Curriculum Vitae

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EDUCATION

- June 2013: Ph.D. in Mechanical Engineering, Stanford University
- April 2009: M.S. in Mechanical Engineering, Stanford University
- June 2004: B.S. with honors in Mechanical Engineering, Northwestern University

DISSERTATION

D. M. Aukes, "Design and Analysis of Selectively Compliant Underactuated Robotic Hands," Stanford University, 2013. Advisor: Prof. Mark Cutkosky. Thesis Committee: Prof. Oussama Khatib, Prof. Paul Mitiguy.

JOURNAL PUBLICATIONS

- S. M. Felton, K. P. Becker, D. M. Aukes, and R. J. Wood, "Self-folding with shape memory composites at the millimeter scale," J. Micromechanics Microengineering, vol. 25, no. 8, p. 085004, 2015.
- D. M. Aukes, B. Goldberg, M. R. Cutkosky, and R. J. Wood, "An analytic framework for developing inherently-manufacturable pop-up laminate devices," Smart Mater. Struct., vol. 23, no. 9, p. 094013, Sep. 2014.
- M. T. Tolley, S. M. Felton, S. Miyashita, D. Aukes, D. Rus, and R. J. Wood, "Self-folding origami: shape memory composites activated by uniform heating," Smart Mater. Struct., vol. 23, no. 9, p. 094006, Sep. 2014.
- D. M. Aukes, B. Heyneman, J. Ulmen, H. Stuart, M. R. Cutkosky, S. Kim, P. Garcia, and A. Edsinger, "Design and testing of a selectively compliant underactuated hand," Int. J. Rob. Res., Feb. 2014.

REFEREED CONFERENCE PAPERS

- J. Koh, D. M. Aukes, B. Araki, S. Pohorecky, Y. Mulgaonkar, M. T. Tolley, V. Kumar, D. Rus, and R. J. Wood, "A Modular Folded Laminate Robot Capable of Multi Modal Locomotion," 2016. pp. 1–12.
- Y. Mulgaonkar, B. Araki, J. Koh, L. Guerrero, D. M. Aukes, A. Makineni, M. T. Tolley, D. Rus, R. J. Wood, and V. Kumar, "The Flying Monkey : a multifunctional mesoscale robot that can run , fly , and grasp," 2016 IEEE Int. Conf. Robot. Autom., 2016.
- N. Doshi, B. Goldberg, R. Sahai, N. Jafferis, D. Aukes, and R. J. Wood, "Model Driven Design for Flexure-Based Microrobots," in International Conference on Robotics and Automation(IROS), 2015, pp. 4119–4126.
- B. An, S. Miyashita, M. T. Tolley, D. M. Aukes, L. Meeker, E. D. Demaine, M. L. Demaine, R. J. Wood, and D. Rus, "An end-to-end approach to making self-folded 3D surface shapes by uniform heating," in 2014 IEEE International Conference on Robotics and Automation, 2014, pp. 1466–1473.
- H. S. Stuart, S. Wang, B. Gardineer, D. L. Christensen, D. M. Aukes, and M. Cutkosky, "A Compliant Underactuated Hand with Suction Flow for Underwater Mobile Manipulation," in 2014 IEEE International Conference on Robotics and Automation, 2014.
- D. M. Aukes and M. R. Cutkosky, "Simulation-Based Tools For Evaluating Underactuated Hand Designs," in 2013 IEEE International Conference on Robotics and Automation, 2013.
- D. M. Aukes, S. Kim, P. Garcia, A. Edsinger, and M. R. Cutkosky, "Selectively compliant underactuated hand for mobile manipulation," in 2012 IEEE International Conference on Robotics and Automation, 2012, pp. 2824–2829.
- D. Aukes, B. Heyneman, V. Duchaine, and M. R. Cutkosky, "Varying spring preloads to select grasp strategies in an adaptive hand," in 2011 IEEE/RSJ International Conference on Intelligent Robots and Systems, 2011, pp. 1373–1379.

