Curriculum Vitae

Haijun Su

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APPOINTMENTS

08/2019-present	Professor, Department of Mechanical & Aerospace Engineering, The Ohio State University, OH.
07/2015-08/2019	Associate Professor, Department of Mechanical & Aerospace Engineering, The Ohio State University, OH.
09/2011-06/2015	Assistant Professor, Department of Mechanical & Aerospace Engineering, The Ohio State University, OH.
08/2007-08/2011	Assistant Professor, Department of Mechanical Engineering, University of Maryland Baltimore County, Baltimore, MD
11/2004-06/2007	Postdoctoral Associate and Lecturer, Department of Mechanical Engineering, Iowa State University, Ames, IA
09/2004-11/2004	Post Graduate Researcher, Department of Mechanical and Aerospace Engineering, University of California, Irvine, CA

EDUCATION

09/1999-09/2004	University of California Ph.D., Mechanical Engineering	Irvine, CA
09/1995-04/1998	Beijing University of Posts & Telecommunications M.S., Mechanical Engineering, Kinematics and Mechanisms, School of Automation.	Beijing, China
09/1991-07/1995	Beijing University of Posts & Telecommunications B.S., Mechanical Engineering, Electronic packaging, School of Automation.	Beijing, China

AWARDS AND HONORS

- Finalist for Best Paper in Biomimetics, 2018 IEEE International Conference on Robotics and Biomimetics (ROBIO 2018)
- Andrew P. Sage Best Transactions Paper Award of IEEE Transactions on Systems, Man and Cybernetics (SMC), 2018.
- Best Paper Award in Theory in Vibration Technical Committee Invited Session, ASME Dynamics Systems and Control Conference, 2018

- **Lumley Interdisciplinary Research Award**, College of Engineering, The Ohio State University, 2018.
- Fellow of American Society of Mechanical Engineers, 2017
- Planetary speaker, Polynomials Kinematics and Robotics Conference, Notre Dame, 2017.
- Invitation to Halcyon Dialogue by S&R Foundation, Washington, DC, 2016.
- National Robotics Initiative Grant, National Science Foundation, 2016
- **Lumley Research Award**, College of Engineering, The Ohio State University, 2015.
- NASA Jet Propulsion Lab Summer Faculty Fellowship**,** 2015, JPL, Caltech, Pasadena, CA, 2015
- Compliant Mechanism Theory best paper award**,** ASME DED Mechanisms & Robotics committee, 2014, Buffalo, NY.
- Nomination of a Distinguished Undergraduate Research Mentor Award, Undergraduate Research Office and URO's Student Advisory Committee, 2014, OSU.
- **Freudenstein/GM Young Investigator award,** ASME DED Mechanisms & Robotics committee, 2010, Montreal, Canada.
- Air Force Summer Faculty Fellowship**,** 2010, Air Force Research Laboratory, WPAFB, OH
- Compliant Mechanism Theory best paper award**,** ASME DED Mechanisms & Robotics committee, 2009, San Diego, CA.
- **Faculty Early Career Development (CAREER) Award**, National Science Foundation, 2009.
- Finalist of Best Paper Award, ASME DED Mechanisms & Robotics committee, 2005, Long Beach, CA.
- ASME MSC Software Simulation best paper award, ASME Mechanisms & Robotics committee, 2002, Montreal, Canada.
- Dissertation Fellowship, University of California Irvine, 2004
- MAE Departmental Fellowship, University of California Irvine, 1999-2000

GRANTS

- 01/01/2019-12/31/2022, "EFRI C3 SoRo: An Integrated Design, Modeling and Control Framework of Reconfigurable Compliant Robots with a Variable Stiffness Enabled by Active Soft Materials," National Science Foundation, **PI**, total $2M, pending.
- 9/01/2018-8/31/2021, "SI2-SSE: Design Automation for Dynamic Multi-Component DNA Origami Nanorobots," National Science Foundation, **PI**, total $500K, pending.
- 9/01/2018-8/31/2021, "A Top-Down Mechanism Synthesis Approach for Performance Driven Design of DNA Biomaterials," National Science Foundation, **PI**, total $480K, pending.
- 9/01/2016-8/31/2019, "NRI: Shape Morphing Arm Robotic (SMART) Manipulators for Simultaneous Safe Human-Robot Interaction and High Performance in Manufacturing," National Science Foundation, **PI**, total $977K + $10K REU supplement.
- 10/01/2016-9/30/2019, "CPS: Synergy: Cyber-Human Vehicle Systems for Driving Safety Enhancement," National Science Foundation, co-**PI**, total $800K, my own budget $250K.
- 9/01/2015-8/31/2018, "Robust Design of Compliant DNA Origami Mechanisms," National Science Foundation, **PI**, total $404K + $5K REU supplement.
- 3/1/2014-9/1/2014, "Prototype testing of a climbing robot" NASA Jet Propulsion Lab, **PI**, total $5K. Percent Effort: 100%. [single investigator]

