

Columbia University
Fu Foundation School of Engineering and Applied Science
Faculty Personnel Record

MATEI THEODOR CIOCARLIE

Associate Professor
Department of Mechanical Engineering
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Date: March 2026

EDUCATION

Columbia University, New York, NY

- Ph.D. in Computer Science, conferred February 2010. Thesis: “Low-Dimensional Robotic Grasping: Eigengrasp Subspaces and Optimized Underactuation”.
- M.S. in Computer Science, conferred May 2005.

Polytechnic University of Bucharest, Romania

- B.S. in Engineering, conferred June 2003.

METRICS

Google Scholar (retrieved: March 2026)

- Citations: 6,384
- h-index: 38
- i10-index: 74

PRINCIPAL FIELDS OF INTEREST

- Mechanical and computational intelligence for contact-driven robotic motor skills such as manipulation and locomotion in complex environments.
- Robot hand designs and control algorithms: underactuated and passively adaptive hands, optimized hand designs, uses of tactile, proprioceptive or range sensing for hand control.
- Assistive and rehabilitation robotics, active orthotic and prosthetic devices for the upper limb.
- Sensing for physical interaction: design of tactile and proprioceptive sensors for robotic mechanisms.
- Computer simulators for physical systems: development (rigid body collision detection and dynamics, models for soft body contacts) and applications (on-line planning and grasp analysis).

CAREER HISTORY

Columbia University, New York, NY

- Associate Professor (with tenure) of Mechanical Engineering (01/2021 – present)
- Associate Professor (without tenure but on tenure track) of Mechanical Engineering (07/2018 – 12/2020)
- Assistant Professor of Mechanical Engineering (07/2014 – 06/2018)
- Affiliated Faculty, Department of Computer Science (12/2014 – present)
- Affiliated Member, Data Science Institute (10/2014 – present)

Google, Inc., Mountain View, CA

- Senior Research Scientist (10/2013 – 06/2014)

Willow Garage Inc., Menlo Park, CA

- Manager, Interactive Manipulation and Gripper Design (05/2012 – 9/2013)
- Research Scientist (09/2009 – 9/2013)

AWARDS RECEIVED

External Awards

- Amazon Faculty Research Award (2024)
- Time Magazine 100 Best Inventions of 2023
- Finalist for Best RA-L/BioRob Paper Award, IEEE Intl. Conf. on Biomedical Robotics and Biomechatronics (BioRob) / IEEE Robotics & Automation Letters (RA-L), 2022
- Amazon Faculty Research Award (2019)
- Sloan Research Fellowship, Alfred P. Sloan Foundation (2016)
- National Science Foundation CAREER Award (2016)
- Google Faculty Research Award (2016)
- Office of Naval Research Young Investigator Award (2015)
- IEEE Robotics and Automation Society Early Career Award (2013)
- Winner of the Robotdalen Scientific Award, international competition for recent doctoral dissertations in the field of robotics - Orebro, Sweden (2010)
- Best Student Paper Award, 2nd Joint Eurohaptics Conference and IEEE Symposium on Haptic Interfaces, Tsukuba, Japan (03/2007)

Internal Awards

- Selected as one of “12 Columbia Scientific Research Findings That Made a Splash in 2023” in campus-wide year review (2023)
- Distinguished Faculty Teaching Award, Columbia Engineering Alumni Association (2019)
- Doctoral Thesis awarded with Honorary Mention for Distinction, Columbia University, Department of Computer Science (2010)
- The Paul Michelman Memorial Award for exemplary service to the community life of the Department of Computer Science, Columbia University (05/2009)
- Extraordinary Teaching Assistant Award, The Fu Foundation School of Engineering and Applied Science, Columbia University (12/2005)
- Ph.D. Service Award for superior contributions to the community life of the Department of Computer Science, Columbia University (awarded twice, 05/2007 and 05/2008)

SERVICE

Department of Mechanical Engineering

- Chair, Graduate Committee (Fall 2023 – Spring 2025)
- Chair, Faculty Search Committee (Fall 2024 – Spring 2025)
- Bi-annual PhD Review Coordinator (Fall 2020 – present)
- Chair, Faculty Search Committee (Fall 2021 – Spring 2022)
- Member, Graduate Committee (Fall 2014 – present)
- Coordinator, Robotics Concentration, Mechanical Engineering Master's Program (Fall 2015 – Fall 2021)
- Coordinator, Departmental Seminar Series (Fall 2015 – Spring 2016)
- Speaker, External Advisory Board Meeting (April 2015)

School of Engineering and Applied Science

- Speaker, SEAS Academic Assembly Class of 2028, August 2024
- Member, SEAS Decanal Search Committee (Fall 2021 – Spring 2022)
- Member, AI Task Force (Fall 2019 – Spring 2020)
- Speaker, Columbia University Robotics Club (March 2022)
- Speaker, SEAS Undergraduate Assembly Class of 2024 (September 2020)
- Speaker, SEAS Faculty Tech Talk: “Our Driverless Future?” (April 2018)
- Speaker, Egleston Student Seminar (October 2017, November 2022)
- Speaker, Mechanical Engineering Graduate Associate Professor Seminar (April 2017)
- Speaker, SEAS Family Weekend (October 2015)
- Speaker, Career Discussion Advising Forum, Computer Science Department (April 2015)

PROFESSIONAL SERVICES

Professional Association Activity

- Treasurer, the Robotics: Science and Systems Foundation (organizer of Robotics: Science and Systems Conference), 2023 – 2025
- Co-Chair, Technical Committee on Mechanisms and Design, *IEEE Robotics and Automation Society* (2014 – 2022)

Program Committee Membership, Editorship and Reviewing

- Program Chair, *Robotics: Science and Systems Conference*, 2026
- Senior Editor, *Intl. Journal of Robotics Research*, 2023 – 2025
- Area Chair, *Conference on Robot Learning (CoRL)*, 2022
- Program Committee Member, *Robotics: Science and Systems Conference*, 2021
- Jury Member, Robothon Grand Challenge, 2021
- Scientific Program Co-Chair, *IEEE Intl. Conf. for Biomedical Robotics and Biomechatronics*, 2020
- Associate Editor, *IEEE Robotics and Automation Letters (RA-L)*, 2017 – 2020
- Program Committee Member, *Robotics: Science and Systems Conference*, 2020
- Panel Member, National Science Foundation, 2018

