

# Yun Seong Song, Ph.D.

Assistant Professor  
Department of Mechanical and Aerospace Engineering  
Missouri University of Science and Technology  
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<https://people.mst.edu/faculty/songyun/index.html>

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## ACADEMIC POSITIONS

- 2016.11 – Present     **Assistant Professor**  
*Department of Mechanical and Aerospace Engineering*  
Missouri University of Science and Technology (formerly the University of Missouri - Rolla)
- 2014 – 2016     **Postdoctoral Researcher**  
*Department of Biomedical Engineering*  
Georgia Institute of Technology and Emory University  
Research Advisor: Lena Ting, Ph.D.  
Co-advisor: C. Karen Liu, Ph.D.
- 2015 – 2016     **Lecturer**  
*Department of Mechanical Engineering*  
Georgia Institute of Technology
- 2012 – 2013     **Postdoctoral Researcher**  
*Department of Mechanical Engineering*  
École Polytechnique Fédérale de Lausanne (EPFL)  
Research Advisor: Jamie Paik, Ph.D.

## EDUCATION

- 2006 – 2012     **Massachusetts Institute of Technology (MIT)**  
*Ph.D. in Mechanical Engineering*  
Research Advisor: Neville Hogan, Ph.D.  
Thesis Committee: Russ Tedrake, Ph.D., Sangbae Kim, Ph.D., Richard Marsh, Ph.D.
- 2004 – 2006     **Carnegie Mellon University (CMU)**  
*M.S. in Mechanical Engineering*  
Research Advisor: Metin Sitti, Ph.D.
- 1997 – 2004     **Seoul National University (SNU)**  
*B.S. in Mechanical Engineering / B.S.E. in Computer Science and Engineering*  
Dual major with Summa Cum Laude  
Thesis Advisor: Frank C. Park, Ph.D.

## TEACHING

### Missouri University of Science and Technology

Spring 2023	<b>Primary Instructor</b> , Mechatronics (Graduate) Enrollment: 10. Teaching effectiveness: 3.86/4.0 (Department average: 3.1/4.0)
Fall 2022	<b>Primary Instructor</b> , Automatic Control of Dynamic Systems (Undergraduate) Enrollment: 62. Teaching effectiveness: 3.73/4.0 (Department average: 3.3/4.0)
Spring 2022	<b>Primary Instructor</b> , Automatic Control of Dynamic Systems (Undergraduate) Enrollment: 61. Teaching effectiveness: 3.52/4.0 (Department average: 3.2/4.0)
Fall 2021	<b>Primary Instructor</b> , <i>Automatic Control of Dynamic Systems</i> (Undergraduate) Enrollment: 56. Teaching effectiveness: 3.75/4.0 (Department average: 3.0/4.0)
Spring 2021	<b>Primary Instructor</b> , <i>Automatic Control of Dynamic Systems</i> (Undergraduate, Online) Enrollment: 81. Teaching effectiveness: 3.20/4.0 (Department average: 2.9/4.0)
Fall 2020	<b>Primary Instructor</b> , <i>Neuromechanics of Human Movement</i> (Graduate, Online) Enrollment: 4. Teaching effectiveness: 4.0/4.0 (Department average: 3.1/4.0)
Spring 2020	<b>Primary Instructor</b> , <i>Automatic Control of Dynamic Systems</i> (Undergraduate) Enrollment: 78. Teaching effectiveness: 3.81/4.0 (Department average: 2.9/4.0)
Fall 2019	<b>Primary Instructor</b> , <i>Modeling and Analysis of Dynamic Systems</i> (Undergraduate) Enrollment: 47. Teaching effectiveness: 3.43/4.0 (Department average: 3.0/4.0)
Spring 2019	<b>Primary Instructor</b> , <i>Automatic Control of Dynamic Systems</i> (Undergraduate) Enrollment: 60. Teaching effectiveness: 3.54/4.0 (Department average: 2.9/4.0)
	<b>Primary Instructor</b> , <i>Automatic Control of Dynamic Systems</i> (Undergraduate) Enrollment: 57. Teaching effectiveness: 3.65/4.0 (Department average: 2.9/4.0)
Fall 2018	<b>Primary Instructor</b> , <i>Automatic Control of Dynamic Systems</i> (Undergraduate) Enrollment: 39. Teaching effectiveness: 3.41/4.0 (Department average: 3.0/4.0)
Spring 2018	<b>Primary Instructor</b> , <i>Automatic Control of Dynamic Systems</i> (Undergraduate) Enrollment: 46. Teaching effectiveness: 3.26/4.0 (Department average: 2.9/4.0)
Fall 2017	<b>Primary Instructor</b> , <i>Automatic Control of Dynamic Systems</i> (Undergraduate) Enrollment: 26. Teaching effectiveness: 3.53/4.0 (Department average: 2.9/4.0)
Spring 2017	<b>Primary Instructor</b> , <i>Automatic Control of Dynamic Systems</i> (Undergraduate) Enrollment: 22. Teaching effectiveness: 3.54/4.0 (Department average: 3.0/4.0)