- 8/15/2012-8/14/2015, "DNA Origami Mechanisms and Machines," National Science Foundation, **Co-PI**, PI: Carlos Castro, total $400K with fee authorization from OSU. Percent Effort: 48%. My own budget is $195K.
- 9/1/2012-08/31/2015, "Syncretizing Science and Art Into Ultra-Precision Machine Design," National Science Foundation, PI, $303K + $10k REU supplement. [single investigator]
- 4/1/2012 - 3/30/2015. A Compliant Mechanism Synthesis Theory for Fostering Innovation of Micro Air Vehicles, AFOSR. $360K, Research Grant. **PI:** Su, HJ [single investigator]
- 5/1/2009 - 4/1/2014. CAREER: A Theoretical Framework for the Conceptual Design of Compliant Systems. National Science Foundation. **($400K+$10K REU supplement, Total Award)** Research Grant. **PI:** Su, HJ [single investigator]
- 6/1/2009 - 5/1/2012. Collaborative Research: Variational Kinematic Geometry and Task Driven Mechanism Design in VR Environment. National Science Foundation. **($**142393+$5K REU supplement, Total Award **)** Research Grant. **PI:** Su, HJ [single investigator]
- 8/1/2008 - 7/1/2009. A Hybrid Method for Synthesizing Compliant Mechanisms. University of Maryland Baltimore County, DRIF. **($**13342 , Total Award **)** Research Grant. **PI:** Su, HJ [single investigator]
- 2009 - 2010. Integrating Entrepreneurial Concepts into ENME 489T Kinematics and Mechanism Design. University of Maryland, Baltimore County. **($**5000 , Total Award **)** Training Grant. **PI:** Su, HJ [single investigator]
- 2008 - 2009. Student Travel Support for 2008 ASME Student Mechanism Design Competition. National Science Foundation. **($**10000 , Total Award **)** Training Grant. **PI:** Su, HJ [single investigator]

RESEARCH INTERESTS

The overarching theme of my research interests focuses on Design, Manufacturing and Simulations of mechanical systems ranging from fundamental compliant mechanism and kinematic theories to applications to human-safe corobots, soft robots, precision machinery, nanorobots, drug delivery, factory automation and automotive research.

- **Robotics**: soft robots, human-safe corobots, variable and controllable stiffness robotic arms, transformable wheels, shape memory alloy actuators, origami wheels, micro aerial vehicles, adaptive and morphing structures, and precision machinery (nanomanipulator/nanopositioners, flexure joints, force sensors etc.).
- **DNA Origami Mechanisms (DOM)**: Design and actuation of nanomechanisms and nanorobots via scaffold DNA origami nanotechnology, design automation and quantification of mechanical characteristics of DOM; application of DOM to drug delivery, precision medicine.
- **Compliant Mechanisms:** pseudo-rigid-body models, screw theory based design method, mobility analysis and synthesis, type synthesis, computer-aided design.
- **Virtual Reality Simulations for Manufacturing**: driving simulations, virtual design and manufacturing, virtual factory automation, 3D immersive visualization, haptics simulation.
- **Kinematics and Synthesis Theories**: kinematic and kinetoelastic synthesis, theoretical kinematics and robotics, polynomial homotopy continuation, algebraic geometry, design optimization.
- **Novel manufacturing and prototyping methods:** shape deposition manufacturing, soft material (silicon, urethane etc.) manufacturing, lamination, layer jamming, 3d printing, molding.

