

AVA CHEN

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EDUCATION

Columbia University

Ph.D in Mechanical Engineering

M.S. in Mechanical Engineering, conferred Feb. 2021

Advisor: Matei Ciocarlie

2019 – present

New York, NY

Massachusetts Institute of Technology (MIT)

B.S. in Mechanical Engineering

Thesis Advisor: Hugh Herr

2013 – 2017

Cambridge, MA

HONORS

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

2023 – 2025

Columbia University CIRTLL Fellow

2023 – 2024

Columbia University Presidential Fellowship

2019 – 2023

Rising Star in ME 2022 at Stanford University

2022

Honorable Mention, MIT MechE deFlorez Design Competition

2016

PUBLICATIONS

Peer-Reviewed Journal Articles

[* indicates equal contributions]

- [J.2] **A. Chen**, L. Winterbottom, S. Park, J. Xu, D.M. Nilsen, J. Stein, 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, 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.3] **A. Chen**, L. Winterbottom, K. O'Reilly, S. Park, D.M. Nilsen, J. Stein, M. Ciocarlie. “Design of Spiral-Cable Forearm Exoskeleton to Provide Supination Adjustment for Hemiparetic Stroke Subjects.” In *Rehabilitation Robotics (ICORR)*, 2022 *IEEE Intl. Conference on*. IEEE. (2022)
- [C.2] J. Xu, C. Meeker, **A. Chen**, L. Winterbottom, M. Fraser, S. Park, L.M. Weber, M. Miya, D.M. Nilsen, J. Stein, M. Ciocarlie. “Adaptive Semi-Supervised Intent Inferral to Control a Powered Hand Orthosis for Stroke.” In *Robotics and Automation (ICRA)*, 2022 *IEEE Intl. Conference on*. IEEE. (2022)
- [C.1] T. Cervantes, W.E. Byun*, **A. Chen***, K. Kim*, K. Nealon*, J. Connor, 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* (2018)

Submitted for Publication

- [S.1] L. Winterbottom*, **A. Chen***, R. Mendonca, D.M. Nilsen, M. Ciocarlie, J. Stein. “Clinician perceptions of a novel wearable robotic hand orthosis for post-stroke hemiparesis.” (2023, in revision.)

Patents

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

Workshop and Symposium Contributions

- [W.4] 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*. (Accepted)
- [W.3] L. Winterbottom, R. Mendonca, **A. Chen**, J. Xu, S. Lin, K. Carroll, M. Ciocarlie, J. Stein, and D. M. Nilsen. “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*. (Accepted)

- [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*.

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 1F31HD111301-01A1 8/2023–1/2025 \$72,587. **PI: Chen**
- *Reciprocal Learning for Intent Inference on an Active Hand Orthosis for Stroke.* (Pending) PI: Ciocarlie/Stein/Nilsen NSF M3X program. Contributed to conceptualization, methodology, investigation, preliminary data, and writing.

PREVIOUS RESEARCH AND ENGINEERING POSITIONS

Harvard Dept. of Organismic & Evolutionary Biology, Shamble Lab	2017 – 2019
Research Assistant with Dr. Paul Shamble	
Dephy, Inc.	Summer 2017, Fall 2018
Mechanical Engineering Intern	
MIT Media Lab, Biomechatronics Group	2013 – 2017
Undergraduate Researcher with Dr. Hugh Herr, Arthur Petron, and Matt Carney	
Apple Inc.	Summer 2016
Product Design Validation Engineer Intern	
Formlabs	Summer 2015
Mechanical Engineering Intern	
Brain Power, LLC	Winter 2015
Hardware Intern	
Cardiovascular Innovation Institute & Christine M. Kleinert Institute	2012 – 2013
Research Intern with Dr. Nolan Boyd and Dr. Christina Kaufman	
Research Science Institute (RSI) at MIT	Summer 2012
Summer Scholar with Arthur Petron	

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
Extracurricular	
Mentor, Columbia University Engineering the Next Generation (ENG)	2022
Mentor, Women in Science at Columbia (WISC)	2020 – 2021
Mentor and Teaching Assistant, Research Science Institute (RSI at MIT)	2014
Teaching Assistant, Bellarmine University Summer Youth Camps	2012 – 2013

RESEARCH STUDENTS SUPERVISED

Akshay Venkatesan , Columbia M.S. Data Science	2023 – present
Matheu Campbell , Columbia Undergraduate	2023 – present
Grace Munger , Columbia Undergraduate	2023 – present
Connor Lee , Columbia Undergraduate	2023 – present
Alex Deli-Ivanov , Columbia Undergraduate [W.4]	2022 – present
Pedro La Rotta , Columbia M.S. Robotics	2023
Joaquin Palacios , Columbia Undergraduate [W.4]	2021 – 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	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

External Paper Reviewer

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 Intl. Conference on Rehabilitation Robotics (ICORR)	2022
IEEE RAS/EMBS Intl. Conference on Biomedical Robotics & Biomechatronics (BioRob)	2022
IEEE Intl. Conference on Robotics and Automation (ICRA)	2021, 2022
IEEE Robotics and Automation Letters (RA-L)	2021, 2022
IEEE Transactions on Neural Systems and Rehabilitation Engineering (TNSRE)	2020

Invited Speaker

Global Perspectives on Medicine, Rehabilitation and Robotics Webinar Series	Sept. 2023
Co-Speaker, “Robotic hand orthoses for assistance and rehabilitation after stroke”	
IROS Workshop on Challenges and Opportunities of Human-Robot Symbiosis: from	Oct. 2021
Wearable Robots to Neurorobotics – Co-Speaker, “ MyHand: a Wearable Hand Orthosis for Stroke. ”	
Harvard Bauer Forum – Speaker, “How jumping spiders use silk to orient themselves in midair”	Oct. 2018
CEE 35th Anniversary Celebration – Speaker, “How Jumping Spiders Jump”	Oct. 2018

University Service

CIRTL Fellow, Columbia University Center for Teaching and Learning	2023 – present
Columbia Engineering Your PhD – Invited Panelist, “Insights from Experienced TAs”	2023
Conference Volunteer, Robotics: Science and Systems (RSS)	2022
Columbia WISC STEM Field Exploration Fair – Invited Panelist, “Behind the Lab Scenes”	2022

Extracurricular

Question Reviewer, US DOE National Science Bowl (NSB)	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
Volunteer, Research Science Institute (RSI) at MIT	2015, 2018
Judge, Sweden Research Academy for Young Scientists (RAYS)	2015

Professional Societies: IEEE, ICORR, SWE

SIDE PROJECTS

Untethered Gait Tracking for Rehabilitation

2018 – 2019

Collaboration with FIGUR8, Inc. to use their wearables platform for monitoring gait trends during self recovery & long-term effects of rehabilitation post knee-reconstruction surgery.

MIT East Campus Roller Coaster

2015

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.

More documentation on side projects at <https://www.avamakesthings.com>