- Area Chair, *Robotics: Science and Systems Conference*, 2017
- Area Chair, *Robotics: Science and Systems Conference*, 2016
- Reviewer, *National Aeronautics and Space Administration*, 2016
- Guest Editor, *Big Data Journal, Special Issue on Big Data in Robotics*, 2016
- Program Committee Member and Mini-symposium Co-Chair, *Intl. Symposium on Robotics Research*, 2015
- Associate Editor, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2015
- Program Committee Member, *Robotics: Science and Systems Conference*, 2015
- Associate Editor, *IEEE Intl. Conference on Robotics and Automation*, 2015
- Panel Member, *National Science Foundation*, 2015
- Reviewer, *National Aeronautics and Space Administration*, 2015
- Associate Editor, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2014
- Program Committee Member, *Robotics: Science and Systems Conference*, 2014
- Associate Editor, *IEEE Intl. Conference on Robotics and Automation*, 2014
- Guest Editor, *IEEE Trans. on Automation Science and Engineering, Special Issue on Cloud Robotics and Automation*, 2014
- Panel Member, *National Science Foundation*, 2013
- Associate Editor, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2013
- Program Committee Member, *AAAI Conference on Artificial Intelligence, Robotics Track*, 2013
- Program Committee Member, *AAAI Conference on Artificial Intelligence, Main Track and Robotics Special Track*, 2012
- Program Committee Member, *Workshop on Challenges and Opportunities in Robot Perception, Intl. Conference on Computer Vision*, 2011
- Program Committee Member, *Intl. Conference on Simulation, Modeling and Programming for Autonomous Robots*, 2010
- Program Committee Member, *Workshop on Mobile Manipulation, Robotics: Science and Systems Conference*, 2010
- Panel Member, *National Science Foundation*, 2010
- Program Committee Member, *Robotics: Science and Systems Conference*, 2009
- Program Committee Member, *Workshop on Mobile Manipulation in Human Environments, Robotics: Science and Systems Conference*, 2009
- Program Committee Member, *Workshop on Semantic Perception for Mobile Manipulation, IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2009
- Journal and book reviewing (selection): Springer STAR Series, Transactions of the IEEE, Intl. Journal of Robotics Research, IEEE Trans. On Robotics, IEEE Robotics & Automation Mag., Autonomous Robots, Robotics and Autonomous Systems, ASME Journal of Mechanisms and Robotics, IEEE Trans. on Neural Systems & Rehabilitation Engineering, Robotica
- Conference reviewing (selection): IEEE ICRA, IEEE/RSJ IROS, AAAI, World Haptics, IEEE Haptics Symposium, SIGGRAPH, ROSCon, SIMPAR, WAFR

Event Organization

- Local Organization Chair, *Robotics: Science and Systems Conference*, 2022
- Co-Organizer, Workshop on Mechanisms and Design: from Inception to Realization, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, October 2020
- Chair, *Northeast Manipulation Symposium (NEMS)*, New York City, June 2019
- Co-Organizer, Cloud Robotics Workshop, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2013

- Co-Organizer, Workshop on Common Platforms in Robotic Manipulation, *Robotics: Science and Systems Conference*, 2013
- Co-Organizer, Workshop on Robots in Clutter: Manipulation, Perception and Navigation in Human Environments, *Robotics: Science and Systems Conference*, 2012
- Co-Organizer, Special Symposium on Grasping and Manipulation, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2011
- Co-Organizer, Workshop on Manipulation Under Uncertainty, *IEEE Intl. Conference on Robotics and Automation*, 2011
- Chair, Mobile Manipulation Challenge, *IEEE Intl. Conference on Robotics and Automation*, 2010
- Co-Chair, Mobile Manipulation Challenge, *Intl. Joint Conference on Artificial Intelligence*, 2009

TEACHING

Courses

- Spring 2026: MECS E6616 “Robot Learning”, Columbia University Dept. of Mechanical Engineering and Dept. of Computer Science. Enrollment: 68 students. Role: Instructor.
- Spring 2025: MECS E6616 “Robot Learning”, Columbia University Dept. of Mechanical Engineering and Dept. of Computer Science. Enrollment: 116 students. Role: Instructor.
- Fall 2024: MECS E4603 “Applied Robotics: Algorithms and Software”, Columbia University Dept. of Mechanical Engineering and Dept. of Computer Science. Enrollment: 59 students. Role: Instructor.
- Spring 2024: MECS E6616 “Robot Learning”, Columbia University Dept. of Mechanical Engineering and Dept. of Computer Science. Enrollment: 77 students. Role: Instructor.
- Fall 2023: MECS E4603 “Applied Robotics: Algorithms and Software”, Columbia University Dept. of Mechanical Engineering and Dept. of Computer Science. Enrollment: 63 students. Role: Instructor.
- Spring 2023: MECS E6616 “Robot Learning”, Columbia University Dept. of Mechanical Engineering and Dept. of Computer Science. Enrollment: 93 students. Role: Instructor.
- Spring 2022: MECS E6616 “Robot Learning”, Columbia University Dept. of Mechanical Engineering and Dept. of Computer Science. Enrollment: 106 students. Role: Instructor.
- Spring 2021: MECS E6616 “Robot Learning”, Columbia University Dept. of Mechanical Engineering and Dept. of Computer Science. Enrollment: 67 students. Role: Instructor.
- Fall B 2020: MECE E4602 “Introduction to Robotics”, Columbia University Dept. of Mechanical Engineering. Enrollment: 9 students. Role: Instructor.
- Fall 2020: MECE E4602 “Introduction to Robotics”, Columbia University Dept. of Mechanical Engineering. Enrollment: 53 students. Role: Instructor.
- Summer 2020: SEAS SCRS 045 2020 “An Introduction to Deep Reinforcement Learning from a Robotics Perspective” (online zero-credit course), Columbia University School of Engineering and Applied Science. Enrollment: 400+ active students. Role: Instructor.
- Spring 2020: MECS E6616 “Robot Learning”, Columbia University Dept. of Mechanical Engineering and Dept. of Computer Science. Enrollment: 106 students. Role: Instructor.
- Fall 2019: MECE E4602 “Introduction to Robotics”, Columbia University Dept. of Mechanical Engineering. Enrollment: 112 students. Role: Instructor.
- Spring 2019: MECE E6616 “Robot Learning”, Columbia University Dept. of Mechanical Engineering. Enrollment: 97 students. Role: Instructor.
- Fall 2018: MECE E4602 “Introduction to Robotics”, Columbia University Dept. of Mechanical Engineering. Enrollment: 120 students. Role: Instructor.