### Georgia Institute of Technology

Spring 2016	<b>Primary Instructor</b> , <i>System Dynamics</i> . Enrollment: 72
Fall 2015	<b>Primary Instructor</b> , <i>System Dynamics</i> . Enrollment: 7 Instructor Overall Effectiveness: 5.0/5.0 (100% percentile)

## HONORS AND AWARDS

2021	<b>CAREER Award</b> , National Science Foundation
2020	<b>Outstanding Teaching Commendation</b> , Missouri University of Science and Technology
2019	<b>Faculty Teaching Award</b> , Missouri University of Science and Technology
2019	<b>University of Missouri Teaching Scholar</b> , Missouri University of Science and Technology
2008 – 2012	<b>Research Assistantship</b> , MIT
2006 – 2010	Recipient, <b>Samsung Scholarship</b> for Ph.D. Studies (4 years)
2004 – 2006	Recipient, <b>Samsung Scholarship</b> for M.S. Studies (2 years)
2006	<b>Best Presenter Award</b> , Bennett Conference for M.S. students (CMU)

1997 – 2004	Recipient, <b>Nong-pa Fellowship</b> for Undergraduate Studies (8 semesters)
1997 – 2004	Recipient, <b>Seoul National University Scholarship</b> for Academic Excellence (8 semesters)
2003	<b>Excellence in Undergraduate Research (SNU)</b>

## PUBLICATIONS

### Book Chapter

- [1] **Yun Seong Song**, Sehoon Ha, Hsiang Hsu, Lena Ting<sup>3</sup> and C. Karen Liu<sup>3</sup>, "Stair negotiation made easier using low-energy interactive stairs," *Powered Prostheses*, pp. 179-199, Ed. H. Dalalli, Ed. M. Rastgaar, *ASME. J. Mechanisms Robotics*, Elsevier, 2020.

### Journal Articles

- [1] Sambad Regmi<sup>1</sup>, Devin Burns and **Yun Seong Song**, "Humans modulate arm stiffness to facilitate motor communication during overground physical human-robot interaction," *Scientific Reports*, 2022.
- [2] Sambad Regmi<sup>1</sup>, Devin Burns and **Yun Seong Song**, "A robot for overground physical human-robot interaction experiments," *PLoS One*, 2022.
- [3] M. Wu, L. Drnach, S. M. Bong, **Y. S. Song**, L. H. Ting<sup>3</sup>, "Human-Human Hand Interactions Aid Balance During Walking by Haptic Communication." *Frontiers in robotics and AI*, 8, 735575, 2021.
- [4] Fazlur Rashid<sup>1</sup>, Devin Burns, and **Yun Seong Song**, "Sensing small interaction forces through proprioception." *Scientific Reports*, 2021.
- [5] Sambad Regmi<sup>1</sup> and **Yun Seong Song**, "Design Methodology for Robotic Manipulator for Overground Physical Interaction Tasks." *ASME. J. Mechanisms Robotics*, 2020.
- [6] Anirudh Saini<sup>1</sup>, Devin Burns, Darian Emmett<sup>2</sup> and **Yun Seong Song**. Trunk velocity-dependent Light Touch reduces postural sway during standing. *PLoS One*, 2019;14(11).
- [7] **Yun Seong Song**, Sehoon Ha, Hsiang Hsu, Lena Ting<sup>3</sup> and C. Karen Liu<sup>3</sup>, "Stair Negotiation Made Easier Using Novel Interactive Energy-Recycling Assistive Stairs," *Plos One*, 2017.
- [8] **Yun Seong Song** and Neville Hogan<sup>3</sup>, "Design, Implementation, Validation of an Interactive Exoskeletal Robot for Overground Locomotion Studies in Rodents," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 2015.
- [9] **Yun Seong Song**, Metin Sitti<sup>3</sup>, "Surface-Tension-Driven Biologically Inspired Water Strider Robots: Theory and Experiments," *IEEE Transactions on Robotics*, Vol. 23, pp. 578-589, 2007.

