

# AVA CHEN

<https://www.avachen.net> ◊ [avachen@stanford.edu](mailto:avachen@stanford.edu)

## ACADEMIC POSITIONS

### Stanford University

Postdoctoral Scholar in Mechanical Engineering, Advisor: Allison Okamura

2025 – present

## EDUCATION

### Columbia University

Ph.D in Mechanical Engineering, Advisor: Matei Ciocarlie

Thesis: “*Robotic Exoskeletons to Assist Volitional Motor Control of the Paretic Hand*”

2019 – 2025

New York, NY

### Columbia University

M.S. in Mechanical Engineering

2019 – 2021

New York, NY

### Massachusetts Institute of Technology (MIT)

B.S. in Mechanical Engineering, Advisors: Hugh Herr, Arthur Petron

Thesis: “*Effectiveness of Active Cooling on Torque Performance for Prosthetic Applications*”

2013 – 2017

Cambridge, MA

## HONORS

### NIH Ruth L. Kirschstein National Research Service Award (NRSA) F31 – NICHD

Robotics: Science & Systems (RSS) Pioneer

Columbia Center for the Integration of Research, Teaching and Learning (CIRTL) Fellow

Rising Star in ME 2022 at Stanford University

Columbia University Presidential Distinguished Fellowship

2023 – 2025

2024

2023 – 2024

2022

2019 – 2023

## PUBLICATIONS

### Peer-Reviewed Journal Articles

[\* indicates equal contribution]

- [J.5] J. Xu\*, R. Wang\*, S. Shang\*, **A. Chen**, L. Winterbottom, L. Hsu, W. Chen, K. Ahmed, P. L. La Rotta, X. Zhu, D. M. Nilsen, J. Stein, and M. Ciocarlie, “ChatEMG: Synthetic Data Generation to Control a Robotic Hand Orthosis for Stroke.” *IEEE Robotics and Automation Letters*, 10, 2, 907-914. (2025)  
• Presented in *2025 IEEE Intl. Conference on Robotics and Automation (ICRA)*.
- [J.4] L. Winterbottom\*, **A. Chen\***, R. Mendonca, D.M. Nilsen, M. Ciocarlie, and J. Stein. “Clinician perceptions of a novel wearable robotic hand orthosis for post-stroke hemiparesis.” *Disability and Rehabilitation*, 1–10. (2024)
- [J.3] J. Palacios\*, A. Deli-Ivanov\*, **A. Chen\***, L. Winterbottom, D. M. Nilsen, J. Stein, and M. Ciocarlie, “Grasp Force Assistance via Throttle-based Wrist Angle Control on a Robotic Hand Orthosis for C6-C7 Spinal Cord Injury.” *IEEE Transactions on Medical Robotics and Bionics*, in press. (2024)  
• Presented in *2024 IEEE RAS/EMBS Intl. Conference on Biomedical Robotics and Biomechatronics (BioRob)*.
- [J.2] **A. Chen**, L. Winterbottom, S. Park, J. Xu, D. M. Nilsen, J. Stein, and M. Ciocarlie, “Thumb Stabilization and Assistance in a Robotic Hand Orthosis for Post-Stroke Hemiparesis.” *IEEE Robotics and Automation Letters*, 7, 8276-8282. (2022)  
• Presented in *2022 IEEE RAS/EMBS Intl. Conference on Biomedical Robotics and Biomechatronics (BioRob)*.  
**Finalist, BioRob2022 Best Paper Award**
- [J.1] **A. Chen**, K. Kim, and P.S. Shamble. “Rapid mid-jump production of high-performance silk by jumping spiders.” *Current Biology*, 31, R1422-R1423. (2021)

### Peer-Reviewed Conference Papers

- [C.7] J. Xu\*, **A. Chen\***, L. Winterbottom, J. Palacios, P. Chivukula, D. M. Nilsen, J. Stein, and M. Ciocarlie. “Reciprocal Learning of Intent Inference with Augmented Visual Feedback for Stroke.” In *2025 IEEE Intl. Conference on Rehabilitation Robotics (ICORR)*.
- [C.6] K. Lee, R. Wang, **A. Chen**, L. Winterbottom, H. M. C. Leung, L. M. DiSalvo, I. Xu, J. Xu, D. M. Nilsen, J. Stein, X. Zhou, and M. Ciocarlie. “Fabric Sensing of Intrinsic Hand Muscle Activity.” In *2025 IEEE Intl. Conference on Rehabilitation Robotics (ICORR)*.

