

## Manufacturing Research Seminar

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University of Michigan, Ann Arbor

College of Engineering

Refreshments Provided

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Yoha Hwang, Principal Research Scientist  
Korea Institute of Science and Technology  
Intelligent System Research Division  
Seoul, Korea

### ***A New Online Rotor Condition Monitoring Method Using Optical Fiber Sensors and a Rotary Optical Coupler***

Strain-gauges have been dominantly used to measure strain at various points on a rotor, however, either a slip ring or telemetry has to be used to send sensor signals to data acquisition instruments at stationary side. Both slip ring and telemetry have numerous inherent problems which force severe limitations in real applications. This seminar introduces a new rotor condition monitoring system using FBG (Fiber Bragg Grating) sensors and a rotary optical coupler. A single optical fiber with many FBG sensors is installed on the rotor and an optical dynamic interrogator is installed at stationary side. The sensor signal connection between rotating part and stationary part is made by the rotary optical coupling method which is making use of light's unique characteristic - light travels through space. Broad band light source from the interrogator travels to the optical fiber on the rotor and reflected FBG sensor signals travel back to the optical fiber on stationary side and are connected to the interrogator. Rotary optical coupler's insertion loss change due to rotation is compensated by using a reference sensor installed at the center of the rotor. The proposed system's performance has been successfully demonstrated by accurately measuring strains at 5 points on a blade rotating at high speed.

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**Thursday, October 11, 2007**  
**4:00 - 5:00 PM**  
**1013 H.H. Dow Building**

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For more information, please call Kathy at (734) 764-3312 or email at [kbishar@umich.edu](mailto:kbishar@umich.edu)  
[http://interpro-academics.engin.umich.edu/mfgeng\\_prog/mfg\\_f07.htm](http://interpro-academics.engin.umich.edu/mfgeng_prog/mfg_f07.htm)

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