

RESEARCH INTERESTS

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

EDUCATION

Carnegie Mellon University 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	Aug 2013 – May 2018
Bilkent University 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	Sept 2010 – Aug 2012
Pennsylvania State University Exchange Program in Mechanical Engineering Department (GPA: 4.0/4.0)	Aug 2009 – Dec 2009
Middle East Technical University B.Sc. in Mechanical Engineering Department (GPA: 3.72/4.0)	Sept 2006 – Jun 2010

RESEARCH EXPERIENCE

Palo Alto Research Center Research Scientist, System Sciences Lab Digital fabrication, computational design and computer graphics	June 2018 - Present
Carnegie Mellon University Research Assistant, Visual Design and Engineering Lab Design for fabrication, computational design and computer graphics	Aug 2013 – May 2018
Disney Research Pittsburgh Lab Associate Learning to build micro-scale LEGO models	Aug 2016 – May 2017
Siemens Corporate Research Research Intern, Product Simulation & Modeling Group Segmentation of 3D models for hybrid manufacturing process planning	May 2016 – Aug 2016
Siemens Corporate Research Research Intern, Product Simulation & Modeling Group Shape Analytics: Data driven human grasps for natural looking simulations	May 2015 – Aug 2015
Aselsan Inc. R&D Engineer, Unmanned Systems Department Control and stabilization of unmanned defense systems	Aug 2012 – Aug 2013
Bilkent University Research Assistant, Smart Mechatronic Systems Lab Mechatronic design, signal processing, and precision positioning	Sept 2010 – Aug 2012

PUBLICATIONS

- E. Ulu**, J. McCann and L. B. Kara (2019). Structural Design Using Laplacian Shells. *ACM Transactions on Graphics (SIGGRAPH 2019 – Under Review)*.
- 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 ComplImage'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	Applied Fabrication Techniques for HCI
Computer Graphics	Computer Graphics Seminar
Finite Element Methods in Mechanics	Introduction to CAD/CAE Tools
Computer Aided Design	