- [C.5] **A. Chen\***, K. Lee\*, L. Winterbottom, J. Xu, C. Lee, G. Munger, A. Deli-Ivanov, D. M. Nilsen, J. Stein, and M. Ciocarlie, “Volitional Control of the Paretic Hand Post-Stroke Increases Finger Stiffness and Resistance to Robot-Assisted Movement.” In *2024 IEEE RAS/EMBS Intl. Conference on Biomedical Robotics and Biomechanics (BioRob)*.
- [C.4] P. L. La Rotta\*, J. Xu\*, **A. Chen**, L. Winterbottom, W. Chen, D. M. Nilsen, J. Stein, and M. Ciocarlie, “Meta-Learning for Fast Adaptation in Intent Inference on a Robotic Hand Orthosis for Stroke.” In *2024 IEEE/RSJ Intl. Conference on Intelligent Robots and Systems (IROS)*.
- [C.3] **A. Chen**, L. Winterbottom, K. O’Reilly, S. Park, D. M. Nilsen, J. Stein, and M. Ciocarlie. “Design of Spiral-Cable Forearm Exoskeleton to Provide Supination Adjustment for Hemiparetic Stroke Subjects.” In *2022 IEEE Intl. Conference on Rehabilitation Robotics (ICORR)*.
- [C.2] J. Xu, C. Meeker, **A. Chen**, L. Winterbottom, M. Fraser, S. Park, L. M. Weber, M. Miya, D. M. Nilsen, J. Stein, and M. Ciocarlie. “Adaptive Semi-Supervised Intent Inference to Control a Powered Hand Orthosis for Stroke.” In *2022 IEEE Intl. Conference on Robotics and Automation (ICRA)*.
- [C.1] T. Cervantes, W.E. Byun\*, **A. Chen\***, K. Kim\*, K. Nealon\*, J. Connor, and A. Slocum. “A Device for Quantitative Analysis of the Thumb Ulnar Collateral Ligament.” ASME. *Frontiers in Biomedical Devices, 2018 ASME Design of Medical Devices Conference*.

#### Submitted for Publication

- [S.1] R. Wang\*, X. Zhu\*, **A. Chen**, J. Xu, L. Winterbottom, D. M. Nilsen, J. Stein, and M. Ciocarlie. “ReactEMG: Stable, Low-Latency Intent Detection from sEMG via Masked Modeling” (2025, under review)

