and more powerful."

He is studying a class of materials called vanadium oxides. Temperature changes spark phase transitions and turn the materials into semiconductors or conductors, and this switch is often accompanied by a structural change. His group is focused on the fundamentals of this transition and determining the reaction pathways. The imaging technique lets him visualize what happens during the transition from state A to state B. How long does it take? How much energy is required? What can impede the transition? Ultimately, this knowledge may also allow us to engineer materials to carry out useful functions.

(lab photo by Chris Watts, Univ. of Houston)