

Christina M. Lucas

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PROFILE Highly motivated, strong-willed and adaptable graduate student seeking an internship position where I can contribute to a fast-paced vibrant environment and expand my expertise in the prognostics and health management field. Demonstrated skills as project lead, ability to work under pressure and ability to balance competing priorities.

EDUCATION **MS** • Mechanical Engineering • GPA 3.77/4.0
Research Focus: *Development of Coupled Model Approach for Health Assessment & Failure Prediction for Critical Actuator Components*
Thesis Advisor: Professor Jay Lee
University of Cincinnati, Cincinnati, OH, USA • June 2013

BSc • Mechanical Engineering • GPA 3.28/4.0
Senior Design Project: *Tactical Reconnaissance Applications Platform – TRAP (A Military Mobile Robot for Battlefield Use)*
Florida Institute of Technology, Melbourne, FL • May 2011

WORK EXPERIENCE **Research Assistant** • NSF I/UCRC for Intelligent Maintenance Systems (IMS) University of Cincinnati, Cincinnati, OH • 2011 – Present
Research and develop various Prognostics and Health Management (PHM) methods with industry partners including:

- » Woodward Inc. – Actuator Gear Assessment and Fault Detection
 - Leading a team of four researchers, in this feasibility study we are working to use data from existing position feedback sensors, collected from on an in-house run-to-failure test for two identical electromechanical brushless DC actuators to develop a model, based on gear wear, for predicting the remaining useful life of the actuator
- » Goodyear – Tire Manufacturing Quality Assessment
 - Contributed on a team of four researchers that work closely with Goodyear to systematically investigate tire quality data to identify manufacturing machine relationships and routing using datasets from two different manufacturing plants
 - The goal is to analyze correlated performance analysis of process variation and yield to develop methods that identify degrading machines
- » API – Laser Tracker Automatic PID Tuning Strategy
 - Using a tracker provided to us, our team of four researchers has been working to do system identification and physics-based modeling with parameter estimation to aid us in ultimately developing a method to automatically tune the controllers PID parameters
- » Shanghai International Automobile City Group (SIAC) – Smart Battery for Electric Vehicles
 - Interned for 3 months in Shanghai, China with SIAC, a company in a designated comprehensive auto production base to companies such as: Volkswagen and GM
 - During the internship, I demonstrated the IMS PHM technology for smart battery systems on electric vehicles in order to promote the continual research of the mobility and safety of electric vehicles

- » GE Aviation – Intelligent Prognostics System for Machine Health Monitoring
 - Worked with engineers to use healthy and abnormal data from Fixed Cycle Feature Tests (FCFT) on manufacturing machines for performance analysis
 - Researched and benchmarked various methods that correlated features from the data to produce useful health assessments of the machines
 - Produced a packaged system including an interface for engineers to test data with and get off-line health assessment results

- » ALSTOM – Health Assessment & Fault Detection of Electro-Mechanical Point Machines
 - Point machines prove as a critical asset in high speed railway systems and therefore was a system of interest for ALSTOM to develop a PHM strategy for health assessment in collaboration with IMS
 - Our team was able to segment the power signature, representing individual movements during point machine operation, and develop PHM methods to recognize abnormalities

- » Goodyear – Smart Tire System
 - Focused on crack propagation in tire, existing tire durability equations, that incorporate energy release rates and aging, were used with different working condition inputs (load, pressure, temperature etc.) to develop a model to predict the length of cracks developing in the tire

Research Assistant • Robotics & Spatial Systems Laboratory

Florida Institute of Technology, Melbourne, FL • 2008 – 2011

Designed and fabricated a six-legged robotic walking machine, SphereWalker.

Machinist • Florida Institute of Technology Machine Shop

Florida Institute of Technology, Melbourne, FL • 2008

Worked with ProEngineer and MasterCam software to manufacture parts on a CNC milling, manual milling and lathe machines for senior design teams, professors and outside companies.

SKILLS MATLAB, ProEngineer, MasterCam, ANSYS, C++, LaTeX, MS Office

SELECTED PATENTS AND PUBLICATIONS Davari H, Lucas C, Siegel D, Chang S, Dersin P, Lee J. PHM for railway system – A case study on the health assessment of the point machines. 2012 IEEE Conference in Prognostics and Health Management (PHM).

Lucas C, Larochelle P, Lee G, Mori J, Scully C, Slate J, Zimmerman O. *Spherical Motion Robotic Walking Machine*. US Provisional Patent Application No. 61440897. September 2, 2011.

ORGANIZATIONS ASME, SWE, Women in Defense

AWARDS Outstanding Junior Mechanical Engineering, 2009-2010
Women in Defense Scholarship Award, 2009
Society of Women Engineers Scholarship Award, 2008