### Peer-reviewed Conference Papers (‡Podium talks)

- [1] ‡Tarani Kanth Kamma<sup>1</sup>, Sambad Regmi<sup>1</sup>, Devin Burns, **Yun Seong Song**, "Validation of the Human Arm Stiffness Estimation Method Developed for Overground Physical Interaction Experiments," *45<sup>th</sup> Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*, 2023.
- [2] George Holmes<sup>1</sup>, Keyri Moreno Bonnett<sup>2</sup>, Amy Costa, Devin Burns, ‡**Yun Seong Song**, "Interaction Forces as a Guide for Trajectory Tracking for Physical Human-Robot Interaction," *9th IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob)*, 2022.
- [3] ‡Fazlur Rashid<sup>1</sup>, Devin Burns and **Yun Seong Song**, "Factors affecting the sensitivity to small interaction forces in humans," *43<sup>rd</sup> Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*, 2021.
- [4] ‡Sambad Regmi<sup>1</sup> and **Yun Seong Song**, "Estimation of Endpoint Impedance of a 2D Parallel Manipulator Using Numerical Simulation Experiments," *International Mechanical Engineering Congress & Exposition (IMECE)*, 2020.

<sup>1</sup> Author is candidate's graduate advisee.

<sup>2</sup> Author is candidate's undergraduate advisee.

<sup>3</sup> Author was candidate's academic (MS, PhD, or post-doc) advisor.

- [5] Chansu Suh, Jordi Condal Margarit, **Yun Seong Song** and ‡Jamie Paik<sup>3</sup>, “Soft Pneumatic Actuator Skin with Embedded Sensors,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2014 (Acceptance rate: 47%).
- [6] ‡**Yun Seong Song**, Y. Sun, R. van den Brand, J. Zitzewitz, S. Micera, G. Courtine, and J. Paik<sup>3</sup>, "Soft Robot for Gait Rehabilitation of Spinalized Rodents," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2013 (Acceptance rate: 43%).
- [7] ‡Yi Sun, **Yun Seong Song**, Jamie Paik<sup>3</sup>, "Characterization of Silicone Rubber Based Soft Pneumatic Actuators," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2013 (Acceptance rate: 43%).
- [8] Yi Sun, **Yun Seong Song**, ‡Jamie Paik<sup>3</sup>, "Soft Pneumatic Actuators with Various Actuation Mechanisms," *The 7<sup>th</sup> World Congress on Biomimetics, Artificial Muscles and Nano-Bio*, 2013.
- [9] ‡**Yun Seong Song**, Neville Hogan<sup>3</sup>, "Design of An Overground Interactive Therapeutic Robot For Rodents Recovering After Spinal Cord Injury," *Proceedings of ASME Dynamic Systems and Control Conference*, pp. 409-411, 2008.
- [10] ‡Vijay Shilpiekandula, **Yun Seong Song**, "A Music-Based Mechatronic System for Teaching Modeling and Control," *Proceedings of ASME International Mechanical Engineering Congress and Expedition*, 2008.
- [11] ‡**Yun Seong Song**, Metin Sitti<sup>3</sup>, "STRIDE: A Highly Maneuverable and Non-Tethered Water Strider Robot," *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 980-984, 2007 (Acceptance rate: 44%).
- [12] ‡**Yun Seong Song**, Steve Suhr, Metin Sitti<sup>3</sup>, "Modeling of the supporting legs for designing biomimetic water strider robots," *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 2303-2310, 2006 (Acceptance rate: 39%).
- [13] Steven Suhr, **Yun Seong Song**, Sang Jun Lee, ‡Metin Sitti<sup>3</sup>, “Biologically Inspired Miniature Water Strider Robot,” *Proceedings of the Robotics: Science and Systems I*, pp. 319-325, 2005.

