

# BENJAMIN T. WALT

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## EDUCATION

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**University of Illinois Urbana-Champaign**  
Ph.D. Candidate in Mechanical Engineering

*Expected August 2025*  
*Advisor: Girish Krishnan*

**University of Illinois Urbana-Champaign**  
Masters of Science in Mechanical Engineering

*August 2020*  
*Advisor: Girish Krishnan*

**University of Illinois Urbana-Champaign**  
Bachelors of Science in Mathematics  
Minor in East Asian Languages and Cultures  
Member of Pi Mu Epsilon

*May 2007*

## RESEARCH INTEREST

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I am interested in manipulation and grasping in realistic, complex environments. I explore the use of sensors to enhance grasp quality and effective manipulation. I am also interested in exploring the effectiveness of soft continuum actuators in manipulation. To achieve this, I am developing model-based control of soft continuum actuators with bending and torsion.

## RESEARCH EXPERIENCE

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**Research Assistant**  
*University of Illinois*

January 2019 - Present  
*Urbana, IL*

- Created dynamic models of soft continuum actuators with both bending and torsional deformations and designed control techniques to work on real hardware.
- Designed, built and programmed a mobile hybrid soft-rigid agricultural robot research platform capable of identifying, maneuvering to, grasping, and plucking cherry tomatoes.
- Used simple sensors and machine learning techniques to identify the current state of the grasp (i.e. slipping, failure, successful pick) while harvesting cherry tomatoes.
- Performed a zero-shot sim-to-real transfer of a Reinforcement Learning control policy for visual servoing a soft continuum actuator.

## TEACHING AND MENTORING EXPERIENCE

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**Computer-Aided Design**  
*Teaching Assistant*

August 2022 - December 2022  
*Urbana, IL*

- Guided students through a multi-phased group project focused on human centered design methods.
- Evaluated student learning through lab reports and presentations.
- Topics taught include: human centered design, parametric design in CAD, geometric dimensioning and tolerancing, and manufacturing methods.

**Sparking High Schoolers' Excitement for Research in Engineering & Science (SpHERES)**  
May 2022 - July 2022

*Mentor*

*Urbana, IL*

- Mentored 2 high school students in "Building Baymax."
- Together we explored soft robotics and built a Baymax-inspired, soft, inflatable arm capable of grasping and moving objects.
- Mentees presented their work at a public poster session.

## Senior Engineering Project

January 2022 - May 2022

*Mentor*

*Urbana, IL*

- Mentored 3 undergraduate seniors in analyzing and improving a pneumatic gripper design.
- Mentees analyzed the original design, implemented design improvements and performed experiments to demonstrate the effectiveness of the improved design.
- Results were presented to members of their class and department faculty.

## Introduction to Robotics

August 2018 - December 2020

*Teaching Assistant*

*Urbana, IL*

- Designed laboratory activities to develop and reinforce classroom lecture topics.
- Evaluated student learning through lab reports, homework, group projects and tests.
- Topics taught include: rigid body motions, forward and inverse kinematics, velocity kinematics, MDPs, Bayes filters, and particle filters.

## AWARDS AND HONORS

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- Harold L. Olesen Undergraduate Teaching Award for 2020-21 School Year
- Six appearances on the List of Teachers Ranked as Excellent by Their Students (University of Illinois Urbana-Champaign)

## PUBLICATIONS

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- **B. T. Walt** and G. Krishnan, “Grasp State Classification in Agricultural Manipulation,” in IEEE International Conference on Intelligent Robots and Systems, 2023.
- H. Yang, M. Khosravi, **B. Walt**, G. Krishnan and S. Sarkar, “Zero-shot Sim-to-Real Transfer for Reinforcement Learning-based Visual Servoing of Soft Continuum Arms,” in Proceedings of the 7th Annual Learning for Dynamics & Control Conference, 2025. (Accepted)
- N. K. Uppalapati, **B. T. Walt**, A. Havens, A. Mahdian, G. Chowdhary, and G. Krishnan, “A Berry Picking Robot With A Hybrid Soft-Rigid Arm: Design and Task Space Control,” in Robotics: Science and Systems Foundation, 2020.
- S. K. Kamtikar, S. Marri, **B. T. Walt**, N. K. Uppalapati, G. Krishnan, and G. Chowdhary, “Visual Servoing for Pose Control of Soft Continuum Arm in a Structured Environment,” in IEEE Robotics and Automation Letters, 2022.
- K. Koe, S. Marri, **B. Walt**, S. Kamtikar, N. K. Uppalapati, G. Krishnan, G. Chowdhary, “Learning-Based Position and Orientation Control of a Hybrid Rigid-Soft Arm Manipulator,” in Journal of Mechanisms and Robotics, 2025.
- K. Koe, P. K. Shah, **B. Walt**, J. Westphal, S. Marri, S. Kamtikar, J. S. Nam, N. K. Uppalapati, G. Krishnan, G. Chowdhary, “Precision Harvesting in Cluttered Environments: Integrating End Effector Design with Dual Camera Perception,” in IEEE International Conference on Robotics and Automation, 2025. (Accepted)
- T. Wang, H. Chang, S. H. Kim, J. Guo, U. Akcal, **B. Walt**, D. Biskup, U. Halder, G. Krishnan, G. Chowdhary, M. Gazzola, P. G. Mehta, ”A Neural Network-based Framework for Fast and Smooth Posture Reconstruction of a Soft Continuum Arm,” in IEEE International Conference on Robotics and Automation, 2025. (Accepted)

## CONFERENCE PRESENTATIONS

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- “Grasp State Classification in Agricultural Manipulation,” in IEEE International Conference on Intelligent Robots and Systems, Detroit, MI, October 2023.

## PROFESSIONAL EXPERIENCE

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### U.S. Navy

January 2002 - July 2003

*Leading Engineering Laboratory Technician*

*New London, CT*

- Supervised and trained a 7 person division in the daily chemistry and radiological operations on board a nuclear submarine. Trained sailors at the divisional, departmental, and ship-wide levels in a classroom setting.
- Analyzed the results of laboratory work and coordinated corrective actions.
- Successfully led the division through 3 major external assessments of operational knowledge.
- Developed, executed and assessed a training plan that resulted in an increase from an ‘average’ to an ‘above-average’ rating by external assessment.

### U.S. Navy

July 1997 - January 2002

*Engineering Laboratory Technician*

*New London, CT*

- Conducted, as part of a team, the daily chemistry and radiological operations on board a nuclear submarine.
- Performed precise laboratory analysis and maintained detailed records of all results.
- Trained groups of 30 at the divisional and departmental levels in a classroom setting.
- Promoted to Leading Engineering Laboratory Technician.

## UNIVERSITY SERVICE

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- Coordinated Science Laboratory Student Conference 2024 Laboratory Tour Chair

## TECHNICAL SKILLS

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### Programming Languages

Python, MATLAB, C/C++

### Robotics Tools

Robotic Operating System (ROS), Gazebo, MoveIt!, OpenCV

### Mechatronics

Serial communication, Microcontroller programming,

Component integration and assembly

### Software & Tools

SOLIDWORKS, LaTeX, Linux, Excel

## PROFESSIONAL MEMBERSHIPS

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- American Society of Mechanical Engineers (ASME) - Student Member
- Institute of Electrical and Electronics Engineers (IEEE) - Student Member