

# Tyler N. Morrison

Graduate Research Assistant

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"Let's see if this works."



## Education



### The Ohio State University

Ph.D. Mechanical Engineering

- GPA: 4.00/4.00
- Distinguished University Fellow
- Department of Mechanical Engineering Supplementary Award

Columbus, OH, USA

Aug. 2017 — May 2022 (est.)



### The University of Tulsa

B.S. Mechanical Engineering

- GPA: 4.00/4.00
- Chapman Presidential Scholar
- Vision Scholar

Tulsa, OK, USA

Aug. 2013 — May 2017

## Research Experience

### Design, Innovation and Simulation Lab (DISL)

The Ohio State University,  
Columbus, OH, USA

Graduate Research Assistant

August 2017 — Present

- Developed software, planned, and conducted experiments for interdisciplinary research on attention to preview in human drivers.
- Modeled, tested, and analyzed variable stiffness links (VSLs) for use in corobots.
- Mentored high school, undergraduate, and MS students on research projects.
- Administered upkeep of lab server and rapid-prototyping equipment.

### NSF Interfaces and Surfaces REU

Clemson University, Clemson, SC,  
USA

REU Research Assistant

May 2016 — August 2016

- Conducted numerical simulations of hydrogel membranes under illumination.
- Modeled and implemented code for numerical simulation of magnetically heated gels with cooling effects.
- Mentored incoming MS student on simulation software and high-performance computing.

### Biological Robotics at Tulsa Lab (BRAT Lab)

The University of Tulsa, Tulsa, OK,  
USA

Undergraduate Research Assistant

May 2015 — July 2017

- Pursued independent research on grasping and manipulation with quadruped robots.
- Developed method optimal foot-shuffle algorithm for quadruped stabilization under disturbances and body-position constraints.
- Developed interactive 3D model of quadruped kinematics and tip-over stability.

## Peer-Reviewed Journal Articles

**Tyler Morrison**, Chunhui Li, Xu Pei, Hai-Jun Su. *A Novel Rotating Beam Link for Variable Stiffness Robotics Arms*. IEEE Robotics and Automation Letters. 2019. «In Revision».

Richard Jagacinski, Emanuele Rizzi, Benjamin Bloom, Omer Turkkan, **Tyler Morrison**, Hai-Jun Su, Junmin Wang. *Drivers' Attentional Instability on a Winding Roadway*. IEEE Transactions on Human-Machine Systems. 2019. «In Revision».

Oksana Savchak, Konstantin Kornev, **Tyler Morrison**, Olga Kuksenok. *Controlling Deformations of Gel-based Composites by Electromagnetic Signals within GHz Frequency Range*. Soft Matter. 2018. «Published». DOI:10.1039/C8SM01207E

## Research Presentations

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**Tyler Morrison**, Joshua Schultz. *Investigation into Coordinated Gaits of Quadruped Robots Engaged in Grasping and Manipulation with Applications in Search and Rescue*. The University of Tulsa Student Research Colloquium Mechanical Engineering Session. *Tulsa, OK, USA*. March 2016. «Poster + Oral».

Oksana Sachak, Yao Xiong, **Tyler Morrison**, Konstantin Kornev, Olga Kuksenok. *Magnonics in hydrogels: modeling and magnetomechanical effects in GHz frequency range*. MRS Spring Meeting: Computer-Based Modeling and Experiment for the Design of Soft Materials Symposium. *Phoenix, AZ, USA*. April 2017. «Oral».

**Tyler Morrison**, Joshua Schultz. *Algorithms for Shuffling Foot Placements to Maintain Stability of a Quadruped Robot Engaged in a Cooperative Task*. The University of Tulsa Student Research Colloquium Mechanical: Engineering Session. *Tulsa, OK, USA*. March 2017. «Oral».

**Tyler Morrison**, Olga Kuksenok. *Numerical Simulations of NIPA Gel Membranes Exposed to Heat and Light*. Clemson Undergraduate Research Symposium. *Clemson, SC, USA*. July 2016. «Poster».

**Tyler Morrison**, Joshua Schultz. *Investigation into Coordinated Gaits of Quadruped Robots Engaged in Grasping and Manipulation with Applications in Search and Rescue*. The University of Tulsa Student Research Colloquium: Mechanical Engineering Session. *Tulsa, OK, USA*. March 2016. «Oral».