#### **Abstracts (†Poster Presenter)**

- [1] †Sindhu Reddy Alluri<sup>1</sup>, Devin Burns and **Yun Seong Song**, “Light-Touch Based Virtual Cane Improves Standing Balance without Physical Support,” *41st International Engineering in Medicine and Biology Conference (EMBC)*, 2019.
- [2] †Sambad Regmi<sup>1</sup> and **Yun Seong Song**, “Design Method for Robots for Overground Physical Interaction,” *41st International Engineering in Medicine and Biology Conference (EMBC)*, 2019.
- [3] †Jake Schuchmann<sup>2</sup> and **Yun Seong Song**, “Design of an Energy-Harvesting Arm Brace,” *41st International Engineering in Medicine and Biology Conference (EMBC)*, 2019.
- [4] †Sindhu Reddy Alluri<sup>1</sup>, Devin Burns and **Yun Seong Song**, “Light-touch based Virtual Cane for Assistance during Walking,” *Hand, Brain and Technology*, 2018.
- [5] †Anirudh Saini<sup>1</sup>, Devin Burns and **Yun Seong Song**, “Velocity-Dependent Light Interaction Force Improves Standing Balance,” *40th International Engineering in Medicine and Biology Conference (EMBC)*, 2018.
- [6] †**Yun Seong Song**, Tiffany L. Chen, Tapomayukh Battacharjee, J. Lucas McKay, Madeleine E. Hackney, Charles C. Kemp and Lena H. Ting<sup>3</sup>, “Human arms remove energy during partnered stepping tasks with a robot follower”, *ASU Rehabilitation Robotics Workshop*, Tempe, USA, 2015.
- [7] †**Yun Seong Song**, Tiffany L. Chen, Tapomayukh Battacharjee, J. Lucas McKay, Madeleine E. Hackney, Charles C. Kemp and Lena H. Ting<sup>3</sup>, “Human arms remove energy during partnered stepping tasks with a robot follower”, *Neural Control of Movement Annual Meeting*, Charleston, SC, 2015.
- [8] **Yun Seong Song**, Yi Sun and Jamie Paik<sup>3</sup>, “Development of a Soft Exoskeleton for Gait Assistance in Spinalized Rodents,” *International Workshop on Soft Robotics and Morphological Computation*, Ascona, Switzerland, 2013.

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<sup>1</sup> Author is candidate's graduate advisee.

<sup>2</sup> Author is candidate's undergraduate advisee.

<sup>3</sup> Author was candidate's academic (MS, PhD, or post-doc) advisor.

- [9] †**Yun Seong Song** and Neville Hogan<sup>3</sup>, "Design, Implementation and Validation of an Overground Interactive Robot for Locomotion Studies in Rodents," *Society of Neuroscience*, Washington DC, USA, 2011
- [10] †**Yun Seong Song** and Neville Hogan<sup>3</sup>, "Design of an Overground Interactive Therapeutic Robot for Rodents Recovering after Spinal Cord Injury," *New York State Spinal Cord Injury Research Program Symposium*, NY, USA, 2008.

### PATENTS

- [1] Sambad Regmi<sup>1</sup> and **Yun Seong Song**, "Mobile Robot Configured to Determine Human Arm Stiffness during Overground Interaction," *US Patent Application #17/939,698*, 2023.
- [2] C. Karen Liu<sup>3</sup>, **Yun Seong Song**, Lena Ting<sup>3</sup> and Sehoon Ha, "Energy-Harvesting Stairs for Assisting Stair Ascent", *US Patent #10,975,574*, 2021.
- [3] **Yun Seong Song** and Neville Hogan<sup>3</sup>, "Method and Apparatus for Pulse-Modulated Feedback Control," *US Patent #9,488,974*, 2016.