OTHER CONFERENCE PAPERS

- D. M. Aukes and R. J. Wood, "PopupCAD: a tool for automated design, fabrication, and analysis of laminate devices," in SPIE.DSS, 2015, p. 94671B.
- D. M. Aukes and R. J. Wood, "Algorithms for Rapid Development of Inherently-Manufacturable Laminate Devices," in Volume 1: Development and Characterization of Multifunctional Materials; Modeling, Simulation and Control of Adaptive Systems; Structural Health Monitoring; Keynote Presentation, 2014, p. V001T01A005.
- D. M. Aukes, O. Ozcan, and R. J. Wood, "Monolithic Design and Fabrication of a 2-DOF Bio-Inspired Leg Transmission," in Third International Conference, Living Machines 2014, Milan, Italy, July 30 – August 1, 2014., Milan, 2014, pp. 1–10.
- D. M. Aukes and R. J. Wood, "PopupCAD: a New Design Tool for Developing Self-folding Devices," in MRS Spring Meeting, 2014.

WORKSHOP PRESENTATIONS

- Toyota Research, Palo Alto CA, Dec 2016
- Foldable Robotics Workshop, IROS, Oct 2016
- D. M. Aukes, "Informal robotics: closing the loop between teaching and research," in Robot makers II: The future of digital rapid design and fabrication of robots, RSS, 2016.
- D. M. Aukes, "Automating the Design Process for Folding Laminate Devices," in Minimality & Design Automation, RSS, 2016.
- D. M. Aukes, "PopupCAD: a New Design Tool for Developing Inherently-Manufacturable Laminate Devices," in Robot makers: The future of digital rapid design and fabrication of robots, RSS, 2014.
- Aukes, D.M. (2012) Simulation-Based Tools For Evaluating Underactuated Hand Designs. Guest Lecture at George Washington University.

PATENTS AND PATENT APPLICATIONS

- P. E. Garcia, T. P. Low, H. Prahlad, D. Aukes, S. Kim, and R. D. Kornbluh, "Multilayer electrolaminate braking system," US Pat. App 2015/0190932 A1, 2015.
- P. E. Garcia, T. P. Low, H. Prahlad, D. Aukes, S. Kim, and R. D. Kornbluh, "Twisted string actuator systems," US Pat. App 2015/0343647 A1, 2015.
- P. Garcia, T. Low, H. Prahlad, D. Aukes, S. Kim, and D. Kornbluh, "Mobile robotic manipulator system," US Pat. 8,833,826 B2, 2014.
- R. Senanayake, G. Denker, P. Lincoln, R. D. Kornbluh, S. Lincoln, R. Heydt, H. Prahlad, D. M. Aukes, K. D. van Dyk, G. Mangus, and J. Eckerle, "Adaptable input/output device," US Pat. App. 2012/0313854 A1, 2012.

RESEARCH EXPERIENCE

Assistant Professor: The Polytechnic School, Arizona State University, 2016-

- Multiple teaching and research responsibilities in robotics, design, and manufacturing.
- Founder of the IDEAlab, which focuses on **I**ntegrating **D**esign, **E**ngineering and **A**nalysis into design tools for research and education.

Post-Doctoral Research: Harvard Microrobotics Laboratory, Harvard University, 2013-2015

- Created popupCAD, a design tool for designing popup-enabled laminate devices.
- Developed design rules and algorithms for fabricating inherently-manufacturable systems.
- Designed laminate robots using kinematic, stiffness, and dynamic analysis.
- Contributed to proposals, project reviews, and annual reports

Doctoral Research: Biomimetics & Dexterous Manipulation Laboratory, Stanford University, 2009-2013

- Prototyped, built, optimized, and developed manufacturing processes for a tendon-driven, underactuated robot hand as part of the DARPA ARM-H project with SRI and Meka Robotics.

- Performed simulation-based analysis for an underactuated, tendon-driven hand for an underwater, tele-operated, diver-replacement robot using several multi-body dynamics engines.
- Designed and built a prototype parallel-mechanism, linkage-driven, underactuated robotic hand for an underwater, automated drilling platform.
- Contributed to proposals and quarterly reports; participated in DARPA competition milestones.

