Andrew S. Morgan

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Curriculum Vitae

EDUCATION:

Yale University, New Haven, CT (2017 – Present)
Doctor of Philosophy in Mechanical Engineering and Materials Science
Expected Graduation: 2023
Focus: Robotics – Manipulation, Learning, Mechanics, Controls
Advisor: Prof. Aaron Dollar

Youngstown State University, Youngstown, OH (2013-2017)
Graduated: May 2017 (summa cum laude from Honors College)
Bachelor of Engineering, GPA 3.98 (President's List & Dean's List)
Major: Computer/Digital Electrical Engineering
Bachelor of Science, GPA 3.98 (President's List & Dean's List)
Major: Computer Science
Minor: Mathematics

WORK EXPERIENCE:

Biz3D Instructor – 3D Printing 101 Outreach Instructor **Summer 2016 & 2017**
Youngstown Business Incubator & Youngstown State University

- Developed a curriculum to provide applicable 3D modeling/printing knowledge
- Constructed memorable and practical real-life examples to 3D Printing practices in the workplace
- Facilitated knowledge growth through supplemental engineering design principles
- Provided hands-on experience for High School students to have the opportunity to work with new and upcoming technologies
- Aided students in building a professional network beyond what was currently available

Honors Engineering Teaching Assistant **/ Engineering Lab Manager**
August 2014- June 2017
YSU College of Science Technology Engineering and Mathematics

- Aided students in homework, project development, project fabrication, and test preparation
- Developed applicable, elementary engineering problems that apply skills acquired in the course to prepare students for future coursework
- Co-founder in the initiative to study how 3D Printing technologies help facilitate learning in First Year Engineering students (2014, 2015)

- Facilitated networks between upper classman and first-year students for coursework support
- Acted as an Honors Ambassador for First Year STEM students to help bridge Honors College requirements into coursework and service projects on campus

Auburn REU on SMART UAVS **Summer 2016**

Auburn University Department of Computer Science and Software Engineering

- "DIY Drone Recovery Parachute"
  - Designed with respect to FAA regulations
  - Worked independently with publishable magazine article at end of work
- "An Unmanned Aircraft "See and Avoid" Algorithm Development Platform using OpenGL and OpenCV"
  - Constructed a collision avoidance tool for future research in unmanned algorithms
  - Research resulted in journal publication, with additional groups adding to this tool in future REUs
- Facilitated extensive communication in meetings and presentations

Test Engineering Co-operative **Summer 2015**

ABB Inc., Wickliffe, OH

- Tested ABB Power Systems and Power Generation (PSPG) controllers and peripherals for corresponding tasks of implementation in the Research and Development group
- Constructed the largest test system built by the ABB Research and Development laboratory at the Wickliffe site
- Organized and coordinated co-op fundraising for the WE CARE charity events, benefiting Rainbow Babies Children's Hospital and Woman's Safe

Undergraduate Research Assistant **August 2014-August 2016**

YSU Department of Computer Science and Information Systems; Dr. Bonita Sharif

Worked extensively with Dr. Sharif on the Koli Workshop 2014 paper:

- Analyzed a research case study, examining eye gaze data of novice programmers' progression of reading and interpreting source code
- Took the lead on constructing the paper published and peer reviewed within the workshop
- Transcribed eye gaze data into phases, or epics, used to interpret cognitive cycles within understanding of source code
- Collected eye tracking data by conducting research sessions with peers to compare within paper constraints

YSU Department of Mechanical and Industrial Engineering; Dr. Kerry Meyers

Co-authored two papers, one in the Global Journal for Engineering Education and one in the Proceedings of the American Society for Engineering Education 2016.