#### Workshop and Symposium Contributions

- [W.8] L. Winterbottom, **A. Chen**, D. M. Nilsen, R. Mendonca, J. Xu, K. Lee, M. Ciocarlie, and J. Stein. “Motor learning techniques to enhance training with robotic hand orthoses for stroke survivors: challenges and opportunities.” In *American Occupational Therapy Association (AOTA) INSPIRE 2025*.
- [W.7] **A. Chen**, J. Xu, K. Lee, L. Winterbottom, D. M. Nilsen, J. Stein, and M. Ciocarlie. “Bidirectional Human-Robot Feedback and Physical Effects of Assisted Manipulation with a Robotic Hand Orthosis for Stroke.” In *New England Manipulation Symposium (NEMS) 2024*.
- [W.6] **A. Chen**. “Assisting Impaired Dexterity with User-Driven Robotic Hand Exoskeletons.” In *Robotics: Science and Systems (RSS) workshop: RSS Pioneers 2024*.
- [W.5] K. Lee, L. M. DiSalvo, I. Xu, **A. Chen**, X. Zhou, and M. Ciocarlie. “Fabric EMG Sensing for Robotic Orthosis Control.” In *2024 IEEE Intl. Conference on Biomedical Robotics and Biomechanics (BioRob) workshop: Building Responsive Body-Machine Interfaces with Biosignals and Robotic Exoskeletons*.
- [W.4] L. Winterbottom, D. Nilsen, R. Mendonca, **A. Chen**, S. Lin, K. Carroll, J. Xu, M. Ciocarlie, and J. Stein. “Collaboration between Occupational Therapists, Engineers, and People with Neurological Conditions in the Development of Wearable Robotic Devices.” In *American Occupational Therapy Association (AOTA) INSPIRE 2024*.
- [W.3] J. Palacios\*, A. Deli-Ivanov\*, **A. Chen**, L. Winterbottom, D. M. Nilsen, J. Stein, and M. Ciocarlie. “Towards Tenodesis-Modulated Control of an Assistive Hand Exoskeleton for SCI.” In *2023 IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS) workshop: Assistive Robotics for Citizens*.
- [W.2] L. Winterbottom, K. Carroll, S. Lin, **A. Chen**, R. Mendonca, D. M. Nilsen, M. Ciocarlie, and J. Stein. “Stroke Survivors’ Perspectives on the Design of a Novel Wearable Robotic Hand Brace.” In *2022 Janet Falk-Kessler Distinguished Lectureship and Day of Scholarship*.
- [W.1] L. Winterbottom, D. Nilsen, R. Mendonca, **A. Chen**, J. Xu, M. Ciocarlie, and J. Stein. “Perspectives of Individuals with C6-C7 Spinal Cord Injury on the Design of a Novel Robotic Hand Brace.” In *2021 Janet Falk-Kessler Distinguished Lectureship and Day of Scholarship*.

#### Patents

- [P.1] M. Ciocarlie, J. Stein, **A. Chen**, S. Park, D.M. Nilsen. “Robotic Hand Orthosis For Stroke”, Application #: US 63/249,456

#### GRANT PROPOSAL EXPERIENCE

---

*Impact of biofeedback and task-specific training with a robotic hand orthosis on voluntary muscle modulation for rehabilitation post-stroke.*    NIH F31 1F31HD111301    NICHD (NCMRR)    8/2023–1/2025    \$72,587    **PI: Chen**

## INVITED TALKS

<b>Robotic Hand Exoskeletons to Assist and Rehabilitate Impaired Dexterity</b> Harvard University, Harvard Biorobotics Lab Meeting	<b>June 2024</b>
<b>Robotic Hand Orthoses for Assistance and Rehabilitation After Stroke</b> (Co-Speaker) Global Perspectives on Medicine, Rehabilitation and Robotics Webinar Series	<b>Sept. 2023</b>
<b>MyHand: a Wearable Hand Orthosis for Stroke</b> (Co-Speaker) IROS Workshop, Challenges and Opportunities of Human-Robot Symbiosis: from Wearable Robots to Neurorobotics	<b>Oct. 2021</b>
<b>How Jumping Spiders Use Silk to Orient Themselves in Midair</b> Harvard University, Harvard Bauer Forum	<b>Oct. 2018</b>
<b>How Jumping Spiders Jump</b> Broad Institute, CEE 35th Anniversary Celebration	<b>Oct. 2018</b>

## TEACHING EXPERIENCE AND MENTORSHIP

### University Courses

Teaching Assistant, Columbia MECE E4602 – Introduction to Robotics	<b>Fall 2020</b>
Lab Assistant, Harvard LS50 – Integrated Science	<b>Spring 2018, Spring 2019</b>

### Pedagogical Training

Participant, Columbia Center for Teaching and Learning (CTL) Teaching Development Program	<b>2022 – 2025</b>
---	--------------------

### Talks on Teaching

Columbia CTL “Wowza!” CIRTL Discussion Series – Speaker, “Supporting Teaching as Scholarship”	<b>Mar. 2024</b>
Columbia CTLGrads Journal Club workshop – Speaker, “Effective Teaching Online, Real-Time”	<b>Oct. 2023</b>