- Spring 2018: MECS E6615 “Advanced Robotic Manipulation”, Columbia University Dept. of Mechanical Engineering and Dept. of Computer Science. Enrollment: 36 students. Role: Instructor.
- Fall 2017: MECS E4603 “Applied Robotics: Algorithms and Software”, Columbia University Dept. of Mechanical Engineering and Dept. of Computer Science. Enrollment: 36 students. Role: Instructor.
- Spring 2017: ColumbiaX CSMM103x “Robotics”, EdX online platform, part of ColumbiaX Artificial Intelligence MicroMasters Program. Enrollment: over 20,000 online students as of April 2017. Role: Instructor.
- Spring 2016: MECS E6615 “Advanced Robotic Manipulation”, Columbia University Dept. of Mechanical Engineering and Dept. of Computer Science. Enrollment: 36 students. Role: Instructor.
- Spring 2016: “Enabling Technologies for Data Science and Analytics: The Internet of Things”, Columbia Data Science Institute (offered online on edX). Role: Lecturer, responsible for one segment (Cloud Robotics).
- Fall 2015: MECE E4602 “Introduction to Robotics”, Columbia University Dept. of Mechanical Engineering. Enrollment: 95 students. Role: Instructor.
- Fall 2014: MECE E4602 “Introduction to Robotics”, Columbia University Dept. of Mechanical Engineering. Enrollment: 36 students. Role: Instructor.

Teaching Innovations

- SEAS SCRS 045 2020 “An Introduction to Deep Reinforcement Learning from a Robotics Perspective”. Developed new, fully online short course as an introduction for current students or alumni. Highlighted at one of the two most popular such courses (400+ active students, number still growing) in the first semester after introduction.
- MECS E6616 “Robot Learning”. Designed new course focusing on the intersection of Machine Learning and Robotics, studying learning abilities needed for physical robots interacting with the world, and applications of recent advances in machine learning for robotics. Created new set of class projects developed in Python and using the open-source Robot Operating System (ROS), covering topics ranging from classification and regression to deep reinforcement learning in robotics.
- MECS E4603 “Applied Robotics: Algorithms and Software”. Designed new interdisciplinary course introducing the field of robotics from an applied perspective, with a focus on the implementation of algorithms with wide use in industry and research. Designed new set of class projects developed in Python and using the open-source Robot Operating System (ROS), covering applied topics from robotic manipulation to mobile robots and self-driving vehicles.
- ColumbiaX CSMM103x “Robotics”. Designed new Massive Online Open Course (MOOC) focusing on Robotics. Designed curriculum and recorded lectures combining slide and whiteboard content with demonstrations of software libraries and tools. Developed cloud-based framework for class programming assignments and projects using open-source Robot Operating System through on-line programming assignment tools.
- MECS E6615 “Advanced Robotic Manipulation”. Designed new interdisciplinary course focusing on the interplay between computational and mechanical intelligence in the context of robotic manipulation. Presented theoretical concepts spanning the mechanics of manipulation, design, simulation, sensing and computer vision. Students from different backgrounds (Mechanical and Electrical Engineering and Computer Science) combined expertise to design, build and program fully functional hand prototypes.
- MECE E4602 “Introduction to Robotics”. Re-designed class, including creation of new handouts and study material. Integrated open-source Robot Operating System (ROS), currently used in a majority of robotics research labs. Integrated new robotic platform: Baxter Robotic Manipulator. Designed set of

class projects culminating with implementation and testing of ROS code on the real Baxter robot; developed simulator allowing multiple teams to develop and test robot code in parallel.

PUBLICATIONS

Notes on authorship

- Underlined authors are students in my group or interns I mentored or co-mentored for the project resulting in the respective publication.
- Traditionally, in the Robotics field, junior authors are listed in order of contributions to the project (the junior author with the largest contribution to a paper is first in the list of authors), while senior authors are listed in reverse order of contributions (i.e. the senior author with the largest contribution to a paper is last in the list of authors).

Peer Reviewed Journal Publications

- J1. J. Xu, Y. Jia, D. Yang, P. Meng, X. Zhu, Z. Guo, S. Song, and **M. Ciocarlie**. "Tactile-based Object Retrieval from Granular Media", *Autonomous Robots* 49(32), 2025
- J2. A. Billard, A. Albu-Schaeffer, M. Beetz, W. Burgard, P. Corke, **M. Ciocarlie**, R. Dahiya, D. Kragic, K. Goldberg, Y. Nagai, and D. Scaramuzza. "A Roadmap for AI in Robotics", *Nature Machine Intelligence* 7, 2025
- J3. J. Xu, R. Wang, S. Shang, A. Chen, L. Winterbottom, T. Hsu, W. Chen, K. Ahmed, P. La Rotta, X. Zhu, D. Nilsen, J. Stein, and **M. Ciocarlie**. "ChatEMG: Synthetic Data Generation to Control a Robotic Hand Orthosis for Stroke", *IEEE Robotics & Automation Letters* 10(2), 2025
- J4. J. Palacios, A. Deli-Ivanov, A. Chen, L. Winterbottom, D. 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 Trans. on Medical Robotics and Bionics* 7(1), 2025
- J5. 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* 47(6), 2025
- J6. G. Khandate, T. Saidi, S. Shang, E. Chang, Y. Liu, S. Dennis, J. Adams, **M. Ciocarlie**. "R×R: Rapid eXploration for Reinforcement Learning via Sampling-based Reset Distributions and Imitation Pre-training", *Autonomous Robots*, 48(17), 2024
- J7. J. Xu, S. Song and **M. Ciocarlie**. "TANDEM: Learning Joint Exploration and Decision Making with Tactile Sensors", *IEEE Robotics and Automation Letters*, 7(4), 2022 (also presented orally at the *IEEE Intl. Conference on Intelligent Robots and Systems*, 2022)
- J8. A. Chen, L. Winterbottom, S. Park, J. Xu, D. Nilsen, J. Stein and **M. Ciocarlie**. "Thumb Assistance Via Active and Passive Exotendons in a Robotic Hand Orthosis for Stroke", *IEEE Robotics and Automation Letters* 7(3), 2022 (also presented orally at the *IEEE Intl. Conf. on Biomedical Robotics and Biomechatronics*, 2022). **Finalist for Best RA-L / BioRob Paper Award.**