TEACHING

Dept. of Mechanical and Aerospace Engineering, The Ohio State University, Columbus, Ohio

- Design and Manufacturing of Compliant Mechanisms and Robots (MECHENG 5751), Spring 2015 (23), Spring 2016 (15), Spring 2017 (19) , Spring 2020 (25).
- Advanced Kinematics and Mechanisms (MECHENG 7751), Spring 2014 (13), Autumn 2015(7), Autumn 2017 (11), Autumn 2019 (5)
- Kinematics and Mechanism Design (MECHENG 3751), Spring 2020 (87)
- Design of Machine Elements I (MECHENG 3670), Autumn 2013 (82), Autumn 2014 (85), Spring 2015 (92), Autumn 2015 (84), Autumn 2016 (150), Spring 2017 (82).
- Special Topics on Compliant Mechanisms (MECHENG 6194), Autumn 2012 (7).
- Kinematics and Dynamics of Machinery (ME 553), Spring 2012 (91).
- Application of Computer Graphics to Kinematic Synthesis and Analysis (ME 751), Winter 2012 (10).

Doctoral Student (Advisor) (5 graduated, 2 post candidacy, 0 passed qualifying exam, 5 current)

2009 - 2013	Cong Yue. University of Maryland, Baltimore County. Major: Mechanical Engineering. Title: "Synthesis and Design Automation of Rigid Body and Compliant Mechanisms" **Graduated** in 05/2013, Current Position**:** industry
2010 - 2013	Hongliang Shi. The Ohio State University, Columbus, OH. Major: Mechanical Engineering. Title: "Modeling and Analysis of Compliant Mechanisms for Designing Nanopositioners," **Graduated** in 12/2013. Current Position**:** Research Engineer, Stanford University
2012 - 2016	Venkatasubramanian Kalpathy Venkiteswaran. The Ohio State University, Columbus, OH. Major: Mechanical Engineering. Title: "Development of a Design Framework for Compliant Mechanisms using Pseudo-Rigid-Body Models," **Graduated** in 12/2016, Current Positions**:** Postdoc Researcher, University of Twente, Netherlands.
2012 - 2016	Scott C. Schnelle. Co-advisor with Junmin Wang. The Ohio State University, Columbus, OH. Major: Mechanical Engineering. **Graduated** in 12/2016, Current Position: Research Engineer, Automotive Research Center, Ohio.
2012 - 2017	Lifeng Zhou. The Ohio State University, Columbus, OH. Major: Mechanical Engineering, **Graduated** in May/2017, Current Position: Postdoc Associate, University at Albany, NY.
2013 - 2017	Omer Anil Turkkan. The Ohio State University, Columbus, OH. Major: Mechanical Engineering, Current Positions**:** Industry, **Graduated** in 12/2017
2014 - 2018	Ye She. The Ohio State University, Columbus, OH. Major: Mechanical Engineering, Current Positions**:** Postdoc at MIT. Graduation date: 10/2018
2014 - Present	Chao-Min Huang. The Ohio State University, Columbus, OH. Major: Mechanical Engineering, Current Positions**:** Advisee. Passed candidacy exam in December, 2015. Expected graduation date: 5/2019
2017 - Present	Tyler Morrison. The Ohio State University, Columbus, OH. Major: Mechanical Engineering, Passed qualifying exam in August, 2018. Current Positions**:** Advisee.

2017 - Present	Xianpai Zeng. The Ohio State University, Columbus, OH. Major: Mechanical Engineering, Passed qualifying exam in January, 2019. Current Positions**:** Advisee.
2018 - Present	Yuan Gao. The Ohio State University, Columbus, OH. Major: Mechanical Engineering, Current Positions**:** Advisee.

Masters Student (Advisor)