### Extracurricular

Columbia Engineering Your PhD – Invited Panelist, “Insights from Experienced TAs”	<b>Aug. 2023, Aug. 2024</b>
Academic Mentor, Women in Science at Columbia (WISC)	<b>2020, 2021, 2023</b>
Research Mentor, Columbia University Engineering the Next Generation (ENG)	<b>Summer 2022</b>
Research Mentor and Teaching Assistant, Research Science Institute (RSI)	<b>Summer 2014</b>
Teaching Assistant, Bellarmine University Summer Youth Camps	<b>Summer 2012, Summer 2013</b>

## RESEARCH STUDENTS SUPERVISED

<b>Sunny Li</b> , Stanford Ph.D Mechanical Engineering	<b>2025 – present</b>
<b>Sarah Nicole Glomski</b> , Stanford Ph.D Mechanical Engineering	<b>2025 – present</b>
<b>Cecilia Wu</b> , Stanford M.S. Computer Science	<b>2025 – present</b>
<b>Andrew Chin</b> , Columbia M.S. Robotics	<b>2024 – 2025</b>
<b>Elise Yang</b> , Columbia Undergraduate	<b>2024 – 2025</b>
<b>Shiyao Marcus Lam</b> , Columbia Undergraduate	<b>2024 – 2025</b>
<b>Grace Munger</b> , Columbia Undergraduate [C.5]	<b>2023 – 2025</b>
<b>Matheu Campbell</b> , Columbia Undergraduate	<b>2023 – 2024</b>
<b>Akshay Venkatesan</b> , Columbia M.S. Data Science	<b>2023 – 2024</b>
<b>Runsheng Wang</b> , Columbia M.A. Statistics [J.5, C.6, S.1, W.8]	<b>2023 – 2024</b>
<b>Connor Lee</b> , Columbia Undergraduate [C.5]	<b>2023 – 2024</b>
<b>Alexandra Deli-Ivanov</b> , Columbia Undergraduate [J.3, C.5, W.3]	<b>2022 – 2024</b>
<b>Joaquin Palacios</b> , Columbia Undergraduate and M.S. Robotics [J.3, C.7, W.3]	<b>2021 – 2024</b>
<b>Pedro Leandro La Rotta</b> , Columbia M.S. Robotics [C.4, J.5]	<b>2023</b>
<b>Katherine O'Reilly</b> , Columbia Undergraduate [C.3]	<b>2020 – 2023</b>
<b>Carolyn David</b> , Columbia M.S. Biomedical Engineering	<b>2022 – 2023</b>
<b>Preethika Chivukula</b> , Columbia M.S. Biomedical Engineering [C.7]	<b>2021 – 2022</b>
<b>Ashley Reyes</b> , Columbia ENG Student	<b>Summer 2022</b>
<b>Brayan Ramos</b> , Columbia ENG Student	<b>Summer 2022</b>
<b>Ciara Little</b> , Columbia Undergraduate	<b>2020 – 2021</b>
<b>Katelyn G. Mitchell</b> , Columbia Undergraduate	<b>2020 – 2021</b>
<b>Frederick Horne</b> , Harvard Undergraduate	<b>2019</b>
<b>Rowen VonPlagenhoef</b> , Harvard Undergraduate	<b>2019</b>
<b>Eliot Burnes</b> , Harvard Undergraduate	<b>2018 – 2019</b>
<b>Henry Burnes</b> , Harvard Undergraduate	<b>2018 – 2019</b>

Lincoln Sorscher, Harvard Undergraduate  
Cheng Lu, RSI Scholar

2018  
Summer 2014

## SERVICE

---

### University and Conference Service

Program Committee, RSS Pioneers 2025 2025  
Workshop Co-Organizer, BioRob 2024 2024  
“Building Responsive Body-Machine Interfaces with Biosignals and Robotic Exoskeletons”  
CIRTL Fellow, Columbia University Center for Teaching and Learning 2023 – 2024  
Conference Volunteer, Robotics: Science and Systems (RSS) 2022