- J9. C. Meeker, M. Haas-Heger and **M. Ciocarlie**. "A Continuous Teleoperation Subspace with Empirical and Algorithmic Mapping Algorithms for Non-Anthropomorphic Hands", *IEEE Transactions on Automation Science and Engineering*, 19(1), 2022
- J10. S. Park, M. Fraser, L. Weber, C. Meeker, L. Bishop, D. Geller, J. Stein and **M. Ciocarlie**. "User-Driven Functional Movement Training with a Wearable Hand Robot after Stroke", *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 28 (10), 2020
- J11. P. Piacenza, K. Behrman, B. Schifferer, I. Kyminsis, and **M. Ciocarlie**. "A sensorized multicurved robot finger with data-driven touch sensing via overlapping light signals", *IEEE/ASME Transactions on Mechatronics*, 25(5), 2020
- J12. M. Haas Heger and **M. Ciocarlie**. "3D grasp stability analysis with Coulomb friction and hierarchical convex relaxations", *IEEE Transactions on Robotics*, 36(4), 2020
- J13. T. Chen, L. Wang, M. Haas Heger, and **M. Ciocarlie**. "Tendon-driven underactuated hand design via optimization of mechanically realizable manifolds in posture and torque spaces", *IEEE Transactions on Robotics*, 36(3), 2020
- J14. S. Park, C. Meeker, L. Weber, L. Bishop, J. Stein and M. **Ciocarlie**. "Multimodal Sensing and Interaction for a Robotic Hand Orthosis", *IEEE Robotics & Automation Letters*, 4(2), 2019
- J15. P. Piacenza, S. Sherman and **M. Ciocarlie**. "Data-driven super resolution on a tactile dome", *IEEE Robotics & Automation Letters*, 3(3), 2018
- J16. M. Haas Heger, G. Iyengar and **M. Ciocarlie**. "Passive Reaction Analysis for Grasp Stability", *IEEE Transactions on Automation Science and Engineering*, 15(3), 2018
- J17. **M. Ciocarlie**, F. Hicks, R. Holmberg, J. Hawke, M. Schlicht, J. Gee, S. Stanford and R. Bahadur. "The Velo Gripper: A Versatile Single-actuator Design for Enveloping, Parallel and Fingertip Grasps", *International Journal of Robotics Research*, 33(5), 2014
- J18. T. Chen, **M. Ciocarlie**, S. Cousins, P. Grice, K. Hawkins, K. Hsiao, C. Kemp, C. King, D. Lazewatsky, A. Leeper, H. Nguyen, A. Paepcke, C. Pantofaru, W. Smart, and L. Takayama. "Robots for Humanity: A Case Study in Assistive Mobile Manipulation", *IEEE Robotics & Automation Magazine, Special issue on Assistive Robotics*, 20(1), 2013
- J19. S. Chitta, E. G. Jones, **M. Ciocarlie** and K. Hsiao. "Perception, Planning, and Execution for Mobile Manipulation in Unstructured Environments", *IEEE Robotics & Automation Magazine Special Issue on Mobile Manipulation*, 19(2), 2012
- J20. **M. Ciocarlie**, C. Pantofaru, K. Hsiao, G. Bradski, P. Brook and E. Dreyfuss. "A Side of Data with My Robot: Three Datasets for Mobile Manipulation in Human Environments", *IEEE Robotics & Automation Magazine Special Issue: Towards a WWW for Robots*, 18(2), 2011
- J21. **M. Ciocarlie** and P. Allen. "A Constrained Optimization Framework for Compliant Underactuated Grasping", *Mechanical Sciences*, 2, 17-26, 2011
- J22. **M. Ciocarlie** and P. Allen. "Hand Posture Subspaces for Dexterous Robotic Grasping", *International Journal of Robotics Research*, 28(7), 2009. **IJRR Top Ten Impact Factor in 2011.**

Peer Reviewed Conference Publications

- C1. E. Chang, P. Ballentine, Z. He, D. Kim, K. Jiang, H. Liang, J. Palacios, W. Wong, P. Piacenza, I. Kyminsis, and **M. Ciocarlie**: "SpikeATac: A Multimodal Tactile Finger with Taxelized Dynamic

- Sensing for Dexterous Manipulation”, *IEEE Intl. Conf. on Robotics and Automation*, 2026 (accepted, in press, acceptance rate: 38%)
- C2. S. Islam, Z. Chen, Z. He, S. Bhatt, A. Permuy, B. Taylor, J. Vickery, Z. Lu, C. Zhang, P. Piacenza, and **M. Ciocarlie**: “MiniBEE: A New Form Factor for Compact Bimanual Dexterity”, *IEEE Intl. Conf. on Robotics and Automation*, 2026 (accepted, in press, acceptance rate: 38%)
- C3. Z. He, Y. Cao, and **M. Ciocarlie**. “Uncertainty Comes for Free: Human-in-the-Loop Policies with Diffusion Models”, *IEEE Intl. Conf. on Robotics and Automation*, 2026 (accepted, in press, acceptance rate: 38%)
- C4. A. El-Azizi, S. Islam, P. Piacenza, I. Kyriassis, and **M. Ciocarlie**. “A Compact, Low-cost Force and Torque Sensor for Robot Fingers with LED-based Displacement Sensing”, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2025 (acceptance rate: 46%)
- C5. K. Zhang, D. Kim, E. Chang, H. Liang, Z. He, K. Lampo, P. Wu, I. Kyriassis and **M. Ciocarlie**. “VibeCheck: Using Active Acoustic Tactile Sensing for Contact-Rich Manipulation”, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2025 (acceptance rate: 46%)
- C6. K. Lee, R. Wang, A. Chen, L. Winterbottom, H. Leung, L. DiSalvo, I. Xu, J. Xu, D. Nilsen, J. Stein, X. Zho, **M. Ciocarlie**. “Fabric Sensing of Intrinsic Hand Muscle Activity”, *IEEE Intl. Conf. on Rehabilitation Robotics*, 2025 (acceptance rate: N/A)
- C7. J. Xu, A. Chen, L. Winterbottom, J. Palacios, P. Chivukula, D. Nilsen, J. Stein, and **M. Ciocarlie**. “Reciprocal Learning of Intent Inference with Augmented Visual Feedback for Stroke”, *IEEE Intl. Conf. on Rehabilitation Robotics*, 2025 (acceptance rate: N/A)
- C8. S. Islam, Z. He, and **M. Ciocarlie**. “Task-Based Design and Policy Co-Optimization for Tendon-driven Underactuated Kinematic Chains”, *IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems*, October 2024 (acceptance rate: 48%)
- C9. P. La Rotta, J. Xu, A. Chen, L. Winterbottom, W. Chen, D. Nilsen, J. Stein, and **M. Ciocarlie**. “Meta-Learning for Fast Adaptation in Intent Inference on a Robotic Hand Orthosis for Stroke”, *IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems*, October 2024 (acceptance rate: 48%)
- C10. A. Chen, K. Lee, L. Winterbottom, J. Xu, C. Lee, G. Munger, A. Deli-Ivanov, D. Nilsen, J. Stein, and **M. Ciocarlie**. “Volitional Control of the Paretic Hand Post-Stroke Increases Finger Stiffness and Resistance to Robot-Assisted Movement”, *IEEE Intl. Conf. on Biomedical Robotics and Biomechatronics*, August 2024 (acceptance rate: N/A)
- C11. E. Chang, R. Wang, P. Ballentine, J. Xu, T. Smith, B. Coltin, I. Kyriassis and **M. Ciocarlie**. “An Investigation of Multi-feature Extraction and Super-resolution with Fast Microphone Arrays”, *IEEE Intl. Conference on Robotics and Automation*, May 2024 (acceptance rate: 45%)
- C12. Z. He and **M. Ciocarlie**. “MORPH: Design Co-optimization with Reinforcement Learning via a Differentiable Hardware Model Proxy”, *IEEE Intl. Conference on Robotics and Automation*, May 2024 (acceptance rate: 45%)
- C13. S. Singi, Z. He, A. Pan, S. Patel, G. Sigurdsson, R. Piramuthu, S. Song and **M. Ciocarlie**. “Decision Making for Human-in-the-loop Robotic Agents via Uncertainty-Aware Reinforcement Learning”, *IEEE Intl. Conference on Robotics and Automation*, May 2024 (acceptance rate: 45%)
- C14. G. Khandate, C. Mehlman, X. Wei and **M. Ciocarlie**. “Value Guided Exploration with Sub-optimal Controllers for Learning Dexterous Manipulation”, *IEEE Intl. Conference on Robotics and Automation*, May 2024 (acceptance rate: 45%)