2008-2009	Juan C. Alvarez, Thesis title: "Virtual Reality Environment for the Conceptual Design of Mechanisms." University of Maryland Baltimore County. Graduated: 2009. Current Positions: Research Engineer at GE.
2010-2011	Dominic Devaud, Thesis title: "Design of a Wing Mechanism for a Perching MAV." University of Maryland Baltimore County. Graduated:2011. Current Positions: Research Engineer at SEACorp (RI).
2008-2011	Hafez Tari. Thesis title: "Kinetostatic Synthesis of Compliant Mechanisms with Numerical Continuation." University of Maryland Baltimore County. Graduated:2011. Current Positions: a postdoc researcher at OSU.
2011-2012	Mark Ryan. Thesis title: "Design Optimization and Classification of Compliant Mechanisms for Flapping Wing Micro Air Vehicles." The Ohio State University, Columbus, OH. Current Positions**:** industry. Graduation date: 8/2012.
2012 - 2014	Jonny Cleary. "Design Modeling of Compliant Mechanisms for Mobile Robots". The Ohio State University, Columbus, OH. Current Positions**:** industry. **Graduation**: 12/2014
2015-2016	Benjamin Rhoads. Major: Mechanical Engineering. Title: "Design & Fabrication of a 3D Printed Origami Wheel", **Graduated**: 5/2016.
2015-2017	Junxiao Cui. MS program. Course option. Major: Mechanical Engineering, **Graduated**, 5/2017.
2015-2017	Ruiqi Hu. BS/MS combined program. Title: "A Variable Stiffness Robotic Arm Design Using Linear Actuated Compliant Parallel Guided Mechanism". Major: Mechanical Engineering. **Graduated**, 12/2017.
2015-2017	Chunhui Li. MS program. Project option. **Graduated**: 12/2017.
2017-2018	Sibei Wei. MS program. Project option. Major: Mechanical Engineering. **Graduated**: 05/2018.
2017-2018	Ying Yang. MS program. Project option. Major: Mechanical Engineering **Graduated**: 05/2018.
2017-2018	Collin Mikol, MS thesis. Major: Mechanical Engineering. Thesis option. Current position: industry. **Graduated**: 05/2018.

Bachelor Student (Advisor)

2012-present	Undergraduate students participated in my NSF REU projects: Jonathon King, Yao Fu, Jia Shung Yeap, Siddharth Nema. James Hasting, Wenhao Deng, Zihui Zhang, Simon Kalouche, Carter Hurd.
2012-2013	Jeff Kohler, Thesis title: "Design, Modeling, and Fabrication of a Flapping Wing Micro Air Vehicle." The Ohio State University, Columbus, OH. Graduated in 05/2013.
2013-2014	Mingle Tong, Thesis title: "Design, Simulation and Prototyping a Pneumatic Actuator for Massage Chairs." The Ohio State University, Columbus, OH. Graduation date:

05/2014.

2014-2015	Benjamin Rhoads, UG Honor Thesis title: "The Design and Fabrication of a 3D Printed Origami Wheel." The Ohio State University, Columbus, OH. Graduated in 12/2015.
2016-2017	Carter Hurd, UG Honor Thesis title: "Variable Stiffness Robotic Arm for Safe Human-Robot Interaction Using Layer Jamming." The Ohio State University, Columbus, OH. Graduated in 5/2017.
2016-2017	Collin Mikol, UG Honor Thesis title: "Compliant Gripping Mechanism for Anchoring and Mobility in Microgravity and Extreme Terrain." The Ohio State University, Columbus, OH. Graduated in 5/2017.
2017-2018	Yupeng Cheng, The Ohio State University, Columbus, OH. BS in Mechanical Engineering. Honor Thesis Title: "Design and Prototyping of a Transformable Quadruped Robot". Graduated 5/2018.
2017-2018	Cameron Spicer, The Ohio State University, Columbus, OH. UG Honor Thesis Title: "Development of an Augmented Reality Testing Platform for Collaborative Robots". BS in Mechanical Engineering, Graduated 5/2018.
2017-2018	Roger Kassouf, The Ohio State University, Columbus, OH. UG Honor Thesis Title: "Simulating Human Robot Collaboration with Virtual and Augmented Reality". BS in Mechanical Engineering, Graduated 11/2018.
2018-present	Zhixin Li, The Ohio State University, Columbus, OH. UG Honor Thesis. BS in Mechanical Engineering, Expected to graduate 05/2019.
2018-present	Qihang Zeng, The Ohio State University, Columbus, OH. UG Honor Thesis. BS in Mechanical Engineering, Expected to graduate 12/2019.
2018-present	John Ouyang, The Ohio State University, Columbus, OH. UG Honor Thesis. BS in Mechanical Engineering, Expected to graduate 12/2019.

