

AMIR GHAZANFARI

Ph.D. Candidate and Graduate Research Assistant

Additive Manufacturing Laboratory

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Research Interests

- Additive Manufacturing (3D Printing)
- Smart Structures
- CAD/CAM
- Structural Ceramics
- Functionally Graded Materials
- Sheet Metal Forming

Education

Candidate for Ph.D. in Mechanical Engineering, Aug. 2012- May. 2017 (exp.)

Missouri University of Science and Technology, Rolla, MO

- Dissertation Title: Optimal Design and Freeform Extrusion Fabrication of Functionally Gradient Smart Parts
- Advisor: Dr. Ming C. Leu

M.S. in Mechanical Engineering, Sep. 2009- Jan. 2012

Sharif University of Technology, Tehran, Iran

- Thesis Title: Theoretical and Experimental Investigations of Calibration Methods and Factors Influencing the Forming Limit Diagrams
- Advisor: Dr. Ahmad Assempour

B.S. in Mechanical Engineering, Sep. 2005- Sep. 2009

Sharif University of Technology, Tehran, Iran

- Thesis Title: Design of Mechanical Equipment for Pilot Project of Production of Bio-Ethanol
- Advisor: Dr. Mohsen Asghari

Honors and Awards

- Best student paper award, ASME Symposium on Integrated Systems Design and Implementation, 2016
- 2nd best paper award, Intelligent Systems Center Research Symposium, 2015
- 2nd best poster award, Tenth Annual Intelligent Systems Center Poster Presentation, 2014
- Vice-Provost for Graduate Studies Scholars Fellowship to pursue graduate studies at the Missouri University of Science and Technology, 2012
- 1st rank, design phase of the National Competition of Design and Manufacturing of RC Submarines as a member of Arsin team, 2010
- 37th rank, national university entrance examination for postgraduate studies in mechanical engineering, 2009
- 5th and 7th rank, respectively in the design and competition phases of the National Competition of Design and Manufacturing of RC Boats as a member of Arsin team, 2008
- 3rd rank, design phase of the first Iranian Machine Design Competition as a member of Blue Lines team, 2008
- 195th rank in region and 321st in nation amongst more than 400,000 participants, national university entrance examination, 2005
- Identified as an Exceptional Talent by National Organization for Development of Exceptional Talents (NODET) through an examination amongst more than 700,000 participants, 1998

Patent

“Method and Apparatus for Fabricating Ceramic and Metal Components via Additive Manufacturing with Uniform Layered Radiation Drying,” M.C. Leu, **A. Ghazanfari**, W. Li, G.E. Hilmas, and R.G. Landers, U.S. Patent Application No. 15/130,261 (pending).

Books

1. "NX 10 for Engineering Design," M.C. Leu, **A. Ghazanfari**, and K. Kolan, Department of Mechanical and Aerospace Engineering, Missouri University of Science and Technology, 2016.
2. "NX 10 Learning Edition for Engineering Design," M.C. Leu and **A. Ghazanfari**, Department of Mechanical and Aerospace Engineering, Missouri University of Science and Technology, 2016.

