Center for Intelligent Maintenance Systems

IMS Researcher Profiles

IMS Researcher Profile

Institution: UM

Name:	Ahmad Almuhtady
Contact Info:	almuhtad@umich.edu 734-272-7362
Expertise:	HVAC Equipment
Current Research Activities:	Screw and Scroll Compressor Health Monitoring
Dissertation/Thesis Topics:	Enhancement of the Lifetime of Screw and Scroll Compressors in HVAC Applications
Skills:	MATLAB, Maple
Previous Background:	R and D Engineer in HVAC Equipment Manufacturer

IMS Researcher Profile

Institution: UM

Name: Saumil Ambani

Contact Info: sambani@umich.edu
734-883-6653

Expertise: Stochastic Modeling

Current Research Activities: Maintenance decision making under risk considerations

Dissertation/Thesis Topics: Risk based maintenance decision making

Project 1: Buffer study for General Motors

- Analyzing impact of certain maintenance policies and buffer management on throughput
- Simulated and compared various maintenance policies

Skills: MATLAB, C/C++, Promodel, Mathematica
ProEngineer, SolidWorks

Previous Background: Student

Publications:

Ambani, S. Li, L., Ni, J., "Maintenance Decision Making: An agent based approach," Submitted to journal of Reliability Engineering & System Safety.

Li, L., Ambani, s., Ni, J., "Plant-level maintenance decision support systems for throughput improvement" Submitted to International Journal of Production Research.

IMS Researcher Profile

Institution: UM

Name: Adam Brzezinski

Contact Info: ajbrzezi@umich.edu
734-615-7445

Expertise: Sensor data processing

Current Research Activities: Real-time signal processing, feature selection, feature fusion

Dissertation/Thesis Topics: Sensor Fusion for Accurate, Real-Time Condition Monitoring

Project 1: Machine Health Monitoring for General Electric Aviation Division

- Investigated time-frequency and time-series analysis to estimate endmill wear
- Implemented inexpensive, embedded system for mitigating improper grinder-dresser crash
- Developing embedded dust extraction and coolant supply monitoring system

Project 2: Shaving Cutting Tool Breakage Detection and Prediction

- Developed sensor selection, installation, and Phase 1 test plan
- Processed Phase 1 data using sensor fusion to provide preliminary method for detection of tooth breakage and prediction of tool wear
- Conducting run-to-life testing for validation and improvement of preliminary results from Phase 1 tests

Skills: MATLAB, LabView, C/C++
Unigraphics, ProEngineer, SolidWorks

Previous Background: Student

Publications:

Brzezinski, A. J., Li, L., Qiao, X., Ni, J., "Real-Time Peak Detection in a Non-Stationary Noisy Signal," Accepted for publication in proceedings of 2008 International Conference on Automation, Robotics and Control Systems.

Brzezinski, A. J., Li, L., Qiao, X., Ni, J., "A New Method for Grinder Dressing Fault Mitigation Using Real Time Peak Detection," Submitted to International Journal of Advanced Manufacturing Technology.

Brzezinski, A. J., Wang, Y., Choi, D.K., Qiao, X., Ni, J., "Feature-based Tool Condition Monitoring in a Gear Shaving Application," Submitted to 2008 ASME International Conference on Manufacturing Science and Engineering.

IMS Researcher Profile

Institution: UM

Name:	Shiming Duan
Contact Info:	duansm@umich.edu 734-615-7445
Expertise:	N/A
Current Research Activities:	Global Stability Analysis, Estimation of Region of Attraction
Dissertation/Thesis Topics:	Stability Analysis of Piecewise Affine Systems
Project 1:	Design of Thermal Management System for Clutch Systems • Develop temperature models for clutch components/sub-systems • Design of control strategy to realize temperature feedback and improve torque accuracy of clutch systems
Skills:	MATLAB
Previous Background:	Student
Publications:	N/A

IMS Researcher Profile

Institution: UM

Name: Xiaoning Jin

Contact Info: xnjin@umich.edu

734-615-7445

Expertise: Option-based maintenance management

Current Research Activities: Research on Joint Production and Maintenance System based on Option, Maintenance Management, Asset Fluctuation impacts on Production System

Dissertation/Thesis Topics: N/A

Project 1:

- BorgWarner Inc., NY, U.S. Manufacturing Process Simulation Project
-
-

Project 2:

-
-
-

Skills: Matlab, Maple, Ampl, Unigraphics, MasterCam, AutoCad, minitab

Previous Background: Bachelor in Industrial Engineering & Management, Shanghai Jiao Tong University,

Master in Industrial & Operations Engineering, University of Michigan.