- C15. G. Khandate, S. Shang, E. Chang, T. Saidi, J. Adams and **M. Ciocarlie**. "Sampling-based Exploration for Reinforcement Learning of Dexterous Manipulation", *Robotics: Science and Systems Conference*, 2023 (acceptance rate: 31%)
- C16. J. Xu, H. Lin, S. Song and **M. Ciocarlie**. "TANDEM3D: Active Tactile Exploration for 3D Object Recognition", *IEEE Intl. Conference on Robotics and Automation*, 2023 (acceptance rate: 43%)
- C17. A. Chen, L. Winterbottom, K. O'Reilly, S. Park, D. Nilsen, J. Stein and **M. Ciocarlie**. "Design of Spiral-Cable Forearm Exoskeleton to Provide Supination Adjustment for Hemiparetic Stroke Subjects", *International Conference on Rehabilitation Robotics*, 2022 (selected for oral presentation; acceptance rate N/A)
- C18. G. Khandate, M. Haas-Heger and **M. Ciocarlie**. "On the Feasibility of Learning Finger-gaiting In-hand Manipulation with Intrinsic Sensing", *IEEE Intl. Conference on Robotics and Automation*, 2022 (acceptance rate: 43%)
- C19. Z. He and **M. Ciocarlie**. "Discovering Synergies for Robot Manipulation with Multi-Task Reinforcement Learning", *IEEE Intl. Conference on Robotics and Automation*, 2022 (acceptance rate: 43%)
- C20. J. Xu, C. Meeker, A. Chen, L. Winterbottom, M. Fraser, S. Park, L. Weber, M. Miya, D. Nilsen, J. Stein and **M. Ciocarlie**. "Adaptive Semi-Supervised Intent Inferral to Control a Powered Hand Orthosis for Stroke", *IEEE Intl. Conference on Robotics and Automation*, 2022 (acceptance rate: 43%)
- C21. T. Chen*, T. Zhang* and **M. Ciocarlie**. "Design Paradigms Based on Spring Agonists for Underactuated Robot Hands: Concepts and Application", *IEEE Intl. Conference on Robotics and Automation*, 2021 (acceptance rate: 48%; *joint first authors)
- C22. T. Chen, Z. He and **M. Ciocarlie**. "Hardware as Policy: Mechanical and Computational Co-Optimization using Deep Reinforcement Learning", *Conference on Robot Learning*, 2020 (acceptance rate 34%)
- C23. E. Hannigan, B. Song, G. Khandate, M. Haas-Heger, J. Yin and **M. Ciocarlie**. "Automatic Snake Gait Generation Using Model Predictive Control", *IEEE Intl. Conference on Robotics and Automation*, 2020 (acceptance rate: 42%)
- C24. C. Meeker and **M. Ciocarlie**. "EMG-Controlled Non-anthropomorphic Hand Teleoperation Using a Continuous Teleoperation Subspace", *IEEE Intl. Conference on Robotics and Automation*, 2019 (acceptance rate: 44%)
- C25. T. Chen and **M. Ciocarlie**. "Grasping Unknown Objects with Proprioception Using a Series-Elastic-Actuated Gripper", *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2018 (acceptance rate: 47%)
- C26. M. Haas Heger, C. Papadimitriou, M. Yannakakis, G. Iyengar and **M. Ciocarlie**. "Passive Static Equilibrium with Frictional Contacts and Application to Grasp Stability Analysis", *Robotics: Science and Systems Conference*, 2018 (acceptance rate: N/A)
- C27. S. Park, L. Bishop, L. Weber, J. Stein and **M. Ciocarlie**. "Design and Development of Effective Transmission Mechanisms on a Tendon Driven Orthosis for Stroke Patients", *IEEE Intl. Conference on Robotics and Automation*, 2018 (acceptance rate: 41%)
- C28. C. Meeker and **M. Ciocarlie**. "Intuitive Hand Teleoperation by Novice Operators Using a Continuous Teleoperation Subspace", *IEEE Intl. Conference on Robotics and Automation*, 2018 (acceptance rate: 41%)