### GRANTS

- NSF CAREER (program: CMMI-M3X): **Yun Seong Song (100%)**, "Advancing Physical Human-Robot Interaction through Intuitive Motor Communication," \$538,876, August 2021 – July 2026.
- Bristow, D. (25%), Landers, R. G. (15%), Dong, X. (10%), Krishnamurthy, K. (10%), Leu, M. (10%), Park, J. (10%) and **Song, Y. (10%)**, Department of Education, "Doctoral Research and Training in Mechatronics," \$2,082,900, July 7, 2021 - June 30, 2024.
- NSF EAGER (program: CMMI-M3X): **Yun Seong Song (67%)** and Devin Burns (33%), "Human Arm Impedance Modulation during Overground Physical Interactions," \$299,928, January 2019 – December 2021.
- Missouri University of Science and Technology, Smart-Living seed grant: **Yun Seong Song (67%)** and Devin Burns (33%), "Light-touch Based Virtual Cane for Balance Assistance During Walking," September 2018 – August 2019, Funded amount: \$36,341

### INVITED TALKS

#### Departmental Seminars

- [1] "Human-Robot Interaction through Physical Contact," University of Iowa, Department of Mechanical Engineering, Iowa City, IO, 2022.
- [2] "Design of Devices for Human Movement Assistance," Missouri University of Science and Technology, Biological Sciences Department, Rolla, MO, 2019.
- [3] "Physical Human-Robot Interaction through Small Interaction Forces," Seoul National University (SNU) Department of Physical Education, Seoul, Korea, 2018.
- [4] "Physical Human-Robot Interaction through Small Interaction Forces, Korea Advanced Institute of Science and Technology (KAIST) Department of Mechanical Engineering / Department of Electrical Engineering, Daejeon, Korea, 2018.
- [5] "Physical Human-Robot Interaction through Small Interaction Forces," Daegu Gyeongbuk Institute of Science and Technology (DGIST) Department of Robotics, Hyunpoong, Korea, 2018.
- [6] "Physical Human-Robot Interaction through Small Interaction Forces," Nanyang Technological University (NTU), School of Mechanical and Aerospace Engineering, Singapore, 2018.
- [7] "Challenges in Designing Robots for Better Physical Human-Robot Interaction," Department of Mechanical Engineering, Missouri University of Science and Technology, 2016.

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<sup>1</sup> Author is candidate's graduate advisee.

<sup>2</sup> Author is candidate's undergraduate advisee.

<sup>3</sup> Author was candidate's academic (MS, PhD, or post-doc) advisor.

- [8] “Designing Robots for Better Physical Human-Robot Interaction,” Department of Mechanical and Aerospace Engineering, Oklahoma State University, 2016.
- [9] “Hindlimb Exoskeleton for Rodents: Two Distinctive Approaches,” Department of Electrical Engineering, Korea Advanced Institute of Science and Technology (KAIST), 2014.
- [10] “Hindlimb Exoskeleton for Rodents: Two Distinctive Approaches,” Department of Robotics Engineering, Daegu Gyeongbuk Institute of Science and Technology (DGIST), 2014.
- [11] “Hindlimb Exoskeleton for Rodents: Two Distinctive Approaches,” Department of Mechanical Engineering, Pohang University of Science and Technology, 2014.
- [12] “Hindlimb Exoskeleton for Rodents: Two Distinctive Approaches,” Department of Mechanical Engineering, Oregon State University, 2014.
- [13] “Design, Implementation and Validation of an Exoskeletal Robot for Locomotion Studies in Rodents,” Samsung Advanced Institute of Technology, Kiheung, Korea, 2012.
- [14] “Design, Implementation and Validation of an Exoskeletal Robot for Locomotion Studies in Rodents,” Biomedical Research Institute, Korea Institute of Science and Technology (KIST), Seoul, Korea, 2012.
- [15] “Design, Implementation and Validation of an Exoskeletal Robot for Locomotion Studies in Rodents,” Wyss Institute at Harvard, Cambridge, MA, 2012.
- [16] “Design, Implementation and Validation of an Exoskeletal Robot for Locomotion Studies in Rodents,” Center for Bionic Medicine, Rehabilitation Institute at Chicago, Chicago, IL, 2012.
- [17] “Design, Implementation and Validation of an Exoskeletal Robot for Locomotion Studies in Rodents,” Department of Neurobiology, University of Pittsburgh, Pittsburgh PA, 2010.

