ERVA ULU

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RESEARCH INTERESTS

My research interests include *design for fabrication*, *computational design, computer graphics*, *machine learning* and *data-driven design*.

EDUCATION

Carnegie Mellon University Aug 2013 – May 2018
Ph.D. Candidate in Mechanical Engineering Department (GPA: 4.0/4.0)
Thesis: Enhancing the structural performance of additively manufactured objects
Advisor: L. Burak Kara

Bilkent University Sept 2010 – Aug 2012
M.Sc. in Mechanical Engineering Department (GPA: 3.80/4.0)
Thesis: Mechatronic design of a modular three-axis slider system for high precision positioning applications
Advisor: Melih Cakmakci

Pennsylvania State University Aug 2009 – Dec 2009
Exchange Program in Mechanical Engineering Department (GPA: 4.0/4.0)

Middle East Technical University Sept 2006 – Jun 2010
B.Sc. in Mechanical Engineering Department (GPA: 3.72/4.0)

RESEARCH EXPERIENCE

Palo Alto Research Center June 2018 - Present
Research Scientist, System Sciences Lab
Digital fabrication, computational design and computer graphics

Carnegie Mellon University Aug 2013 – May 2018
Research Assistant, Visual Design and Engineering Lab
Design for fabrication, computational design and computer graphics

Disney Research Pittsburgh Aug 2016 – May 2017
Lab Associate
Learning to build micro-scale LEGO models

Siemens Corporate Research May 2016 – Aug 2016
Research Intern, Product Simulation & Modeling Group
Segmentation of 3D models for hybrid manufacturing process planning

Siemens Corporate Research May 2015 – Aug 2015
Research Intern, Product Simulation & Modeling Group
Shape Analytics: Data driven human grasps for natural looking simulations

Aselsan Inc. Aug 2012 – Aug 2013
R&D Engineer, Unmanned Systems Department
Control and stabilization of unmanned defense systems

Bilkent University Sept 2010 – Aug 2012
Research Assistant, Smart Mechatronic Systems Lab
Mechatronic design, signal processing, and precision positioning

PUBLICATIONS

E. Ulu, N. Gecer Ulu, W. Hsiao and S. Nelaturi (2019). Manufacturability Oriented Model Correction and Build Direction Optimization for Additive Manufacturing. *ASME Journal of Mechanical Design.*

E. Ulu, J. McCann and L. B. Kara (2019). Structural Design Using Laplacian Shells. *Computer Graphics Forum (In Symposium on Geometry Processing (SGP)).*

E. Ulu, R. Huang, L. B. Kara and K.S. Whitefoot (2019). Concurrent Structure and Process Optimization for Minimum Cost Metal Additive Manufacturing. *ASME Journal of Mechanical Design.*

E. Ulu (2018). Enhancing the Structural Performance of Additively Manufactured Objects. *Doctoral Dissertation, Carnegie Mellon University, Pittsburgh, PA.*

Y. Wang, **E. Ulu**, A. Singh and L. B. Kara (2018). Efficient Load Sampling for Worst-Case Structural Analysis Under Force Location Uncertainty. *ASME IDETC, Quebec City, Canada.*

E. Ulu, J. McCann and L. B. Kara (2017). Lightweight Structure Design Under Force Location Uncertainty. *ACM Transactions on Graphics (SIGGRAPH 2017).*

R. Huang, **E. Ulu**, L. B. Kara and K.S. Whitefoot (2017). Cost Minimization in Metal Additive Manufacturing Using Concurrent Structure and Process Optimization. *ASME IDETC, Cleveland, OH.*

E. B. Arisoy, G. Ren, **E. Ulu**, N. Gecer Ulu and S. Musuvathy (2016). A Data-driven Approach to Predict Hand Positions For Two-Hand Grasps of Industrial Objects. *ASME IDETC, Charlotte, NC.* ***(Best Paper Award)***

N. Gecer Ulu, **E. Ulu**, and M. Cakmakci (2016). Design and Analysis of A Modular Learning Based Cross-Coupled Control Algorithm for Multi-Axis Precision Positioning Systems. *International Journal of Control Automation and Systems.*

E. Ulu, E. Korkmaz, K. Yay, O. B. Ozdoganlar, and L. B. Kara (2015). Enhancing the Structural Performance of Additively Manufactured Objects Through Build Orientation Optimization. *ASME Journal of Mechanical Design, Special Issue: Design for Additive Manufacturing.*