Publications:

[1] Jin Xiaoning, Ma Chunxiang, "*Evaluation in Intensity of Labor Based on PAPERS Comprehensive Fuzzy Evaluation Method*", Journal of Industrial Engineering and Management vol.12,2007
[2] X.Zeng, Xiaoning Jin and W Qiang,"*Trading Options in Supply Chain*". Proceedings of the IEEE International Conference on Industrial Engineering and Engine ering Management, Singapore, Dec 2007
[3] Xiaoning Jin, Lin Li, Jun Ni, "*Option Model for Joint Production and Preventive Maintenance System*". University of Michigan, Ann Arbor Working Paper 2007. (To be submitted to International Journal of Production Economics)

IMS Researcher Profile

Institution: UM

Name:	Seungchul Lee
Contact Info:	seunglee@umich.edu 734-764-5391
Expertise:	Factory Simulation and Maintenance Decision Optimization
Current Research Activities:	Stochastic Modeling of factory Manufacturing Line
Dissertation/Thesis Topics:	Modeling of Degradation Processes to Obtain an Optimal Maintenance Policy
Project 1:	Enhanced Maintenance Decision Making Based on Station-Level and End-of-Line Yield Predictions for Semiconductor Manufacturing Process • Method for estimation of system-level yield, given any set of maintenance actions • Software for simulation of system-level yield, given any set of maintenance actions • Method for maximizing system-level yield through optimization of maintenance actions • Software implementation of the maintenance optimization procedure
Project 2:	Manufacturing Simulation Model Development • Developed the manufacturing simulation model • Improvement of OEE based on simulation model • Scheduling, optimization and prioritization of system operations and maintenance tasks
Skills:	MATLAB, ProModel, C/C++
Previous Background:	Student

Publications:

Lee, S. C., Djurdjanovic, D., Ni, J. Optimal Condition-Based Maintenance Decision Making for a Cluster Tool, *TECHCON 2007*.

Enhanced Maintenance Decision Making Based on Station-Level and End-of-Line Yield Predictions, *the SRC annual review*, the Solution Center, Durham, NC

IMS Researcher Profile

Institution: UM

Name: Lin Li

Contact Info: lilz@umich.edu, 734-763-7119

Expertise: Decision support tool, remaining useful life prediction, manufacturing systems research, operation research

Current Research Activities:

- Bottleneck detection in complex manufacturing systems
- Buffer management based on risk analysis
- Feature selection using ANN
- Two-zone PHM for RUL prediction
- ANN based RUL preduction
- Cost model for joint production and maintenance
- Degradation modeling by Makov chain

Dissertation/Thesis Topics: Short-term supervisory control of manufacturing systems

Previous Background:

- Ph.D. (2007) Mechanical Engineering**,** University of Michigan, Ann Arbor, MI, USA
- M.S.E. (2005) Industrial and Operations Engineering, University of Michigan, Ann Arbor, MI, USA
- M.S.E. (2003) Mechanical Engineering, University of Michigan, Ann Arbor, MI, USA
- B.A.(2001) Business Administration, Shanghai Jiao Tong University, Shanghai, China
- B.S. (2001) Mechanical Engineering, Shanghai Jiao Tong University, Shanghai, China

Publications:

1. **L. Li**, Q. Chang, J. Ni, G. Xiao, and S. Biller, "Bottleneck Detection of Manufacturing Systems Using Data Driven Method", Proceedings of the 2007 *IEEE International Symposium on Assembly and Manufacturing (IEEE ISAM)*, Ann Arbor, Michigan, USA, July 22-25, 2007, pp. 76-81.
2. **L. Li**, D. Djurdjanovic and J. Ni, "Maintenance Task Prioritization Using Data Driven Bottleneck Detection and Maintenance Opportunity Windows", Proceedings of the *2007 ASME Manufacturing Science and Engineering Conference (MSEC)*, October 15-18, 2007, Atlanta, Georgia, USA, paper number MSEC2007-31150.
3. **L. Li**, Q. Chang, and J. Ni, "Data Driven Bottleneck Detection of Manufacturing Systems", accepted to appear in *International Journal of Production Research*, paper no TPRS-2007-IJPR-0657.R2, 2008.