- Constructed lessons and presentations to introduce students to the fundamentals of Fused Deposition Modeling (FDM) 3D printing
- Composed surveys and questionnaire's regarding experience and interests in Solid Modeling
- Acted as an 3D Printing ambassador between students and the STEM college in an initiative to enhance awareness of available technologies at the university

LANGUAGE SKILLS: Intermediate Reading and Speaking capabilities in *Greek & Spanish*
Proficient programmer in C, C++, Java, Matlab, Python, & Arduino

AWARDS/HONORS:

- Youngstown State University Scholars Program USXXI — Fall 2013
  (4-year) Full-Funding Academic Merit Scholarship
- National Science Foundation Graduate Fellow — Spring 2019
- Robert E. Apfel Graduate Fellowship 2017 — Fall 2017
- Best Honors Undergraduate Research Project — Spring 2017
- Tau Beta Pi Fellow 2017 — Spring 2017
- National Science Foundation Honorable Mention Fellow — Spring 2017
- Barry M. Goldwater Scholar 2016 — Spring 2016
- Tau Beta Pi Scholar 2016 — Summer 2016
- Ohio State Senate Recognition Award — Summer 2016
- Ohio State House of Reps. Recognition Award — Summer 2016
- ΤΒΠ National Engineering Society — Fall 2015
- ΦΚΦ National Honor Society — Spring 2015
- ΠΜΕ National Math Honor Society — Spring 2015

PUBLICATIONS:

Refereed Journal Articles:

J7. Morgan, A.S., Hang, K., Bircher, W. G., Calli, B., and Dollar, A.M., "Benchmarking Pick-and-Place Manipulation with the Box and Blocks Test", *Special Issue on Benchmarking Robot Manipulation: Robotics and Automation Letters,* 2019. (In Review).

J6. Hang, K.*, Bircher, W. G.*, Morgan, A. S., and Dollar, A.M., "Hand-Object Configuration Estimation using Particle Filters for Dexterous In-Hand Manipulation", *Special Issue on Soft Manipulation: International Journal of Robotics Research*, 2019. (Accepted)

J5. Spiers, A., Morgan, A. S., Srinivasan, K., Calli, B., and Dollar, A. M., "Using Variable-Friction Finger Surfaces and Proprioceptive Sensing to Classify Objects during Robotic Within-Hand Manipulation", *Transactions on Haptics*, 2019. (Minor Revisions Requested)

J4. Sintov, A., Morgan, A. S., Kimmel, A., Dollar, A. M., Bekris, K. E., and Boularias, A., "Learning a State Transition Model of an Underactuated Adaptive Hand", *IEEE Robotics and Automation Letters,* Vol. 4, No. 2, pp. 1287-1294, 2019.

J3. Hang, K., Morgan, A. S., and Dollar, A. M., "Pre-Grasp Sliding Manipulation Planning of Thing Objects Using Soft, Compliant, or Underactuated Hands", *IEEE Robotics and Automation Letters,* Vol. 4, No. 2, pp. 662-669, 2019. **Nominated for best paper in robot manipulation (ICRA 2019).**

J2. Morgan, A. S., Jones, Z., Chapman, R., and Biaz, S., "An Unmanned Aircraft "See and Avoid" Algorithm Development Platform using OpenGL and OpenCV", *Journal of Computing Sciences in Colleges*, Consortium for Computing in Colleges, Vol. 33, No. 2, pp. 229-236, 2017.

J1. Meyers, K., Morgan, A. S., and Conner, B. "3D printing to introduce design in a cornerstone project". *Global Journal of Engineering Education*, Vol. 18, Issue 1, 2016.

Refereed Conference Papers (full manuscripts):

C7. Morgan, A. S., Hang, K., Bircher, W. G., and Dollar, A. M., "A Data-Driven Framework for Learning Spatial, Object-Agnostic Underactuated Dexterous Manipulation", IEEE *International Conference on Intelligent Robots and Systems (IROS)*, Macao, China, 2019. (Accepted)

C6. Morgan, A. S. *, Baines, R. L.*, McClintock, H., and Scassellati, B., "Unstructured Terrain Navigation and Topographic Mapping with a Low-cost Mobile Cuboid Robot", *IEEE International Conference on Intelligent Robots and Systems (IROS),* Macao, China, 2019. (Accepted)

C5. Morgan, A. S., Bircher, W. G., Calli, B., and Dollar, A. M., "Learning from Transferable Mechanics Models: Generalizable Online Mode Detection in Underactuated Dexterous Manipulation", *IEEE International Conference on Robotics and Automation (ICRA),* 2019.

