

Tianyi Wang

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Citizenship: China
Date of Birth: March 3rd, 1979

Contact

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Credentials

- Leading researcher in 3 industry projects; involved in over 8 industry/NSF projects; involved in over 12 industry/grant proposal preparation during the four-year PhD study at the IMS Center, UC
- 5 published technical papers; presenter at 4 Industry Advisory Board Meetings of the IMS Center
- Overall winner of 2008 PHM (Prognostics and Health Management) Data Challenge competition
- 6-month internship at Manufacturing Technology R&D group, Caterpillar Inc., Peoria, IL
- Experience in giving training courses to industry audience on intelligent maintenance technologies
- Webmaster and IT administrator at the IMS Center since 2005
- Proficient in Matlab, Visual C/C++ and Java software development
- Excellent graduate (top 2%) at both undergraduate (Tsinghua University, China) and master-degree (University of Siegen, Germany) study
- Professional attitude for work; multi-tasking time management; quick learner in new areas

Education

- 2005 to present Ph.D. in Industry Engineering (expected in August 2010)**
University of Cincinnati, Cincinnati, U.S.A. **GPA 3.99/4** (till Spring 2009)
- 2002 to 2005 Master of Science in Mechatronics**
University of Siegen, Siegen, Germany, **GPA 1.1** (equivalent 3.9/4.0)
- 1998 to 2002 Bachelor of Engineering in Machine Design, Manufacture and Automation**
Tsinghua University, Beijing, China, **GPA 88.2/100**

Work Experience

- Caterpillar, Inc., Peoria** **Internship**
Job: Manufacturing R&D Engineer **May-December, 2007**
- ✓ Develop a machine tool health monitoring system, focusing on spindle bearing, tool wear and crash
 - ✓ Responsible for the majority work of sensor and DAQ hardware installation, experimental data collection, algorithms and software development
- Center for Sensor System (ZESS), University of Siegen, Siegen, Germany** **Research Assistant**
Job: MATLAB®/Simulink® interface development for industrial cameras **April-July, 2005**
- ✓ Responsible for the development of Simulink toolbox for industry cameras

Research Experience

- Research and industry projects at Center for Intelligent Maintenance Systems (IMS), University of Cincinnati (UC), Cincinnati** **PhD Study**
- **PhD Thesis: similarity-based prognostics for engineering system remaining useful life prediction** **2007 to Present**
 - ✓ A prognostics framework incorporating multiple-model approach, similarity-based approach and data fusion techniques
 - ✓ Winning algorithm of the 2008 PHM Data Challenge Competition
 - **Industry project: development of an online process data mining system** **Sept. 2008-present**
 - ✓ Responsibility: lead in software architecture design and algorithm development
 - **Industry project: development of a prototype machine tool health** **Aug. 2008-May 2009**

prognostics system

- ✓ Focusing on spindle and axis bearing health assessment and prediction
- ✓ Responsibility: lead in machine instrumentation, algorithm development and software packaging

- **Industry project: high-pressure hydraulic hose prognostics** Jan 2008-Sept 2008
 - ✓ Responsibility: involved in hose instrumentation and fatigue experiments
- **NSF TIE project: bridge damage detection and identification** Sept 2007-Oct 2008
 - ✓ Responsibility: involved in model development using vibration data from bridge girder FEA simulation
- **Industry project: CVD process fault diagnosis and prognostics** Oct 2006-Nov 2007
 - ✓ Responsibility: involved in modeling of sensor dependency
- **Industry project: feasibility study of industrial robot predictive maintenance** Sept 2005-Sept 2006
 - ✓ Responsibility: lead in FMECA analysis and formulation of predictive maintenance solutions

Selected research projects involved at University of Siegen, Siegen Germany

M.S. Study

- ✓ Master thesis: design automation of embedded image processing applications based on MATLAB[®] Simulink[®] Nov 2004-Mar 2005
- ✓ Remote configuration of programmable devices over Ethernet based on TINI[™] embedded System May 2004-Nov 2004
- ✓ A preliminary study on the application of the Ferraris sensor for diagnosis purposes of electrical machines Oct 2003-Aug 2004
- ✓ Remote control of mobile robot via Ethernet and radio link Jun 2003-Jan 2004

Knowledge and Skills

- Knowledge** Signal processing, pattern analysis, statistics, machine learning, data mining, vibration analysis, bearing and gearbox condition monitoring, system dynamics and control, manufacturing systems, robotics, embedded systems
- Software** MS Visual Studio, Matlab/Simulink, LabVIEW, Java SE, MS Office, AutoCAD
- Skills** Data acquisition system design, communication interfacing, C/Matlab/Simulink cross programming and code generation, microcontroller programming

Publications

1. E. Lapira, T. Wang, and J. Lee, "E-Maintenance System Design for Smart and Lean Machine Tools," Proceedings of the 10th International Conference on Automation Technology. June 2009
2. T. Wang and J. Lee, "On Performance Evaluation of Prognostics Algorithms," Proceedings of MFPT 2009. April 2009. pp. 219-226
3. A. A. Mosavi, T. Wang, H. Wang, R. Seracino, and S. Rizkalla, "Damage Identification for Bridges Using Frequency and Time Domain Data", Proceeding of International Modal Analysis Conference (IMAC XXVII), Orlando, Florida, February 2009, pp 258-267
4. T. Wang, J. Yu, D. Siegel, and J. Lee, "A Similarity-Based Prognostics Approach for Remaining Useful Life Estimation of Engineered Systems," Proceedings of 2008 Intl. Conference on PHM. Oct 2008. pp. 1-6
5. T. Wang and J. Lee, "The operating regime approach for precision health prognosis", Proceedings of 62th meeting of the MFPT society: Failure Prevention for System Availability. May 2008. pp. 87-98

References

- **Dr. Jay Lee**, Ohio Eminent Scholar and L.W. Scott Alter Chair Professor in Advanced Manufacturing, Department of Mechanical Engineering, University of Cincinnati, director of the NSF I/UCR Center for Intelligent Maintenance Systems. Email: jay.lee@uc.edu Phone: 513-5562493
- **Dr. Samuel Huang**, professor, Department of Mechanical Engineering, University of Cincinnati, director of UC ME graduate program. Email: Sam.Huang@UC.edu Phone: 513-5561154
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