STUDENT HONORS

- Yu She, Recipient of Presidential Fellowship, 2018
- Collin Mikol, Recipient of **Ohio Space Grant Consortium Scholarship**, OSU (2017)
- Collin Mikol, Recipient of **The Second Place** of Denman Undergraduate Research Forum in Engineering Category, OSU (2017)
- Lifeng Zhou, Presidential Fellowship, The Ohio State University 2015
- Carter Hurd, Recipient of **the first place** in the ASME Student Mechanism and Robot Design Competition, Undergraduate Robot Division, 2015
- Yu She, Recipient of **the fourth place** in the ASME Student Mechanism and Robot Design Competition, Graduate Robot Division, 2015
- Simon Kalouche, Recipient of **the second place** in the ASME Student Mechanism and Robot Design Competition, Undergraduate Robot Division (2014), **The First Place** of Denman Undergraduate Research Forum in Engineering Category, OSU (2014)
- Jonathon King, **MAE Outstanding Research and Outstanding Leadership for UG students**, 2013
- Jeff Kohler, Recipient of **the third place** in the ASME Student Mechanism and Robot Design Competition, Undergraduate Mechanism Division, 2013

PROFESSIONAL ACTIVITIES

Editorship
- Editorial Board, Journal of Chinese Society of Mechanical Engineering, 2018-present
- Associate Editor, ASME Journal of Mechanical Design, 2018-present
- Associate Editor, Mechanism and Machine Theory, 2016-present
- Associate Editor, ASME Journal of Mechanisms and Robotics, 2015-2018
- Co-Editor, Special Issue of 2016 IDETC M&R, ASME Journal of Mechanisms and Robotics.
- Guest Editor, Special Issue on "Advances in Compliant Mechanisms: Theories, Tools and Applications" for Journal of Mechanical Sciences, 2012-2013
- Co-Editor, "Advances in Mechanisms, Robotics and Design Education and Research". Mechanisms and Machine Science Series Vol.14, Springer. 2012-2013.

Technical Committee Memberships:
- ASME Mechanisms and Robotics Executive Committee, treasurer, 2018 to present
- ASME Mechanisms and Robotics Committee, elected member, 2010 to present

Professional Society Membership
- American Society of Mechanical Engineering (ASME), member, since 2000
- Institute of Electrical and Electronics Engineers (IEEE), member, since 2002

Advising of student organizations
- Faculty mentor, Underwater Robotics Club, The Ohio State University
- Advisor, First Robotics Competition, New Albany High School

Proposal *review* panel,
  - NSF CMMI Engineering Design and Innovation, Panelist, 2008, 2009, 2011
  - NSF CMMI Manufacturing Equipment and Machines, Panelist, 2013
  - NSF National Robotics Initiative, Panelist, 2012, 2013, 2016, 2017, 2018
  - NSF Engineering Frontier Research Initiative, Panelist, 2012, 2013

Conference Organization:
- Session chair, 2018 2018 IEEE International Conference on Robotics and Biomimetics (ROBIO 2018), 2018
- Session chair, the 42nd ASME Mechanisms and Robotics Conference, Charlotte, Laval, Canada, 2018
- Session co-chair, IEEE International Conference on Robotics and Automation (ICRA), Singapore, 2017
- Conference chair, the 40th ASME Mechanisms and Robotics Conference, Charlotte, North Carolina, 2016
- Publication chair, the ASME International Design Engineering Technical Conferences, Buffalo, NY, 2014
- Symposium co-chair and review coordinator of the ASME International Design Engineering Technical Conferences, Portland, OR, 2013
- Member of program committee, The Second ASME/IEEE International Conference on Reconfigurable Mechanisms and Robots (ReMAR 2012), Tianjin, China, July 9-11, 2012

- Symposium co-chair and review coordinator of the ASME International Design Engineering Technical Conferences, Chicago, IL, 2012
- Symposium chair, review coordinator and session chair of the ASME International Design Engineering Technical Conferences, Washington, DC, 2011
- Exhibition and Demonstration Chair, Session Chair and Co-Chairs, the ASME 2010 World Conference on Innovative Virtual Reality (WINVR2010), Ames, Iowa, May 12-14, 2010
- Industry Relation Chair, the 2010 ASME International Design Engineering Technical Conferences, Montreal, Canada, August 15-18, 2010
- Symposium co-organizer of the ASME 34th Mechanisms & Robotics Conference, Montreal, Canada, 2010
- Symposium coordinator of UMBC and NIST Manufacturing Engineering Lab, October, 2009
- Member of ASME Mechanism and Robotics Committee, elected, September 2009
- Member of program committee, ASME/IFToMM International Conference on Reconfigurable Mechanisms and Robots (ReMAR 2009), King's College of London, London, United Kingdom, June 22-24, 2009
- Symposium co-organizer of the ASME 33rd Mechanisms & Robotics Conference, San Diego, CA, August 30- September 2, 2009
- Session chair, Compliant Mechanism symposium of the ASME 33rd Mechanisms & Robotics Conference, San Diego, CA, August 30- September 2, 2009
- Sponsorship coordinator of the Student Mechanism Design Competition, ASME 33rd Mechanisms & Robotics Conference, San Diego, CA, August 30- September 2, 2009
- Symposium co-organizer of the ASME 32nd Mechanisms & Robotics Conference, New York City, NY, August 3-6, 2008
- Undergraduate coordinator of the Student Mechanism Design Competition, ASME 32nd Mechanisms & Robotics Conference, New York City, NY, August 3-6, 2008
- Judge panel of the Student Mechanism Design Competition, ASME 29th Mechanisms & Robotics Conference, Long Beach, California, September 25-28, 2005.

