



## **Manufacturing Research Seminar** *Fall 2005*

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University of Michigan, Ann Arbor

College of Engineering

Refreshments Provided

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### **Professor Theo van Niekerk**

Interim Dean of the Faculty of Engineering  
The Built Environment and Information Technology  
Nelson Mandela Metropolitan University  
Port Elizabeth, South Africa

### ***Friction Stir Welding Process: Monitoring and Control Technology***

Friction Stir Welding (FSW) is a process patented in the early 90's by The Welding Institute (TWI) of the United Kingdom. A rotating tool with a specific geometry uses friction to heat the materials to be joined. The heat-softened material of the abutting materials is entrained and transferred around the tool, where it is deposited prior to re-coalescence, thereafter forming a joint. Advanced process monitoring is essential to better understand the influence of tool geometry and process parameters on weld properties and to ensure consistent and reliable friction stir welds. Implementation aspect of a rotating transducer with telemetry capability as well as the development of supporting software/hardware architecture to enable on-line static and dynamic sensor data analysis and control for FSW process will be introduced. Presentation will include the advances of current projects: Tool characterization by means of sensor data, a fuzzy logic control scheme sensitive to tool and workpiece changes and a neural-fuzzy scheme to maintain tool-workpiece contact for complex curvature application.

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**Thursday, October 20, 2005**  
**4:00 - 5:00 PM**  
**1013 H.H. Dow Building**

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

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