### External Paper Reviewer

IEEE Robotics and Automation Letters (RA-L) 2021, 2022, 2025  
IEEE Transactions on Haptics (ToH) 2025  
Robosoft 2025  
Disability and Rehabilitation 2025  
IEEE Intl. Conference on Rehabilitation Robotics (ICORR) 2022, 2025  
IEEE Transactions on Robotics (TRO) 2024  
IEEE Intl. Conference on Robotics and Automation (ICRA) 2021, 2022, 2024  
IEEE/RSJ Intl. Conference on Intelligent Robots and Systems (IROS) 2024  
IEEE RAS/EMBS Intl. Conference on Biomedical Robotics & Biomechatronics (BioRob) 2022, 2024  
IEEE Transactions on Medical Robotics and Bionics (T-MRB) 2023  
Scientific Reports 2022, 2023  
IEEE Intl. Conference on Robot and Human Interactive Communication (RO-MAN) 2022, 2023  
IEEE Transactions on Neural Systems and Rehabilitation Engineering (TNSRE) 2020

### Science Volunteering and Outreach

Volunteer, Stanford Institutes of Medicine Summer Research Program 2025  
Question Reviewer, U.S. Dept. of Energy National Science Bowl (NSB) 2023, 2024  
Volunteer / Paper Reviewer, Research Science Institute (RSI) at MIT 2015, 2018, 2024, 2025  
Columbia Engineering Achievers in Graduate Education (EngAGE) – Invited Panelist Mar. 2024  
Columbia WISC STEM Field Exploration Fair – Invited Panelist, “Behind the Lab Scenes” Apr. 2022  
Judge, Kentucky Science and Engineering Fair 2021  
Judge, MIT Mechanical Engineering Research Exhibition 2020  
Question Writer, USA Biolympiad (USABO) 2019  
Volunteer, Adaptive Climbing Group NY 2019  
Judge, Sweden Research Academy for Young Scientists (RAYS) 2015

## PREVIOUS POSITIONS

---

Harvard Dept. of Organismic & Evolutionary Biology, Shamble Lab 2017 – 2019

Research Assistant with Paul Shamble

*Studied jumping dynamics and mid-air silk production of jumping spiders (*S. scenicus*) [J.1]*

### Dephy, Inc.

Summer 2017, Fall 2018

Mechanical Engineering Intern

*Designed and built validation equipment for full-system stress testing*

### MIT Media Lab, Biomechatronics Group

2013 – 2017

Undergraduate Researcher with Hugh Herr, Arthur Petron, and Matt Carney

*Worked on FitSocket project for soft-tissue characterization and on active motor cooling*

### Apple Inc.

Summer 2016

Product Design Validation Engineer Intern

*Worked on design, usability, and validation for mechanical features in hardware products*

<b>Formlabs</b> Mechanical Engineering Intern <i>Electromechanical design for early versions of Form 2 and Form Cure products</i>	<b>Summer 2015</b>
<b>Brain Power, LLC</b> Hardware Intern <i>Hardware development of Google Glass applications for users with autism</i>	<b>Winter 2015</b>
<b>Cardiovascular Innovation Institute &amp; Christine M. Kleinert Institute</b> Research Intern with Nolan Boyd and Christina Kaufman <i>Worked on tissue self-assembly using adipose stromal vascular fraction</i>	<b>2012 – 2013</b>

## SIDE PROJECTS

---

<b>Untethered Gait Tracking for Rehabilitation</b> <i>Collaboration with FIGUR8, Inc. to use their wearables platform for monitoring gait trends during self recovery and long-term effects of rehabilitation post knee-reconstruction surgery.</i>	<b>2018 – 2019</b>
<b>MIT East Campus Roller Coaster</b> <i>Formed and led team of students to complete \$15,000 construction project in 8 days. Unofficial Guinness World Record holder for Steepest Wooden Roller Coaster.</i>	<b>2015</b>
More documentation on personal projects at <a href="https://www.avamakesthings.com">https://www.avamakesthings.com</a>	