Journal Papers

1. "A Novel Freeform Extrusion Fabrication Process for Producing Solid Ceramic Components with Uniform Layered Radiation Drying," **A. Ghazanfari**, W. Li, M.C. Leu, and G.E. Hilmas, Additive Manufacturing Journal (under review).
2. "Mechanical Characterization of Parts Produced by Ceramic On-Demand Extrusion Process," **A. Ghazanfari**, W. Li, M.C. Leu, J.L. Watts, and G.E. Hilmas, International Journal of Applied Ceramic Technology (under review).
3. "Advanced Ceramic Components with Embedded Sapphire Optical Fiber Sensors for High Temperature Applications," **A. Ghazanfari**, W. Li, M.C. Leu, Y. Zhuang, and J. Huang, Materials and Design 112, pp. 197-206, 2016.
4. "Modeling and Analysis of Paste Freezing in Freeze-Form Extrusion Fabrication of Thin-Wall Parts via a Lumped Method," M. Li, **A. Ghazanfari**, W. Li, R.G. Landers, and M.C. Leu, Journal of Materials Processing Technology 237, pp. 163-180, 2016.
5. "Adaptive Rastering Algorithm for Freeform Extrusion Fabrication Processes," **A. Ghazanfari**, W. Li, and M.C. Leu, Virtual and Physical Prototyping 10, pp. 163-72, 2015.
6. "The Effect of the Imposed Boundary Rate on the Formability of Strain Rate Sensitive Sheets Using the MK Method," R. Hashemi, **A. Ghazanfari**, K. Abrinia, and A. Assempour, Journal of Materials Engineering and Performance 22, pp. 2522-7, 2013.
7. "Loading Path Determination for Tube Hydroforming Process of Automotive Component Using APDL," E.M. Khalil Abad, **A. Ghazanfari**, and R. Hashemi, International Journal of Automotive Engineering 3, pp. 555-63, 2013.
8. "Calibration of Forming Limit Diagrams Using a Modified Marciniak-Kuczynski Model and an Empirical Law," **A. Ghazanfari** and A. Assempour, Materials and Design 34, pp. 185-91, 2012.
9. "A New Calibration Method for FLCs in the M-K Frame-Work," **A. Ghazanfari** and A. Assempour, Advanced Materials Research 341, pp. 426-31, 2012.
10. "Forming Limit Diagrams of Ground St14 Steel Sheets with Different Thicknesses," R. Hashemi, **A. Ghazanfari**, K. Abrinia, and A. Assempour, SAE International Journal of Materials and Manufacturing 5, pp. 60-4, 2012.

Peer Reviewed Conference Papers

1. "A Novel Extrusion-Based Additive Manufacturing Process for Ceramic Parts," **A. Ghazanfari**, W. Li, M.C. Leu, and G.E. Hilmas, Solid Freeform Fabrication Symposium, Austin, TX, 2016.
2. "Properties of Partially Stabilized Zirconia Components Fabricated by the Ceramic On-Demand Extrusion Process," W. Li, **A. Ghazanfari**, D. McMillen, M.C. Leu, G.E. Hilmas, and J.L. Watts, Solid Freeform Fabrication Symposium, Austin, TX, 2016.

3. "Designed Extrudate for Additive Manufacturing of Zirconium Diboride by Ceramic On-Demand Extrusion," D. McMillen, W. Li, **A. Ghazanfari**, J.L. Watts, G.E. Hilmas, and M.C. Leu, Solid Freeform Fabrication Symposium, Austin, TX, 2016.
4. "Freeform Extrusion Fabrication of Advanced Ceramic Components with Embedded Sapphire Optical Fiber Sensors," **A. Ghazanfari**, W. Li, M.C. Leu, J.L. Watts, Y. Zhuang, and J. Huang, ASME Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS), Stowe, VT, 2016.
5. "Planning Freeform Extrusion Fabrication Processes with Consideration of Horizontal Staircase Effect," **A. Ghazanfari**, W. Li, M.C. Leu, and R.G. Landers, Solid Freeform Fabrication Symposium, Austin, TX, 2015.
6. "Optimal Rastering Orientation in Freeform Extrusion Fabrication Processes," **A. Ghazanfari**, W. Li, M.C. Leu, and R.G. Landers, Solid Freeform Fabrication Symposium, Austin, TX, 2015.
7. "Methods of Extrusion On Demand for High Solids Loading Ceramic Paste in Freeform Extrusion Fabrication", W. Li, **A. Ghazanfari**, M.C. Leu, and R.G. Landers, Solid Freeform Fabrication Symposium, Austin, TX, 2015.
8. "Composition Optimization for Functionally Gradient Parts Considering Manufacturing Constraints," **A. Ghazanfari** and M. C. Leu, Proceedings of the ASME 2014 Manufacturing Science and Engineering Conference (MSEC 2014), Detroit, MI, 2014.
9. "A Critical Assessment of Forming Limit Prediction Models and Beneficial Modifications to Them," **A. Ghazanfari** and A. Assempour, SAE World Congress, Detroit, MI, 2012.
10. "Forming Limit Diagrams of Ground St14 Steel Sheets with Different Thicknesses," R. Hashemi, **A. Ghazanfari**, K. Abrinia, and A. Assempour, SAE World Congress, Detroit, MI, 2012.
11. "Determination of Geometrical Parameters of the Dead Metal Zone in the Extrusion Process of Non-Symmetrical Dies Using the Upper Bound Method," M. Rastegar, A. Assempour, and **A. Ghazanfari**, SAE World Congress, Detroit, MI, 2012.
12. "A Theoretical Study on the Effect of Strain Rate on Forming Limit Diagrams," A. Assempour and **A. Ghazanfari**, 3rd International Conference on Manufacturing Engineering (ICME2011), Tehran, Iran, 2011.
13. "Effect of Manufacturing Processes on Formability of Steel Sheets," **A. Ghazanfari A**, R. Hashemi, A. Assempour, K. Abrinia, and A. Akbarzadeh, 3rd International Conference on Manufacturing Engineering (ICME2011), Tehran, Iran, 2011.
14. "Prediction of the Dead Metal Zone Profile in the Extrusion Process of Flat Dies Using Energy Minimization Method," M. Rastegar, A. Assempour, and **A. Ghazanfari**, 3rd International Conference on Manufacturing Engineering (ICME2011), Tehran, Iran, 2011.
15. "A New Calibration Method for FLCs in the M-K Frame-Work," **A. Ghazanfari A** and A. Assempour, International Conference on Material and Manufacturing Technology (ICMMT 2011), Xiamen, China, 2011.
16. "A Modified NADDRG Relation for Prediction of the Limiting Strains," A. Assempour and **A. Ghazanfari**, 5th National Conference of Metals and Materials Forming, Tehran, Iran, 2011.