#### **Podium Talks at Conference Workshops**

- [1] “Stair Negotiation Made Easier using Energy-Recycling Assistive Stairs with Simple Event-Triggered Control Scheme,” Workshop on Adaptive Control Methods in Assistive Technologies, *IEEE/RSJ International Conference on Intelligent Robots and Systems*, Vancouver, Canada, September 2017.
- [2] “Human arms remove energy during blindfolded partnered stepping tasks with a robot follower.” *ICRA Workshop on Rehabilitation Robotics and Human-Robot Interaction*, Seattle, WA, 2015.
- [3] “Hindlimb Exoskeleton for Rodents: Two Distinctive Approaches,” Workshop on Soft Technologies for Wearable Robots, *IEEE/RSJ International Conference on Intelligent Robots and Systems*, Tokyo, Japan, 2013.

#### **Other Seminars**

- [1] “Human-Robot Interaction through Physical Contact,” *Missouri S&T Intelligent Systems Center*, Rolla, MO, 2023.
- [2] “Human-Robot Interaction through Physical Contact,” *Midwest Regional Conference of Korean-American Scientists and Engineers Association*, Chicago, IL, 2023
- [3] (Outreach) “Would you like a Nudge from a Robot?”, *Science in St. Louis Series*, St. Louis Academy of Science, St. Louis, MO, 2021
- [4] “Biomechanics and Mechanical Engineering,” *University of Missouri System Research Summit: Engineering and Health*, Rolla, MO, 2019.
- [5] “Light-touch Based Virtual Cane for Balance Assistance During Standing,” *Missouri S&T Smart Living*, Rolla, MO, 2019
- [6] “Physically Interactive Robots for Human Assistance.” *University of Missouri System Research Summit: Humanities in the Digital Age*, Kansas City, MO, 2018.
- [7] “Physical Human-Robot Interaction through Small Interaction Forces.” *Program of Physical Medicine*, Washington University in St. Louis, MO, 2018.
- [8] (Outreach) “The Present and Future of Robotics.” *Korean Presbyterian Church Community Lecture Series*, St. Louis, MO, 2018.
- [9] “Human Acceptance of Physical Assistance from Robotic Devices.” *Missouri S&T Biomedical Humanities Symposium*, Rolla, MO, 2018.

- [10] “Physical Interaction between man and machine – General and specific considerations.” *Missouri S&T Intelligent Systems Center*, Rolla, MO, 2017.
- [11] “Considerations for Human Robot Physical Interaction in Manufacturing.” *20th CAMT Industry Advisory Board Meeting*, Rolla, MO, 2017.

### Invited Panel

- Expert Panel, Focus on Teaching & Technology Conference, St. Louis, Oct. 2021.

### STUDENT ADVISING

#### Ph. D. Students

- 2022 – present    **Research Advisor**, Doctor of Philosophy, Missouri University of Science and Technology  
 Student name: Mohsen (Mason) Mohammadi Beirami (Mechanical Engineering)  
 Title: *Dynamically Correct Hugging Robot with Human-like Interaction*
- 2022 – present    **Research Advisor**, Doctor of Philosophy, Missouri University of Science and Technology  
 Student name: Tarani Kanth Kamma (Mechanical Engineering)  
 Title: *Arm Stiffness Measurement Method for Overground Physical Human-Robot Interaction*
- 2018 – 2020        **Research Advisor**, Doctor of Philosophy, Missouri University of Science and Technology  
 Student name: George Holmes (Mechanical Engineering)  
 Title: *Intuitive Control of an Overground Interactive Robot Based on Human Data*
- 2017 – 2022        **Research Advisor**, Doctor of Philosophy, Missouri University of Science and Technology  
 Student name: Sambad Regmi (Mechanical Engineering)  
 Title: *Development of small-force interactive robot with human-like force semantics*
- Recipient, *John W. Claypool Award for Medical Research*, 2020.  
 5<sup>th</sup> place winner, Missouri S&T Office of Graduate Studies Virtual Poster Competition, 2021.  
 3<sup>rd</sup> place winner, 3-Minute Thesis (3MT) presentation, Missouri S&T, 2022.

