

RESEARCH INTERESTS

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

EDUCATION

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| 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

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| 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. *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 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

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| 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

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|--------------------------------------|--|
| 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 | |