



MECHANICAL ENGINEERING

SEMINAR

“Self-powered Communicating Sensors for the Industrial Internet”

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Abstract: The seminar will describe 3D-printing with a CNC dispenser for the prototyping of thermoelectric generators, batteries and capacitors. These are being assembled on flexographic substrates as an integrated unit including low-power radios, control, and sensors. The sensors will measure vibrations of heavy industrial equipment. Vibration measurement is the focus of case studies because high-value energy-industry facilities/products have an associated operational vibration spectrum. Specifically, large industrial motors and generators exhibit accelerations ranging from 0.05 to 0.2g at frequencies of 120 Hz or less. As a first step, base-line vibration characteristics of new pumps were measured. Second, data were obtained from power-industry experts to establish the vibration amplitude pre-condition at which pumps quickly deteriorate (a y-axis acceleration greater than 0.2g at 20Hz being chosen). Third, these data analytics established a predictable schedule for long-term equipment monitoring. In industry, this has become known as *Condition based Monitoring (CbM)* and in more popular writings the *Industrial Internet*.



Paul Wright is the A. Martin Berlin Professor of Mechanical Engineering and Director of the Berkeley Energy and Climate Institute. His research takes place in the Advanced Manufacturing for Energy (AME) laboratory. Funds from industry, foundations, the federal government, and the California Energy Commission (CEC), support an integrated research program on the *resilience & analytics of energy systems*. Individual PhD projects cover a broad spectrum: Communicating MEMS-sensors for advanced electrical-grids and gas distribution systems; Energy harvesting; 3D printing of energy storage systems; Demand Response, and Condition Based Monitoring (CbM) of energy systems. These projects are the catalysts for many recent start-ups such as *Imprint Energy* and *Wireless Industrial Technologies*.

Friday, October 24th, 2014
11:00 am Seminar in 233 Mudd
Lunch served at 12:00pm
in MECE Lobby