Masters Research: Biomimetics & Dexterous Manipulation Laboratory, Stanford University, 2007-2009

- Developed a symbolic, vector-based dynamics engine with basic OpenGL visualization for creating, solving, and integrating dynamic equations of motion using Kane's method.
- Designed, built, and programmed several custom circuit boards for data collection and actuator control, using various microprocessors and communication protocols.
- Created custom parts using advanced rapid prototyping techniques (Shape Deposition Manufacturing, 3D Printing, Laser Cutting) for several lab projects.
- Developed flexible optical sensor "skin" for detecting contact on a flexible, deformable surface for a human-safe robot arm.
- Deployed new postprocessor file for existing CNC during lab switch from Unigraphics to Pro/Engineer.8

Undergraduate Honors Research: Laboratory for Intelligent Mechanical Systems, Northwestern University, 2003-2004

- Design and Analysis of an Electromagnetic Ball Bouncer

TEACHING EXPERIENCE

- Fall 2016: EGR598: Foldable Robotics, ASU Polytechnic Campus.
- Spring 2016: EGR202, ASU Polytechnic Campus.
- Fall 2015: *Informal Robotics*, Harvard Graduate School of Design. Taught several classes and mentored project teams.
- Fall 2014: *Informal Robotics*, Harvard Graduate School of Design. Developed new class with lecturer Chuck Hoberman and PhD student Jonathan Grinham. Taught several classes and mentored project teams.
- Attended one-day teaching conference organized by the Harvard Initiative for Learning and Teaching , September, 2014.
- Teaching Assistant, *Dynamics of Mechanical, Aerospace, and Biomechanical Systems*, Fall 2011, with Prof. Paul Mitiguy. Responsible for weekly study sections, research presentation in class, office hours.

MENTORING EXPERIENCE

Research Mentoring

- Fall 2018: Drew Carlson, FURI Program
- Fall 2017: Jacob Knaup, FURI Program
- Spring 2017: Jacob Knaup, FURI Program
- Summer 2015: Mentored Summer Student. Topic: Dynamic simulation of laminate devices with Python and Gazebo
- Fall 2014: Mentored a Harvard Undergraduate Student. Topic: Design of a lightweight single-degree-of-freedom walking platform for quad copters.
- Summer 2014: Mentored summer student. Topic: Self-assembling furniture.

Thesis Committees

- Fall 2016: Aman Yadav (Sohum Sohoni chair)

AWARDS, HONORS, FELLOWSHIPS

- Wyss Institute Postdoctoral Fellowship in Technology Development, 2014-2015
- Stanford Graduate Fellow, Stanford University, 2007-2010
- Magna Cum Laude, Northwestern University, 2004
- Department Honors, Northwestern University, 2004
- Tau Beta Pi, 2004

SERVICE & OUTREACH

- RSS 2017 Program Committee
- Junior Chair, RSS Technical Committe on Mechanisms and Design, 2016-2019
- Developed the robotics.asu.edu website for ASU robotics faculty, April 2016-Jan 2017
- IROS 2016 Workshop on “Folding in Robotics”, Oct 2016
- Chair, ASU New Faculty Advisory Committee, 2016-2017
- Fall 2016: Polytechnic School faculty search committee
- RSS 2016 Program Committee
- Developed and maintain www.popupcad.org, a website dedicated to topics related to folding mechanism design. 2015-present
- Mentor for high school students at ArtScience, an after-school program, Boston, 2013-2014 school year.
- Student coach for graduate mechatronics class (ME218), 2008, 2009.
- ME218 course committee, 2008-2009.
- President, Tau Beta Pi Honor Fraternity, Northwestern University, May 2003-May 2004.

PROFESSIONAL EXPERIENCE & INTERNSHIPS

System Integration Engineer, DMC, Inc., Chicago, IL, 2004-2007

- Developed custom software solutions for system integration, industrial automation, motion control, vision inspection, and data collection systems.
- Improved existing production lines with innovative control and debug strategies on a wide range of industrial controllers.
- Provided controls leadership and guidance on new and existing systems to clients.
- Designed Human-Machine Interfaces for a variety of platforms and development environments.

Research Internship, SRI International, Menlo Park, CA 2010-2012

- Development work related to the DARPA ARM-H project.(See Research)
- General engineering work for a variety of other projects including dynamic analysis of an unstable airfoil and kinematic analysis for linkages and nonlinear transmissions.
- Developed packages for device control and data collection with the Robot Operating System(ROS)

Summer Internship, General Motors, North America Product Development, Warren, MI, Summer 2003

Summer Internship, Los Alamos National Laboratory, DARHT Project, Los Alamos, NM, Summer 2002