- C29. T. Chen, M. Haas Heger and **M. Ciocarlie**. “Underactuated Hand Design Using Mechanically Realizable Manifolds”, *IEEE Intl. Conference on Robotics and Automation*, 2018 (acceptance rate: 41%)
- C30. C. Meeker, S. Park, L. Bishop, J. Stein and **M. Ciocarlie**. “EMG Pattern Classification to Control a Hand Orthosis for Functional Grasp Assistance after Stroke”, *IEEE International Conference on Rehabilitation Robotics*, 2017 (acceptance rate: 74%)
- C31. I. Park, T. Smith, H. Sanchez, S. W. Wong, P. Piacenza and **M. Ciocarlie**. “Developing a 3-DOF Compliant Perching Arm for a Free-Flying Robot on the International Space Station”, *IEEE International Conference on Advanced Intelligent Mechatronics*, 2017 (acceptance rate: N/A)
- C32. P. Piacenza, W. Dang, E. Hannigan, J. Espinal, I. Hussein, I. Kyriassis and **M. Ciocarlie**. “Accurate Contact Localization and Indentation Depth Prediction with an Optics-based Tactile Sensor”, *IEEE Intl. Conference on Robotics and Automation*, 2017 (acceptance rate: 41%)
- C33. M. Haas Heger, G. Iyengar and **M. Ciocarlie**. “On the Distinction between Active and Passive Reaction in Grasp Stability Analysis”, *12th Intl. Workshop on the Algorithmic Foundations of Robotics*, 2016 (biennial conference; direct acceptance rate: 25%)
- C34. P. Piacenza, Y. Xiao, S. Park, I. Kyriassis and **M. Ciocarlie**. “Contact Localization through Spatially Overlapping Piezoresistive Signals”, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2016 (acceptance rate: 48%)
- C35. S. Park, L. Bishop, T. Post, Y. Xiao, J. Stein and **M. Ciocarlie**. “On the Feasibility of Wearable Exotendon Networks for Whole-Hand Movement Patterns in Stroke Patients”, *IEEE Intl. Conference on Robotics and Automation* (acceptance rate: 35%), Stockholm, May 2016
- C36. J. Mahler, S. Patil, B. Kehoe, J. van den Berg, **M. Ciocarlie**, P. Abbeel and K. Goldberg. “GP-GPIS-OPT: Grasp Planning Under Shape Uncertainty Using Gaussian Process Implicit Surfaces and Sequential Convex Programming”, *IEEE Intl. Conference on Robotics and Automation* (acceptance rate: 41%), Seattle, May 2015
- C37. A. Leeper, K. Hsiao, **M. Ciocarlie**, I. Sucan and K. Salisbury. “Methods for Collision-Free Arm Teleoperation in Clutter Using Constraints from 3D Sensor Data”, *IEEE Intl. Conf. on Humanoid Robots*, Atlanta, October 2013
- C38. **M. Ciocarlie**, F. Hicks and S. Stanford. “Kinetic and Dimensional Optimization for a Tendon-driven Gripper”, *IEEE Intl. Conference on Robotics and Automation*, Karlsruhe, May 2013
- C39. H. Nguyen, **M. Ciocarlie**, K. Hsiao and C. Kemp. “ROS Commander: Flexible Behavior Creation for Home Robots”, *IEEE Intl. Conference on Robotics and Automation*, Karlsruhe, May 2013
- C40. **M. Ciocarlie**, K. Hsiao, A. Leeper and D. Gossow. “Mobile Manipulation Through An Assistive Home Robot”, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Vilamoura, October 2012
- C41. T. Chen, **M. Ciocarlie**, S. Cousins, P. Grice, K. Hawkins, K. Hsiao, C. Kemp, C. King, D. Lazewatsky, A. Leeper, H. Nguyen, A. Paepcke, C. Pantofaru, W. Smart and Leila Takayama. “Robots for Humanity: User-Centered Design for Assistive Mobile Manipulation”, Video Session Contribution, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Vilamoura, October 2012
- C42. M. Dogar, K. Hsiao, **M. Ciocarlie** and S. Srinivasa. “Physics-based Grasp Planning Through Clutter”, *Robotics: Science and Systems*, Sydney, July 2012
- C43. A. Leeper, K. Hsiao, **M. Ciocarlie**, D. Gossow and L. Takayama. “Strategies for Human-in-the-Loop Robotic Grasping”, *IEEE/ACM Intl. Conf. on Human-Robot Interaction*, Boston, March 2012

- C44. A. Leeper, S. Chan, K. Hsiao, **M. Ciocarlie** and K. Salisbury. "Constraint-based Haptic Rendering of Point Data for Teleoperated Robot Grasping", *IEEE Haptics Symposium*, Vancouver, March 2012
- C45. P. Brook, **M. Ciocarlie** and K. Hsiao. "Collaborative Grasp Planning with Multiple Object Representations", *IEEE Intl. Conference on Robotics and Automation*, Shanghai, May 2011
- C46. **M. Ciocarlie**, K. Hsiao, E. G. Jones, S. Chitta, R. B. Rusu and I. A. Sucan. "Towards Reliable Grasping and Manipulation in Household Environments", *Intl. Symp. on Experimental Robotics*, Delhi, December 2010
- C47. K. Hsiao, S. Chitta, **M. Ciocarlie** and E. Gil Jones. "Contact-Reactive Grasping of Objects with Partial Shape Information", *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Taipei, October 2010
- C48. **M. Ciocarlie** and P. Allen. "Data-driven Optimization for Underactuated Robotic Hands", *IEEE Intl. Conference on Robotics and Automation*, Anchorage, May 2010
- C49. **M. Ciocarlie** and P. Allen. "A Design and Analysis Tool for Underactuated Compliant Hands", *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, St. Louis, October 2009
- C50. C. Goldfeder, **M. Ciocarlie**, J. Peretzman, H. Dang and P. Allen. "Data-Driven Grasping with Partial Sensor Data", *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, St. Louis, October 2009
- C51. C. Goldfeder, **M. Ciocarlie**, H. Dang and P. Allen. "The Columbia Grasp Database", *IEEE Intl. Conference on Robotics and Automation*, Kobe, May 2009
- C52. **M. Ciocarlie**, H. Dang, J. Lukos, M. Santello and P. Allen. "Functional Analysis of Finger Contact Locations during Grasping", *3rd Joint EuroHaptics Conference and IEEE Symposium on Haptic Interfaces*, Salt Lake City, March 2009
- C53. **M. Ciocarlie**, S. Clanton, M. Spalding and P. Allen. "Biomimetic Grasp Planning for Cortical Control of a Robotic Hand", *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Nice, September 2008
- C54. **M. Ciocarlie** and P. Allen. "On-Line Interactive Dexterous Grasping", *EuroHaptics Conference*, Madrid, June 2008
- C55. **M. Ciocarlie**, C. Goldfeder and P. Allen. "Dimensionality Reduction for Hand-Independent Dexterous Robotic Grasping", *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, San Diego, October 2007
- C56. **M. Ciocarlie**, C. Lackner and P. Allen. "Soft Finger Model with Adaptive Contact Geometry for Grasping and Manipulation Tasks", *2nd Joint EuroHaptics Conference and IEEE Symposium on Haptic Interfaces*, Tsukuba, March 2007 (**Best Student Paper Award**)
- C57. **M. Ciocarlie**, A. Miller and P. Allen. "Grasp Analysis Using Deformable Fingers", *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Edmonton, August 2005