## Other Presentations

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Abdulhamid Aljaber, Sultan Al-Nabhani, Nick Criser, Brian Hall, Joel Kapp, **Tyler Morrison**, Drake Norman, Alex Price, Tommy Weissert. *The Tulsa Children's Museum Petroleum Exhibit Ball Lift*. The University of Tulsa Senior Projects. *Tulsa, OK, USA*. April 2017. «Oral».

Brian Hall, **Tyler Morrison**, Alex Price. *The Tulsa Children's Museum Auger Ball Lift*. The University of Tulsa Department of Mechanical Engineering Advisory Board Meeting. *Tulsa, OK, USA*. March 2017. «Oral».

## Skills and Experience

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<b>Programming</b>	Mathematica, MATLAB, Python, JAVA, C, VBA, $\text{\LaTeX}$
<b>Modeling and Design Software</b>	Solidworks, Revit, AutoCAD, Adobe Illustrator
<b>Simulation</b>	ANSYS, ABAQUS, Solidworks Simulation
<b>Hardware</b>	Arduino, Raspberry Pi
<b>Rapid Prototyping</b>	3D-Printing, Laser Cutting, Plasma Cutting

## Additional Experience

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### The Tulsa Children's Museum

Mechanical Engineering Senior Project

- Team designed and built a 15 foot steel auger ball-lift system for an exhibit at the children's museum.
- I made significant contributions to the design and modeling of the device.
- Elected project MVP.
- Of the 10 projects, ours was runner-up to best project as voted by peers.
- You can see a video of the project before it was installed in the museum here: <https://youtu.be/jlq1ikz-zHM>

*Tulsa, OK, USA*

*October 2016 — May 2017*

### The University of Tulsa Mechanical Engineering Department

Student Grader

- Mechanics of Materials (ME 3023)
- Instrumentation and Measurement (ME 3053)

*Tulsa, OK, USA*

*Spring 2016 — Spring 2017*

## Mechanical Department, Aviation and Federal Division, Burns and McDonnell

Kansas City, MO, USA

Mechanical Engineering Intern

Summer 2015

- Assisted in designing HVAC and plumbing systems at Tinker Air Force Base, Portland International Airport, The Sampson School At Guantanamo Bay Naval Base

## Navitas ESCO

Olathe, KS, USA

Jobsite Administrative Assistant

Summer 2014

## Dairy Queen

Overland Park, KS, USA

2012 — 2013

## Extracurricular Activity

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### Tau Beta Pi

Tulsa, OK, USA

Involved Member of Oklahoma Beta Chapter

2015 — 2017

- Helped lead initiation of new members and organize induction ceremonies and fellowship activities.

### Mathematical Association of America Putnam Competition

Tulsa, OK, USA

University of Tulsa Team Member and Individual Competitor

2014, 2015

- Personal best score of 11, ranks in top 21% of mathematicians in North America. (Median score is zero points)
- Trained with Dr. Christian Constanda.
- Resigned from team to focus on research.

### Boy Scouts of America

Kansas City, KS, USA

Eagle Scout

2001 — 2013

- Eagle Scout service project: leading and organizing a project to build bookshelves for a library system at a home for troubled children.
- Member of U.S. BSA Delegation to the 2011 World Scout Jamboree in Sweden.
- Heart of America Council, Trailhead District, Troop 92 & Pack 3449.

## Honors & Awards

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### Graduate

2017 **Distinguished University Fellow**, The Ohio State University

Columbus, OH,  
USA

2017 **Department Supplementary Fellowship Award**, The Ohio State University

Columbus, OH,  
USA

### Undergraduate

2017 **College of Engineering and Natural Sciences Steven J. Bellovich Medal**, The University of Tulsa

Tulsa, OK, USA

2017 **Sidney Born Award in Mechanical Engineering**, The University of Tulsa

Tulsa, OK, USA

2017 **Senior Project MVP**, The University of Tulsa Mechanical Engineering Senior Projects

Tulsa, OK, USA

2017 **Best Senior Project Team Runner-Up**, The University of Tulsa Mechanical Engineering Senior Projects

Tulsa, OK, USA

2017 **Nominee for National Barry Goldwater Scholarship**, The University of Tulsa

Tulsa, OK, USA

2013 —  
2017 **President's Honor Roll**, The University of Tulsa

Tulsa, OK, USA

2013 **National Merit Finalist**, National Merit Scholarship Corporation

## Attended Conferences

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- Robotics: Science and Systems; June 26-30, 2018; Pittsburgh, PA, USA

## Peer-Review Assistance

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- IROS2018