IMS Researcher Profile

Institution: UM

Name: Chaoye Pan

Contact Info: pancy@umich.edu

734-272-2733

Expertise: Material handling, Dispatching Strategy Optimization

Current Research Activities: General representative of discrete event system

Dissertation/Thesis Topics: General mathematical Programming of Discrete-Event System Dynamics , Sequenced Dolly Material Handling Optimization

Project 1: Modeling OF DOLLY MATERIAL HANDLING AND WORKFORCE DISPATCHING OPTIMIZAION

1. Developing a virtual plant for what-if tests
2. Integrating real data inputs into the simulation model
3. Finding out optimization dispatching strategies for multi-dolly delivery sequences
4. Constructing searching method for optimized zoning coverage of drivers

Skills: C++ , Arena, VB

Previous Background: Student

Publications: Pan,C. Xiao,g. Chang,Q. Ni,J., "Optimization of Workforce Zoning for Dolly Material Handling " accepted for Proceedings of the 2008 Industrial Engineering Research Conference

IMS Researcher Profile

Institution: UM

Name: Yong Wang

Contact Info: wangyong@umich.edu
734-764-5391

Expertise: Signal processing

Current Research Activities: Signal processing, artificial neural networks, feature selection

Dissertation/Thesis Topics: ---

Project 1: Gear Shaving Cutting Tool Breakage Detection and Prediction [with BorgWarner]

- Perform data analysis, feature extraction using Phase1 data
- Build up detection model for multiple broken tool teeth using ANN
- Compose test plan for Phase 2 run-to-failure testing
- Performing data analysis using Phase 2 data
- Evaluate the capability of vibration signals in shaving tool tooth breakage prediction

Skills: MATLAB and other programming languages

Previous Background: B.S. 2003, Huazhong University of Science and Technology

M.S. 2006, Huazhong University of Science and Technology

Publications:

Brzezinski, A. J., Wang, Y., Choi, D.K., Qiao, X., Ni, J., "Feature-based Tool Condition Monitoring in a Gear Shaving Application," Submitted to 2008 ASME International Conference on Manufacturing Science and Engineering.

LI Yanghai, GAO Wei, HUANG Shuhong, WANG Yong, ZHANG Jinping & YANG Tao (2004). A java solution on data communication among webpages for a web-based fault diagnosis system. Computer Programming Skills & Maintenance, 12 (5), pp. 15-18. [In Chinese]

YANG Tao, HUANG Shuhong, GAO Wei, WANG Yong, ZHANG Jinping, ZHANG Bailing & HUANG Piwei (2004). Research on web-based monitoring and fault diagnosis system of steam turbine sets. Power Engineering, 24 (6), pp. 840-844. [In Chinese]

ZHANG Yanping, HUANG Shuhong, YANG Tao, WANG Yong & GAO Wei (2006). Research on continuous wavelet transform scalogram in fault diagnosis system of steam turbine sets. Turbine Technology, 48 (3), pp. 209-211. [In Chinese]

IMS Researcher Profile

Institution: UM

Name:	Mingyi You
Contact Info:	myyou@umich.edu 734-615-7445
Expertise:	Reliability
Current Research Activities:	Two-zone proportional hazard model for equipment reliability assessment and remaining useful life estimation Condition-based predictive maintenance scheduling with imperfect repair
Dissertation/Thesis Topics:	Reliability-centered Diagnostics, Prognostics and Maintenance Optimization
Skills:	MATLAB, LabView, C/C++ Unigraphics, ProEngineer, SolidWorks
Previous Background:	Student