Book Chapters

- B1. P. Allen, **M. Ciocarlie** and C. Goldfeder, "Grasp Planning Using Low Dimensional Subspaces", in "The Human Hand as an Inspiration for Robot Hand Development", Springer Tracts in Advanced Robotics (STAR) Series, Balasubramanian, R. and Santos, V.J., Eds., Springer, Heidelberg, 2014

Invited Articles and Editorials

- I1. T. Chen, Z. He and **M. Ciocarlie**. “Co-designing hardware and control for robot hands”, Focus Article, *Science Robotics* 6(53), 2021
- I2. J. Mahler, R. Platt, A. Rodriguez, **M. Ciocarlie**, A. Dollar, R. Detry, M. Roa, H. Yanco, A. Norton, J. Falco, K. Van Wyk, E. Messina, D. Morrison, M. Mason, O. Brock, L. Odhner, A. Kurenkov, M. Matl, K. Goldberg. "Guest editorial open discussion of robot grasping benchmarks, protocols, and metrics", *IEEE Transactions on Automation Science and Engineering* 15(4), 2018
- I3. P. Beckerle, G. Salvietti, R. Inal, D. Prattichizzo, S. Rossi, C. Castellini, S. Hirche, S. Endo, H. Ben Amor, **M. Ciocarlie**, F. Mastrogiovanni, B. Argall and M. Bianchi. “A Human-Robot Interaction Perspective on Assistive and Rehabilitation Robotics”, *Frontiers in Robotics and AI* (Perspective Paper), 2017

Workshop Papers, Abstracts and Presentations

- W1. P. Ballentine, E. Chang, **M. Ciocarlie**, and I. Kyriassis. “Dynamic Tactile Sensing with a Flexible PVDF Sensor in a Multimodal Robotic Finger”, *Materials Research Society Fall Meeting*, December 2025
- W2. L. Winterbottom, D. Nilsen, R. Mendonca, A. Chen, K. Lee, J. Xu, **M. Ciocarlie** and J. Stein. “Motor learning techniques to enhance training with robotic hand orthoses for stroke survivors: challenges and opportunities”, *American Occupational Therapy Association Conference*, April 2025
- W3. E. Chang, P. Ballentine, I. Kyriassis, and **M. Ciocarlie**. “Development Towards a PVDF-Based Tactile Finger with Distributed Vibration Sensing”, ViTac Workshop, *IEEE Intl. Conf. on Robotics and Automation*, May 2024
- W4. 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”, *American Occupational Therapy Association Conference*, April 2024
- W5. J. Palacios*, A. Deli-Ivanov*, A. Chen, L. Winterbottom, D. Nilsen, J. Stein, and **M. Ciocarlie**. “Towards Tenodesis-Modulated Control of an Assistive Hand Exoskeleton for SCI”, Workshop on Assistive Robotics for Citizens, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Detroit, October 2023 (*joint first authors)
- W6. E. Chang, P. Ballentine, I. Kyriassis and **M. Ciocarlie**. “Towards Development of a Signal-Dense Multimodal Tactile Finger”, ViTac Workshop: Blending Virtual and Real Visuo-Tactile Perception, *IEEE Intl. Conf. on Robotics and Automation*, London, May 2023
- W7. S. Shang*, G. Khandate* and **M. Ciocarlie**. “State-only Demonstration Driven Exploration for Learning Unstable Dexterous Manipulation and Locomotion”, Workshop on the role of uncertainty and how it is tackled in robotic grasping and manipulation, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Kyoto, October 2022 (*joint first authors)
- W8. S. Shang, G. Khandate and **M. Ciocarlie**. “Reset Distribution Engineering with State-Only Demonstration for Learning Unstable Dexterous Manipulation and Locomotion”, *Northeast Robotics Colloquium*, 2022
- W9. W. Chen, J. Xu and **M. Ciocarlie**. “Shift-invariant Intent Detection with an EMG Armband”, *Northeast Robotics Colloquium*, 2022

- W10. E. Hannigan and **M. Ciocarlie**. “Context Training for Learning Tactile Latent Spaces”, Workshop on Advancing Artificial Intelligence and Manipulation for Robotics, *Robotics: Science and Systems Conference*, July 2021
- W11. G. Khandate, M. Haas-Heger and **M. Ciocarlie**. “In-Hand Object Re-orientation via Finger Gaiting”, Workshop on Advancing Artificial Intelligence and Manipulation for Robotics, *Robotics: Science and Systems Conference*, July 2021
- W12. S. Park, M. Fraser, L. Webber, C. Meeker, L. Bishop, D. Geller, J. Stein and **M. Ciocarlie**. “A User-Driven Wearable Hand Robot for Functional Task Training After Stroke”, *American Occupational Therapy Association Conference*, Boston, April 2020
- W13. L. Wang, T. Chen and **M. Ciocarlie**. “A Platform for Remotely Assisted Versatile Manipulation in Orbit”, Workshop on High Accuracy Mobile Manipulation in Challenging Environments, *IEEE Intl. Conf. on Robotics and Automation*, Montreal, May 2019
- W14. C. Meeker, M. Haas-Heger and **M. Ciocarlie**. “An Object-Based, Hand-Independent Algorithm for Creating Teleoperation Mappings”, Workshop on Human Movement Science for Physical Human-Robot Collaboration, *IEEE Intl. Conf. on Robotics and Automation*, Montreal, May 2019
- W15. G. Khandate, E. Hannigan, M. Haas-Heger, B. Song, J. Yin and **M. Ciocarlie**. “Algorithmic Gait Synthesis for a Snake Robot”, Toward Online Optimal Control of Dynamic Robots Workshop: From Algorithmic Advances to Field Applications, *IEEE Intl. Conf. on Robotics and Automation*, Montreal, May 2019
- W16. E. Hannigan, B. Song, G. Khandate, J. Yin, M. Haas Heger and **M. Ciocarlie**. “SBP-Guided MPC to Overcome Local Minima in Trajectory Planning”, Toward Online Optimal Control of Dynamic Robots Workshop: From Algorithmic Advances to Field Applications, *IEEE Intl. Conf. on Robotics and Automation*, Montreal, May 2019
- W17. T. Chen, P. Piacenza, M. Haas-Heger and **M. Ciocarlie**. “The ROAM Hand: Design for Sensing and Dexterity”, *Workshop on Hands in the Real World, IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Madrid, October 2018
- W18. P. Piacenza, E. Hannigan, S. Sherman, C. Baumgart, K. Behrman, I. Kymissis and **M. Ciocarlie**. “Tactile Sensing with Overlapping Signals”, *Workshop on Active Touch, IEEE Intl. Conf. on Robotics and Automation*, Brisbane, May 2018
- W19. L. Webber, L. Bishop, J. Stein, S. Park, C. Meeker and **M. Ciocarlie**. “MyHand: A wearable robotic device for upper extremity rehabilitation and performance following stroke”, *American Occupational Therapy Association Conference*, Salt Lake City, April 2018
- W20. S. Sherman, P. Piacenza and **M. Ciocarlie**. “Super-resolution on a tactile dome: simulation, analysis and initial results”, *Workshop on Tactile Sensing for Manipulation: Hardware, Modeling, and Learning, Robotics: Science and Systems Conference*, Boston, July 2017
- W21. P. Piacenza, W. Dang, E. Hannigan, J. Espinal, I. Hussein, I. Kymissis and **M. Ciocarlie**. “An Optics-based Tactile Sensor: Design and Operation”, *Workshop on Tactile Sensing for Manipulation: New Progress and Challenges, IEEE Intl. Conf. on Humanoid Robots*, Cancun, November 2016
- W22. M. Haas-Heger, G. Iyengar and **M. Ciocarlie**. “Active and Passive Reaction in Grasp Stability Analysis of Underactuated Hands”, *Workshop on Evaluation and Benchmarking of Underactuated and Soft Robotic Hands, IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Daejeon, October 2016
- W23. P. Piacenza, W. Dang, E. Hannigan, J. Espinal, I. Hussein, I. Kymissis and **M. Ciocarlie**. “Tactile Sensing with Overlapping Optical Signals”, *Workshop on Closed-loop Grasping and Manipulation:*