Journal Reviewer:
- IEEE Robotics and Automation Letters
- Soft Robotics
- IEEE Transaction on Mechatronics
- IEEE Transaction on Robotics and Automation
- Robotica
- Precision Engineering
- ASME Journal of Mechanisms and Robotics
- ASME Journal of Mechanical Design
- Mechanism and Machine Theory
- Journal of Virtual Reality
- Computer Aided Design
- ASME Journal of Computing and Information Science and Engineering
- Journal of Mechanical Sciences
- Journal of Mechanical Engineering Science, UK

Book Reviewer:

- Elsevier

Internal Services:
- Department of Mechanical and Aerospace Engineering, OSU
  - o Graduate admission committee, chair in Design, Materials and Manufacturing, 2016-present
  - o Mechanical Design search committee, 2016-2017
  - o Mechanical Design search committee, 2015-2016
  - o Robotics search committee, 2014-2015
  - o Robotics search committee, 2016-2017
  - o Dynamics and kinematics qualifying exam, chair, 2013-present
  - o Member of Design & Manufacturing Division, help with preparing syllabus of ME 3670 for Autumn 12.
- UMBC
  - o Seminar committee chair, 2008-2009, 2009-2010
  - o Member of seminar committee, 2007-2008
  - o Lecturer search committee, 2007-2008

SEMINARS, TUTORIAL, POSTERS AND PRESENTATIONS

Keynotes, Invited Lectures, Tutorials and Seminars:

1. "Design of Variable Stiffness Compliant Mechanisms for Collaborative Robots in Manufacturing Applications," Invited seminar, Vanderbilt University, November 2019.
2. "Active Variable Stiffness Materials for Soft Robots," Invited presentation, SES Soft Evolutionary Material Symposium, Washington University at St. Louis, October 2019.
3. "Design of DNA Nanomechine and Nanorobots from a Mechanical Engineering Perspective," Invited presentation, 2nd Conference on Biomotors, Virus Assembly, and Nanobiotechnology Applications, Columbus, Ohio, July 29-31, 2019.
4. "Kinematics Problems in Design of DNA Origami Mechanisms," Invited seminar, Southern University of Science and Technology, April 2019.
5. "Computer-Aided Design and Analysis of Planar and Spatial Compliant Mechanisms," Invited seminar, Macau University, April 2019.
6. "Computer-Aided Design and Analysis of Planar and Spatial Compliant Mechanisms," Keynote, Compliant Mechanism Symposium, Guangzhou, China, November 2018.
7. "Kinematics Problems in Design of DNA Origami Mechanisms," Keynote, Biennial Kinematics and Mechanism Meeting of Chinese Society of Mechanical Engineers, Beijing, China, July 2018.
8. "Design Principles for DNA Origami Nanorobots and Human-Safe Corobots," Invited seminar, National University of Taiwan, December 2017.
9. "Design Principles for DNA Origami Nanorobots and Human-Safe Corobots," Invited seminar, Taiwan University of Science and Technology, December 2017.
10. "T5:   Design and Fabrication of DNA Origami Mechanisms," Tutorial, ASME International Design Engineering Technical Conferences, Cleveland, August 6, 2017.
11. "Algebraic Geometry for Projection Kinematic Analysis of DNA Origami Nano-Mechanisms," Plenary speaker, Polynomials Kinematics and Robotics Conference, Notre Dame, June 5-7, 2017.

12. "Kinematic Principles for Designing DNA Origami Mechanisms and Nanorobots," Invited seminar, Singapore University of Technology and Design, May 31/2017.

