AVA CHEN

https://www.avachen.net ◇ ava.chen@columbia.edu

EDUCATION

Columbia University — **2019 – present**
Ph.D in Mechanical Engineering — *New York, NY*
M.S. in Mechanical Engineering, conferred Feb. 2021
Advisor: Matei Ciocarlie

Massachusetts Institute of Technology (MIT) — **2013 – 2017**
B.S. in Mechanical Engineering — *Cambridge, MA*
Thesis Advisor: Hugh Herr

HONORS

NIH Ruth L. Kirschstein National Research Service Award (NRSA) F31 – NICHD — **2023 – 2025**
Columbia University CIRTL 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 Inferral on an Active Hand Orthosis for Stroke.(Pending)* PI: Ciocarlie/Stein/Nilsen NSF M3X program. Contributed to conceptualization, methodology, investigation, preliminary data, and writing.

RESEARCH AND WORK EXPERIENCE

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