C4. Bircher, W. G., Morgan, A. S., Hang, K., and Dollar, A. M., "Energy Gradient-Based Graphs for Planning Within-Hand Caging Manipulation", *IEEE International Conference on Robotics and Automation (ICRA),* 2019.

C3. Calli, B., Srinivasan, K., Morgan, A. S., and Dollar, A. M., "Learning Modes of Within-hand Manipulation." *IEEE International Conference on Robotics and Automation (ICRA),* Brisbane, Australia, 2018. **Nominated for best paper in robot manipulation.**

C2. Meyers, K., Morgan, A. S., and Conner, B. "3D Printing in a First-Year Engineering Design Project". *American Society for Engineering Education National Conference*, New Orleans, 2016.

C1. Morgan, A. S., Sharif, B., and Crosby, M. "Understanding a Novice Programmer's Progression of Reading and Summarizing Source Code". Koli Workshop 2014. Koli, Finland. 2014.

Magazine Articles:

M1. Morgan, A. S., Chapman, R., and Biaz, S., "DIY Drone Recovery Parachute", *Make Magazine,* Vol. 61, Feb/March Issue, pp. 42., 2018.

Patent:

P1. Morgan, A.S., and Kreatsoulas, N., Provisional Patent completed in April 2015, "IV Locking Device", Patent Application Number: 62/146,434.

PRESENTATIONS:

Invited Talks:

OP5. Coalition for Life Sciences-Life Science Fair 2019. Captiol Hill, Washington D.C., 2019.,
"Design Process Towards Robotic and Prosthetic Hands"

OP4. ICRA Workshop on Benchmarking in Manipulation, Montreal, Canada, 2019
"The Box and Blocks Test in Cluttered Robot Pick-and-Place Applications"

OP3. YSU's QUEST: a Forum for Undergraduate Research, Youngstown, OH, 2017
"Digital Licensing Platform for Retro Games"
Best Honors College Project Award

OP2. NSF Emerging Researchers National Conference, Washington DC, 2017
"Computer Vision 'See and Avoid' Simulation using OpenGL and OpenCV"
Second Place winner in Computer Sciences and Information Management

OP1. Gulf Coast Undergraduate Research Symposium, Houston, TX, 2016
"Computer Vision 'See and Avoid' Simulation using OpenGL and OpenCV"

Poster Presentations:

PP5. International Conference on Robotics and Automation, Montreal, Canada, 2019
"Learning from Transferable Mechanics Models: Generalizable Online Mode Detection in Underactuated Dexterous Manipulation"

PP4. International Conference on Robotics and Automation, Montreal, Canada, 2019

"Energy Gradient-Based Graphs for Planning Within-Hand Caging Manipulation"

PP3. New England Manipulation Symposium, New Haven, CT, 2018
"Data Driven Detection of Manipulation States"

PP2. American Society for Engineering Education National Conference, New Orleans, LA, 2016
"3D Printing in a First-Year Engineering Design Project"

PP1. Koli Workshop, Koli, Finland, 2014
"Understanding a Novice Programmer's Progression of Reading and Summarizing Code"

TEACHING ASSISTANTSHIPS:

Spring 2019 – Mechanical Engineering Capstone II	Yale University
Fall 2018 – Mechanical Engineering Capstone I	Yale University
Spring 2016 – Honors First Year Engineering Computing	Youngstown State University
Fall 2015 – Honors First Year Engineering Concepts	Youngstown State University
Spring 2015 – Honors First Year Engineering Computing	Youngstown State University
Fall 2014 – Honors First Year Engineering Concepts	Youngstown State University

ORGANIZATIONS AND SERVICE:

Over 110 community service hours logged annually during undergraduate career in over 15 organizations

Yale Openhand Workshop Co-coordinator	Summer 2018
Yale Engineering Day(s) Volunteer	Sept. 2017 – Present
Yale Flipped Science Fair (FSF) Presenter	Aug. 2018 – Present
Yale Science in the News Lecture Series Presenter	Aug. 2018 – Present
YSU STEM 3D Printing Outreach Coordinator	*Dec. 2014 – July 2017*
YSU Student Government Association Representative	Aug. 2014 – July 2017