13. Halcyon Dialogue on "Promise and Peril of Military Robotics Technology in Civilian Settings," Invited participant, S&R Foundation, Washington, DC, October 27, 2016.

14. "Computer Aided-Design of Compliant Mechanisms," Invited lecture, Kinematics Summer School, Charlotte, NC, August 21, 2016.

15. "T2: Analysis and Synthesis of Compliant Mechanisms," Invited tutorial, ASME International Design Engineering Technical Conferences, Boston, MA, August 2, 2015.

16. "Computational Methods for Solving Kinematics Problems," Invited lecture, Kinematics Summer School, Buffalo, NY, August 15-16, 2014.

17. "Systematic Machine Innovation and Virtual Reality Simulation," Department of Mechanical Engineering, the Stony Brook University, NY, October, 2010.

18. "Compliant Mechanism Synthesis and Virtual Reality Simulation," Department of Mechanical and Aerospace Engineering, Rutgers University, NJ, March, 2010.

19. "Design Synthesis and Virtual Reality Simulation of Machine Systems," Manufacturing Engineering Lab, National Institute of Standards and Technology, Gaithersburg, MD, October, 2009.

20. "Computational Synthesis of Mechanisms & Virtual Reality Simulation," Department of Mechanical Engineering, University of Texas, Pan American, Edinburg, Texas, February 2007.

21. "Computational Synthesis of Mechanisms & Virtual Environment for Designing Bio-Nanomachines," Department of Mechanical Engineering, University of Maryland, Baltimore County, MD, March 2007.

22. "Computational Synthesis of Spatial Robotic Systems and Compliant Mechanisms," Department of Mechanical Engineering, University of Maryland, College Park, MD, February 2006.

23. "Mechanism Design: From Traditional to Modern," Department of Mechanical Engineering, California State University, Northridge, March 2004.

24. "From Mechanism Design to Drug Design: Challenges for Kinematics," Department of Mechanical and Aerospace Engineering, Rutgers University, NJ, March 2004.

25. "Robot Design Using Mechanism Synthesis Theory," invited lecture to a tutorial offered at ASME International Design Engineering Technical Conference, Salt Lake City, Utah, October 2004

Posters and Demos:

26. "An Actively Controlled Variable Stiffness Structure via Layer Jamming and Pneumatic Actuation," Poster, *IEEE 2019 International Conference on Robotics and Automation* (ICRA 2019). May 20-24, 2019. Montreal, Canada. (2019).

27. "SHARP: A System for Haptic Assembly & Realistic Prototyping ," Poster, Haptics Symposium, IEEE Virtual Reality Conference, Alexandria, VA, March 25-26 2006 "Virtual Manufacturing and Assembly," John Deere Day Demo, Virtual Reality Application Center, Iowa State University, October 11, 2005

28. "SYNTHETICA 1.0 Demo," special session of ASME International Design Engineering Technical Conference, Montreal, Canada, 2002.

Conference Presentations and Meetings:

1. "Design and Actuation of DNA Origami mechanisms for Functional Bionanomaterials." ASME 2019 ASME International Design Engineering Technical Conferences. Anaheim, CA, August 18 – 21, (2019).

2. "A Variable Stiffness Robotic Arm Using Linearly Actuated Compliant Parallel Guided Mechanism," *the 4th IFToMM Symposium on Mechanism Design for Robotics (MEDER)*, Udine, Italy, September 11th - 13th, 2018.

3. A Pneumatically-Actuated Variable Stiffness Robot Arm Using Parallel Flexures," IEEE International Conference on Robotics and Biomimetics (ROBIO 2018), Kuala Lumpur, Malaysia, December, 2018.

4. "NRI: Shape Morphing Arm Robotic (SMART) Manipulators for Simultaneous Safe Human-Robot Interaction and High Performance in Manufacturing", NSF National Robotics Initiative PI Meeting, October 29-30, 2018, Washington, DC. (November 2018).

5. "On the Impact Force of Human-Robot Interaction: Joint Compliance vs. Link Compliance." In: *IEEE 2017 International Conference on Robotics and Automation* (ICRA 2017). May 28-June 3, 2017. Singapore. (2017).

6. "Robust Design of Compliant DNA Origami Mechanisms", NSF Engineering and Systems Design, and Systems Science (ESD/SYS) Program Workshop and Grantees Meeting, January 20-22, 2017, Atlanta, Georgia Institute of Technology.