Invited Talk

"Finite Element Analysis and Topology Optimization Using NX," **Student Section of American Society of Mechanical Engineers**, Missouri University of Science and Technology, 2016.

Work Experience

Sharif Satellite (funded by Iran's Space Agency), Sharif University of Technology, Tehran, Iran, Dec. 2009-Aug. 2012

Design engineer of Attitude Determination and Control Group

Studied and selected all required sensors and actuators. Designed the configuration of Sun Sensors. Designed the Reaction Wheel. Participated in the design and fabrication of a 3 DOF gimbal simulator and a 3 DOF air-bearing simulator. Participated in study and implementation of attitude determination algorithms. Participated in the Product Assurance group. Supervised the test subgroup. Supervised the Hardware In the Loop (HIL) subgroup.

Research Consortium for Design and Building a Pilot Unit for Production of Bio-Ethanol from Bagasse (funded by Iran's Ministry of Industries and Mines), Tehran, Iran, Jan. 2009- Jan. 2011

Design engineer of Mechanical Design Group

Designed 30+ tanks, pressure vessels and fermenters. Designed 3 distillation towers and their cartridge trays. Prepared datasheets of 25 different pumps.

Petrochemical Industries Equipment Design and Parts Manufacturing Company, Karaj, Iran, 2009

Intern

Studied the design and manufacturing processes of pressure vessels and heat exchangers.

"Iran Khodro" automobile manufacturing company, Karaj, Iran, 2007

Intern

Studied dynamical test of cars and proposed solutions for improving the test methods. Studied the design, manufacturing and assembling processes of automobile components.

Teaching Experience

- **Instructor** for **"Principles and Practice of Computer-Aided Design (Lab Session)"**, Missouri University of Science and Technology, Fall 2015
- Assistant for **"Metal Forming Analysis"** (a graduate level course), Sharif University of Technology, Spring 2011
- Assistant for **"Vibrations Laboratory"**, Sharif University of Technology, Spring 2011
- Assistant for **"Statics"**, Sharif University of Technology, Spring 2011
- **Instructor** for **AutoCAD software** for students of "Engineering Graphics I", Sharif University of Technology, Fall 2010
- Assistant for **"Vibrations Laboratory"**, Sharif University of Technology, Fall 2010

Computer Skills

Skilful at: NX, MATLAB & Simulink, ABAQUS, ANSYS, Solid Works, AutoCAD and PVELite

Familiar with: COMSOL, LabVIEW, CATIA, Fluent, Gambit, Automation Studio and Pascal

Service Activities

Council of Graduate Students (CGS), Missouri University of Science and Technology

Department Representative and member of Travel Grant Committee, Sep. 2013- Sep. 2014

Voiced the opinions of his constituents during discussions at meetings. Developed rules and regulations for awarding the travel grant to applicants.

Iranian Students Association (ISA), Missouri University of Science and Technology

Secretary, Aug. 2013- Aug. 2014

Held several cultural celebrations on campus. Developed rules and regulations for the association. Communicated with Iranian students.