

HENG LIU

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EDUCATION

University of Missouri, Rolla

Dec. 2013

M.S. in Manufacturing Engineering

GPA: 3.75/4.0

Thesis: *Numerical Analysis of Thermal Stress and Deformation in Laser Metal Deposition Process*

Area of Study: Solid Mechanics, Computational Mechanics, Numerical Simulation

Southwest Jiaotong University

Jul. 2011

B.E. in Mechanical Engineering

Rank: 1/368, GPA: 3.8/4.0

QUALIFICATIONS

CAE/CAD

Hypermesh/TSV/Simlab, Abaqus, Ansys, FEMFAT, nCode, CATIA

Programming

Python, MATLAB, Fortran

Language

English, Mandarin

PROFESSIONAL EXPERIENCE

Ford Motor Company

Mar. 2014 - Present

Durability CAE Engineer

Livonia, MI

- Conducted Finite Element Analysis (FEA) on components and assemblies of Transmission & Driveline products, analysis types include: stress & strain, displacement, fatigue & fracture, topology/shape/size/weight optimization, contact problems and thermo-mechanical problems.
- Collaborated with product/system engineers and suppliers to provide design directions and resolve test failures based on results obtained from CAE analysis; collaborated with test engineers to correlate test and CAE results.
- Reacted to launch and warranty issues, and performed quick analysis to identify root causes and provide solutions.
- Developed numerical tools (scripts, subroutines, etc.) with Python and MATLAB for CAE pre/post-processing, numerical simulation and mathematical optimization.

University of Missouri, Rolla

Jan. 2012 - Dec. 2013

Graduate Research Assistant

Rolla, MO

- Boeing and Rolls-Royce Research Project - TiAl6V4 Substrate Behavior Prediction and Validation
 - Developed coupled thermo-mechanical finite element models to study the stress/strain and deformation of TiAl6V4 substrate during laser aided Direct Metal Deposition process.
 - Conducted experiments to validate the temperature field simulation with infrared camera and the deformation of substrate with laser displacement sensor.
- NASA Research Project - Multiphysics and Multiscale Modeling of Additive Manufacturing
 - Developed finite element models for heat transfer processes involved in additive manufacturing process with Abaqus.
 - Investigated the cooling rate of fused zone under different cooling conditions.

Eastsun Oilfield Equipment Manufacturing Co.

Aug. 2011 - Dec. 2011

Intern

Wuxi, Jiangsu, China

- Created 3-D models and sketches and applied the GD&T for the pipes and fittings products.

- Worked with manufacturing group to define the requirement of manufacturing process.

Southwest Jiaotong University
Undergraduate Research Assistant

Mar. 2011 - Jul. 2011
Chengdu, Sichuan, China

- Analyzed the structure principle and working characteristics of Continuously Variable Transmission (CVT) in Fendt Vario 900 series tractors; studied the hydraulic power diversion ratio using AMESim.
- Designed a special bed with proper control systems to secure users when earthquake occurs; created a simulation of the process with Ansys; fabricated and assembled the bed with team members.

ACADEMIC PROJECTS

Finite Element Analysis Curriculum Projects

Sept. 2012 - May. 2013

- Investigated the stress distribution in a pressure vessel under thermal and mechanical loadings.
- Analyzed the frequency and mode shape of a water tower with solid and pipe cross sections.
- Studied the stress distribution in a thin-walled cylinder undergoing concentrated cutting force.

Applied Computational Methods Curriculum Projects

Jan. 2013 - May. 2013

- Developed MATLAB/Python codes for numerical solutions of linear and nonlinear equations, numerical interpolation and polynomial approximation, gradient-based optimization, and numerical differentiation and integration.

Six Sigma Curriculum Project - Hydraulic Leak Reduction

Sept. 2012 - Dec. 2012

- Analyzed the variables that exist in the hydraulic assembly lines at John Deere which are not controlled or monitored; identified all the possible risks involved in the assembly operations using Process Failure Mode Effects Analysis (PFMEA) method.
- Developed a mistake proofing assembly method that would achieve robust process control by eliminating possibilities for the operators to bypass a defective subassembly.

PUBLICATIONS

- Wang, Z., Liu, R., Sparks, T., Liu, H., & Liou, F. W. (2014). **Stereo vision based hybrid manufacturing process for precision metal parts**. Precision Engineering.
- Liu, H., Sparks, T., Liou, F. W., & Dietrich, D. M. (2013). **Numerical Analysis of Thermal Stress and Deformation in Multi-Layer Laser Metal Deposition Processes**. Proceedings of Solid Freeform Fabrication Symposium, Austin, TX.
- Zhang, J., Liou, F. W., Fan, Z., Liu, H. (2013). **Probabilistic Simulation of Solidification Microstructure Evolution during Laser-Based Metal Deposition**. Proceedings of Solid Freeform Fabrication Symposium, Austin, TX.
- Liu, H., & Liu, T. (2011). **The Analysis of Fendt Vario 900 Tractor Transmission System**. Machine Tool & Hydraulics.

HONORS & ACTIVITIES

- Ford Motor Company – Transmission & Driveline Engineering Technical Achievement Award
- University of Missouri at Rolla – Secretary of Council of Graduate Students
- Ministry of Education of China – National Scholarship (Top 1 %, Multiple years)
- Southwest Jiaotong University – Si Shi Yang Hua Medal Winner (Top 0.05 %)
- Southwest Jiaotong University – 1st Prize Scholarship (Top 5 %, Multiple years)
- Ministry of Education of China – 2nd Prize of National Mechanical Design Competition