#### Masters Students (2-year Thesis Program)

- 2022 – present    **Research co-advisor**, Master of Science, Missouri University of Science and Technology  
 Student name: Adam Sawyer (Computer Engineering)  
 Title: *Robotic Vision for Biomedical Robots and Structural Health Monitoring Systems*
- 2020 – 2021        **Research Advisor**, Master of Science, Missouri University of Science and Technology  
 Student name: Fazlur Rashid (Mechanical Engineering)  
 Title: *Effect of Human Arm Impedance to Force Sensitivity*
- Finalist, 3-Minute Thesis (3MT) presentation, Missouri S&T, 2021
- 2018 - 2019        **Research Advisor**, Master of Science, Missouri University of Science and Technology  
 Student name: Sindhu Reddy Alluri (Manufacturing Engineering)  
 Title: *Development of Virtual Cane for Balance Assistance during Standing*  
 Current Position: NPI Process Engineer, Amazon Robotics
- 2017 - 2018        **Research Advisor**, Master of Science, Missouri University of Science and Technology  
 Student name: Anirudh Saini (Manufacturing Engineering)  
 Title: *Investigation of human proprioception and balance improvement during light-touch tasks using virtual force fields*  
 Current Position: Sr Manufacturing Equipment Engineer, Tesla.

#### Undergraduate Students

- 2022                **Research Advisor**, undergraduate research, Missouri University of Science and Technology  
 Student name: Riley Still (Mechanical and Aerospace Engineering)  
 Title: *Development of a force-perturbation handle for physical human-human interaction research*  
**MAE Distinguished Undergraduate Research Fellow**

- 2021 **Research Advisor**, undergraduate research, Missouri University of Science and Technology  
 Student name: Mathew Sykes (Mechanical and Aerospace Engineering)  
 Title: *A robot that feels natural to your hand*  
**MAE Distinguished Undergraduate Research Fellow**
- 2019 - 2020 **Research Advisor**, undergraduate research, Missouri University of Science and Technology  
 Student name: Keyri Moreno Bonnett (Mechanical and Aerospace Engineering)  
 Title: *Human-human physical interaction experiment setup development*
- 2019 **Research Advisor**, undergraduate research, Missouri University of Science and Technology  
 Student name: Bryan Woode (Mechanical and Aerospace Engineering)  
 Title: *Force handle development for human-human interaction task*
- 2018 - 2019 **Research Advisor**, undergraduate research, Missouri University of Science and Technology  
 Student name: Jake Schuchmann (Mechanical and Aerospace Engineering)  
 Title: *Development of the planning algorithm for low-impedance energy-recycling elbow brace*
- 2018 **Research Advisor**, undergraduate research, Missouri University of Science and Technology  
 Student name: Matthew Hoepfner (Mechanical and Aerospace Engineering)  
 Title: *Mimicking neural spikes to control non-linear physical systems*  
**MAE Distinguished Undergraduate Research Fellow**
- 2018 **Research Advisor**, undergraduate research, Missouri University of Science and Technology  
 Student name: Darian Emmett (Mechanical and Aerospace Engineering)  
 Title: *Effect of small additional mass on standing balance in humans*  
**MAE Distinguished Undergraduate Research Fellow**
- 2017 **Research Advisor**, undergraduate research, Missouri University of Science and Technology  
 Student name: Sachith Gamlath (Mechanical and Aerospace Engineering)  
 Title: *Development of low-impedance energy-recycling elbow brace*
- 2017 **Research Advisor**, undergraduate research, Missouri University of Science and Technology  
 Student name: Vincent Marco (Computer Science and Engineering)  
 Title: Development of a vibrotactile glove for providing balance assistance  
**Opportunities for Undergraduate Research Experiences (OURE)**
- 2017 **Research Advisor**, undergraduate research, Missouri University of Science and Technology  
 Student name: Samuel Bowles (Mechanical and Aerospace Engineering)  
 Title: *Design and Development of tendon and sole vibration device for balance alterations*
- 2017 **Research Advisor**, undergraduate research, Missouri University of Science and Technology  
 Student name: Seth Cockram (Mechanical and Aerospace Engineering)  
 Title: *Development of virtual physical objects for human balance experiments*  
**MAE Distinguished Undergraduate Research Fellow**

