

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

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

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

Conference Papers

Tyler Morrison, Chunhui Li, Xu Pei, Hai-Jun Su. *A Novel Rotating Beam Link for Variable Stiffness Robotics Arms*. IEEE Conference on Robotics and Automation. *Montreal, CA*. May 2019. «Forthcoming».

Research Presentations

Tyler Morrison, Joshua Schultz. *Optimal shuffles to prevent quadruped tipover during cooperation*. Robotics: Science and Systems Workshop on Design and Control of Small Legged Robots. *Pittsburgh, PA, USA*. June 2018. «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».

Honors & Awards

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

Skills and Experience

Programming	Mathematica, MATLAB, Python, Java, C/C++, LaTeX
Modeling and Design Software	Solidworks, Revit, AutoCAD, Adobe Illustrator
Simulation	ANSYS, ABAQUS, Solidworks Simulation
Hardware	Arduino, Raspberry Pi
Rapid Prototyping	3D-Printing, Laser Cutting, Plasma Cutting

Additional Experience

The Tulsa Children's Museum

Mechanical Engineering Senior Project

Tulsa, OK, USA

October 2016 — May 2017

- 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>

The University of Tulsa Mechanical Engineering Department

Tulsa, OK, USA

Student Grader

Spring 2016 — Spring 2017

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

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

Other Presentations

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».

Extracurricular Activity

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.

Attended Conferences

- Robotics: Science and Systems; June 26-30, 2018; Pittsburgh, PA, USA
- IEEE International Conference on Robotics and Automation; May 20-24, 2019; Montreal, QC, CA

Peer-Review Assistance

- IROS2018