E. Ulu, R. Zhang, and L. B. Kara (2015). A Data-Driven Investigation and Estimation of Optimal Topologies Under Variable Loading Configurations. *Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization*. (Extended version of CompImage'14)

E. Ulu, R. Zhang, M. E. Yumer, and L. B. Kara (2014). A Data-Driven Investigation and Estimation of Optimal Topologies Under Variable Loading Configurations. *Computational Modeling of Objects Presented in Images: Fundamentals, Methods, and Applications* (*CompIMAGE'14), Pittsburgh, PA.*

E. Ulu, N. Gecer Ulu, and M. Cakmakci (2014). Development and Validation of an Adaptive Method to Generate High-Resolution Quadrature Encoder Signals. *ASME Journal of Dynamic Systems, Measurement, and Control.*

E. Ulu (2012). Mechatronic Design of a Modular Three-Axis Slider System for High-Precision Positioning Applications. *Master's Thesis, Bilkent University, Ankara, Turkey.*

E. Ulu, N. Gecer Ulu, and M. Cakmakci (2012). Adaptive Correction and Look-up Table Based Interpolation of Quadrature Encoder Signals. *ASME Dynamic Systems and Control Conf. (DSCC 2012), Ft. Lauderdale, FL.*

N. Gecer Ulu, **E. Ulu**, and M. Cakmakci (2012). Learning Based Cross-Coupled Control for Multi-Axis High Precision Positioning Systems. *ASME Dynamic Systems and Control Conf. (DSCC 2012), Ft. Lauderdale, FL.* ***(Best Paper Award)***

N. Gecer Ulu, **E. Ulu**, S. Filiz, and M. Cakmakci (2012). Development of a Modular Single-Axis Slider System for High Precision Positioning Applications. *The 15th International Conference on Machine Design and Production, Denizli, Turkey.*

PATENTS

E. Ulu, E. B. Arisoy, S. Musuvathy, and N. Gecer Ulu (2017). System and Method for Build Orientation Based Volumetric Segmentation. *(Application in preparation).*

E. B. Arisoy, S. Musuvathy, **E. Ulu**, and N. Gecer Ulu (2017). Methods and System to Predict Hand Positions for Multi-Hand Grasps of Industrial Objects. *(Publication Number: WO2017132134 A1).*

MEDIA

Phys.org – Lighter Weights, Lower Costs In Additive Manufacturing.

Treehugger – Optimizing Additive Manufacturing For 3-D Printing Stronger, Lighter Parts.

IEEE GlobalSpec – Watch This: Structural Optimization for Additive Manufacturing.

Carnegie Mellon University – Lighter Weights, Lower Costs In 3D Printing.

TEACHING EXPERIENCE

Carnegie Mellon University, Mechanical Engineering Department Jan 2015 – Jan 2016
Teaching Assistant, Engineering Design II

Bilkent University, Mechanical Engineering Department Sept 2010 – Jun 2012
Teaching Assistant, Fundamentals of Mechanical Engineering
Teaching Assistant, Introduction to Systems Engineering
Teaching Assistant, Mechanics and Materials II

FELLOWSHIPS & AWARDS

David Barakat and LaVerne Owen-Barakat Fellowship	2016
Milton Shaw PhD Student Travel Award, Carnegie Mellon University	2015
International Scientific Research Incentive Award, TUBITAK	2014
Student Travel Grant, ASME Dynamic Systems and Control Conference 2012	2012
Graduate Fellowship of Scientific and Technical Research Council of Turkey	2010 - 2012
Full Scholarship for MSc.,Bilkent University	2010 - 2012
Dean's List, Pennsylvania State University	2009
Dean's High Honor List, Middle East Technical University	2006 – 2010

TECHNICAL SKILLS

Programming - C++, Matlab, OpenGL, Qt
CAD Tools - Solidworks, NX, Autodesk Inventor, ANSYS Mechanical APDL
Simulation - NI Labview, Matlab Simulink and SimMechanics

PHD COURSEWORK

Computational Aspects of Fabrication
Computer Graphics
Finite Element Methods in Mechanics
Computer Aided Design
Applied Fabrication Techniques for HCI
Computer Graphics Seminar
Introduction to CAD/CAE Tools