7. "NRI: Shape Morphing Arm Robotic (SMART) Manipulators for Simultaneous Safe Human-Robot Interaction and High Performance in Manufacturing", NSF National Robotics Initiative PI Meeting, November 9-10, 2017, Washington, DC. (November 2017).

8. "NRI: Shape Morphing Arm Robotic (SMART) Manipulators for Simultaneous Safe Human-Robot Interaction and High Performance in Manufacturing", NSF National Robotics Initiative PI Meeting, November 28-30, 2016, Washington, DC. (November 2016).

9. "Design & Fabrication of a 3D Printed Origami Wheel", ASME 2016 International Design Engineering Technical Conferences. Charlotte, NC. (August 2016).

10. AFOSR 2016 Multi-Scale Structural Mechanics and Prognosis Program Review, Dayton, Ohio, July 18-22, 2016.

11. "The Kinematic Principle for Designing DNA Origami Mechanisms: Challenges and Opportunities." ASME 2015 International Design Engineering Technical Conferences. Boston, MA. (2015).

12. "Design of a Compliant XY Positioning Stage With Large Workspace." ASME 2015 International Design Engineering Technical Conferences. Boston, MA. (2015).

13. "A Transformable Wheel Robot with A Passive Leg." 2015 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). Hamburg, Germany, (2015).

14. "Dynamic Modeling of A 2D Compliant Link for Safety Evaluation in Human-Robot Interactions." 2015 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). Hamburg, Germany, (2015).

15. "A kinetostatic synthesis theory of compliant mechanisms for flapping wing micro air vehicles." AFOSR Structureal Mechanics Annual Grantee Meeting, Kirtland AFB, Albuquerque, New Mexico, 09/03-05, 2014.

16. "Optimization of the Workspace of a MEMS Hexapod Nanopositioner Using an Adaptive Genetic Algorithm." IEEE 2014 International Conference on Robotics and Automation (ICRA 2014). May 31-June 7, 2014. Hongkong, China. (2014).

17. "A Unified Kinetostatic Analysis Framework for Planar Compliant and Rigid Body Mechanisms." ASME 2014 International Design Engineering Technical Conferences. Buffalo, NY. (2014)

18. "Type Synthesis of 3-Dof Translational Compliant Parallel Mechanisms." 2013 ASME International Design Engineering Technical Conferences. ASME. Portland, Oregon, August, 2013.

19. "Quantifying Effects of Compliant Joints on a Flapping Wing MAV." AFOSR Grantee Conference. DC, July, 2013.

20. "Peak Input Torque Minimization of a Flapping Wing Mechanism for MAVs," the 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference. Boston, MA, April, 2013.

21. "Design Optimization of a Flapping Wing Mechanism for Micro Air Vehicles." *8th Annual Dayton Engineering Sciences Symposium (DESS 2012), October 29, Dayton, Ohio*.

22. "Workspace of a Flexure Hexapod Nanopositioner." *2012 ASME International Design Engineering Technical Conferences*, Chicago, IL, August 12-15, 2012.

23. "Design and Fabrication of DNA Origami Mechanisms and Machines." The Second ASME/IEEE International Conference on Reconfigurable Mechanisms and Robots (ReMAR 2012), Tianjin, China, July 9-11, 2012

24. "Compliance Analysis and Synthesis of Flexure Mechanisms," *2011 ASME International Design Engineering Technical Conferences*, Washington, DC, August 29-31, 2011.

25. "Mobility Analysis of Flexure Mechanisms via Screw Algebra," *2011 ASME International Design Engineering Technical Conferences*, Washington, DC, August 29-31, 2011.

26. "On Line Screw Systems and Its Application to Flexure Synthesis," *2010 ASME International Design Engineering Technical Conferences*, Montreal, Canada, August 15-18, 2010.

27. "Synthesis of Flexures for Orthogonal Motions," *2010 ASME International Design Engineering Technical Conferences*, Montreal, Canada, August 15-18, 2010.

28. "Compliant Mechanism Analysis and Synthesis via Polynomial Solvers," Kinematics and Numerical Algebraic Geometry Symposium, *2010 SIAM Annual Meeting*, Pittsburgh, PA, July 14, 2010.

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PUBLICATIONS AND SUBMISSIONS

ISI h-index: 20. Google Index: h-index: 30, i10-index: 64 (54 since 2013)

Research Gate Score: 32.88

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