### Thesis Committee

#### Ph.D. students

S. Sreevalsan Menon (2021), advisor: K. Krishnamurthy  
 N. Lutes (present), advisor: K. Krishnamurthy  
 M. Woodside (present), advisor: D. Bristow  
 P. Bazzoli (present), advisor: D. Bristow  
 H. Chen (present), advisor: M. Leu  
 N. Zendejdel (present), advisor: M. Leu

### Student Organization

Advisor, Missouri S&T Biomedical Engineering Design Team (2022 – present)



## **SERVICE AND OTHER PROFESSIONAL ACTIVITIES**

### **Associate Editor**

International Conference for Biomedical Robotics and Biomechatronics (BioRob), New York, NY, 2020.  
International Conference for Biomedical Robotics and Biomechatronics (BioRob), Seoul, South Korea, 2022.

### **Review Editor**

Frontiers in Robotics and AI – Human-Robot Interaction, 2023-present

### **Editorial Board Member**

Scientific Reports, Nature Publishing – Biomedical Engineering Section, 2023-present

### **Panel Reviewer**

National Science Foundation Convergence Accelerator Track H Panel P222575, September, 2022.  
National Science Foundation FW-HTF Panel P201920, May, 2020.  
National Science Foundation CMMI/DCSD Panel P171696, April, 2017.  
Proposal Reviewer, John R. Evans Leaders Fund, Canada Foundation for Innovation, 2020.  
Proposal Reviewer, Young Investigator Grant, Korean-American Scientists and Engineers Association, 2020.

### **Reviewer**

IEEE Sensors  
IEEE/ASME Transactions on Mechatronics  
IEEE Transaction on Neural Systems and Rehabilitation Engineering  
IEEE Transaction on Biomedical Engineering  
IEEE Transaction on Robotics  
IEEE International Conference on Robotics and Automation (ICRA)  
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)  
IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob)  
IEEE International Conference of the Engineering in Medicine and Biology Society (EMBC)  
IEEE Conference on Control Technology and Applications  
IEEE Robotics and Automation Letters  
ASME Journal of Mechanical Design  
ASME Journal of Dynamic Systems, Measurement and Control  
ASME Dynamic Systems and Control Conference (DSCC)  
Mechatronics (Elsevier)  
Soft Robotics  
Gait and Posture  
PLoS ONE  
Neuroscience Letters  
Experimental Brain Research  
Academic Press, Vienna University of Technology

### **Service**

Research space allocation committee, College of Engineering, Missouri S&T, 2020-2021  
Graduate recruitment committee, Mechanical and Aerospace Engineering, Missouri S&T, 2022-present  
NTT Faculty Search Committee, Mechanical and Aerospace Engineering, Missouri S&T, 2022  
Tenure-Track Faculty Search Committee, Mechanical and Aerospace Engineering, Missouri S&T, 2023

### **Professional Membership**

American Physiological Society (2021 – present)  
Society for Neuroscience (2011 – 2012)  
IEEE Member (2005 – present)  
IEEE Robotics & Automation Society (RAS) Member (2013 – present)  
Society for Neural Control of Movement (2015)  
ASME Member (2016 – present)  
Korean-American University Professors Association (2018 – present)  
Korean-American Scientists and Engineers Association (2023 – present)

**Select Media Coverage**

St. Louis Public Radio, 2022 ([link](#))

PBS News Hour, 2017 ([link](#))

Smithsonian Magazine, 2017 ([link](#))

Wired (UK), 2017 ([link](#))

Phys.org, 2007 ([link](#))