

AVA CHEN

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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*, 7, 1, 149-155. (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

Assisting Human Autonomy with Wearable Robots Duke University, Duke Robotics Seminar	Dec. 2025
Lessons in Dexterity From Observing Spiders, Humans, and Robots Duke University, Robot Dexterity Lab (DexLab) Meeting	Dec. 2025
Robots to Assist and Observe Biological Autonomy, Behavior, and Interaction UT Austin, MERGe Lab Meeting	Dec. 2025
Robotic Hand Exoskeletons to Assist and Rehabilitate Impaired Dexterity Harvard University, Harvard Biorobotics Lab Meeting	June 2024
Robotic Hand Orthoses for Assistance and Rehabilitation After Stroke (Co-Speaker) Global Perspectives on Medicine, Rehabilitation and Robotics Webinar Series	Sept. 2023
MyHand: a Wearable Hand Orthosis for Stroke (Co-Speaker) IROS Workshop, Challenges and Opportunities of Human-Robot Symbiosis: from Wearable Robots to Neurorobotics	Oct. 2021
How Jumping Spiders Use Silk to Orient Themselves in Midair Harvard University, Harvard Bauer Forum	Oct. 2018
How Jumping Spiders Jump Broad Institute, CEE 35th Anniversary Celebration	Oct. 2018

TEACHING EXPERIENCE AND MENTORSHIP

University Courses

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

Pedagogical Training

Participant, Columbia Center for Teaching and Learning (CTL) Teaching Development Program	2022 – 2025
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Talks on Teaching

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

Extracurricular

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

RESEARCH STUDENTS SUPERVISED

Sunny Li , Stanford Ph.D Mechanical Engineering	Fall 2025
Sarah Nicole Glomski , Stanford Ph.D Mechanical Engineering	Fall 2025
Cecilia Wu , Stanford M.S. Computer Science	Fall 2025
Andrew Chin , Columbia M.S. Robotics	2024 – 2025
Elise Yang , Columbia Undergraduate	2024 – 2025
Shiyao Marcus Lam , Columbia Undergraduate	2024 – 2025
Grace Munger , Columbia Undergraduate [C.5]	2023 – 2025
Matheu Campbell , Columbia Undergraduate	2023 – 2024
Akshay Venkatesan , Columbia M.S. Data Science	2023 – 2024
Runsheng Wang , Columbia M.A. Statistics [J.5, C.6, S.1, W.8]	2023 – 2024
Connor Lee , Columbia Undergraduate [C.5]	2023 – 2024
Alexandra Deli-Ivanov , Columbia Undergraduate [J.3, C.5, W.3]	2022 – 2024
Joaquin Palacios , Columbia Undergraduate and M.S. Robotics [J.3, C.7, W.3]	2021 – 2024
Pedro Leandro La Rotta , Columbia M.S. Robotics [C.4, J.5]	2023
Katherine O'Reilly , Columbia Undergraduate [C.3]	2020 – 2023
Carolyn David , Columbia M.S. Biomedical Engineering	2022 – 2023
Preethika Chivukula , Columbia M.S. Biomedical Engineering [C.7]	2021 – 2022
Ashley Reyes , Columbia ENG Student	Summer 2022

Brayan Ramos , Columbia ENG Student	Summer 2022
Ciara Little , Columbia Undergraduate	2020 – 2021
Katelyn G. Mitchell , Columbia Undergraduate	2020 – 2021
Frederick Horne , Harvard Undergraduate	2019
Rowen VonPlagenhoef , Harvard Undergraduate	2019
Eliot Burnes , Harvard Undergraduate	2018 – 2019
Henry Burnes , Harvard Undergraduate	2018 – 2019
Lincoln Sorscher , Harvard Undergraduate	2018
Cheng Lu , RSI Scholar	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
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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
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Mechanical Engineering Intern

Designed and built validation equipment for full-system stress testing

MIT Media Lab, Biomechatronics Group	2013 – 2017
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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
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Product Design Validation Engineer Intern

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

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

SIDE PROJECTS

Untethered Gait Tracking for Rehabilitation <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>	2018 – 2019
MIT East Campus Roller Coaster <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>	2015
More documentation on personal projects at https://www.avamakesthings.com	