Challenges and Progress, IEEE/RSJ Intl. Conference on Intelligent Robots and Systems, Daejeon, October 2016

- W24. P. Piacenza, Y. Xiao, S. Park, I. Kyriassis and **M. Ciocarlie**. “An Investigation of Contact Localization through Overlapping Signals”, *Workshop on Exploiting Contact and Dynamics in Manipulation, IEEE Intl. Conference on Robotics and Automation*, Stockholm, May 2016
- W25. I. Park, T. Smith, H. Sanchez, S. Wong, P. Piacenza and **M. Ciocarlie**. “Developing a 3-DOF Compliant Perching Arm for a Free-Flying Robot on the International Space Station”, Late-breaking Result Abstract, *IEEE Intl. Conference on Robotics and Automation*, Seattle, May 2015
- W26. A. Leeper, K. Hsiao, **M. Ciocarlie**, I. Sucan and K. Salisbury. “Assisted Arm Teleoperation in Clutter Using Constraints from 3D Sensor Data”, *Workshop on Robots in Clutter, Robotics: Science and Systems Conference*, Berlin, June 2013
- W27. L. Zhang, **M. Ciocarlie** and K. Hsiao. “Grasp Evaluation with Graspable Feature Matching”, *Workshop on Mobile Manipulation, Robotics: Science and Systems Conference*, Los Angeles, June 2011
- W28. K. Hsiao, **M. Ciocarlie** and P. Brook. “Bayesian Grasp Planning”, *Workshop on Mobile Manipulation, IEEE Intl. Conference on Robotics and Automation*, Shanghai, May 2011
- W29. **M. Ciocarlie**, G. Bradski, K. Hsiao and P. Brook. “A Dataset for Grasping and Manipulation using ROS”, *RoboEarth Workshop, IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Taipei, October 2010
- W30. **M. Ciocarlie** and P. Allen. “A Constrained Optimization Framework for Compliant Underactuated Grasping”, *Workshop on Underactuated Grasping*, Montreal, August 2010
- W31. **M. Ciocarlie**, K. Hsiao, E. Gil Jones, S. Chitta, R. B. Rusu and I. A. Sucan. “Towards Reliable Grasping and Manipulation in Household Environments”, *Robotics: Science and Systems Manipulation Workshop*, Zaragoza, June 2010
- W32. K. Hsiao, S. Chitta, **M. Ciocarlie** and Gil E. Jones. “Contact-reactive Grasping of Objects with Partial Shape Information”, *Workshop on Mobile Manipulation, IEEE Intl. Conference on Robotics and Automation*, Anchorage, May 2010
- W33. **M. Ciocarlie** and P. Allen. “Low-Dimensional Dexterous Grasping for Robotic and Prosthetic Hands”, *IEEE Intl. Conf. on Robotics and Automation Full-Day Tutorial on Dexterous Manipulation*, Pasadena, May 2008
- W34. **M. Ciocarlie**, C. Goldfeder, and P. Allen. “Dexterous Grasping via Eigengrasps: a Low-Dimensional Approach to a High-Complexity Problem,” *Robotics: Science and Systems Manipulation Workshop - Sensing and Adapting to the Real World*, Atlanta, June 2007.

Thesis

- T1. **M. Ciocarlie**. “Low-Dimensional Robotic Grasping: Eigengrasp Subspaces and Optimized Underactuation”, Doctoral Thesis, Dept. of Computer Science, Columbia University, February 2010

Other Publications

- O1. **M. Ciocarlie**. “Obstacle Avoidance and Path Planning Using a Sparse Array of Sonars”, Technical Report 04904, Department of Computer Science, Columbia University, December 2004
- O2. **M. Ciocarlie**. “Parallel Numerical Algorithms Using MPI”, B.S. Eng. Graduation Thesis, School of Automatic Control and Computers, Polytechnic University of Bucharest, June 2003

INVITED LECTURES

Conferences and Workshops

- “Manipulation: A <<Full Stack>> Problem”, Keynote Presentation, *7th UK Manipulation Workshop*, Edinburgh, UK, January 2026
- “Human-in-the-Loop Robot Learning”, Human to Robot (H2R): *Workshop on Sensorizing, Modeling, and Learning from Humans, Conference on Robot Learning*, September 2025 (joint with Zhanpeng He)
- “Force and Touch Sensors for Low-cost Dexterous Manipulators”, *Amazon Consumer Robotics Symposium*, April 2025 (joint talk with Ioannis Kymissis)
- “(Co-)Designing Robots with Reinforcement Learning”, *Workshop on Embodiment-aware Robot Learning, Robotics: Science and Systems Conference*, July 2024 (joint talk with Zhanpeng He)
- “Aiming for Dexterity: A New Hand Design with a New F/T Sensor”, *Workshop on Ingredients of Dexterous Manipulation, Robotics: Science and Systems Conference*, July 2024
- “(Co-)Designing Robots with Reinforcement Learning”, *Workshop on Co-design in Robotics: Theory, Practice, and Challenges, IEEE Intl. Conference on Robotics and Automation*, May 2024
- “What we’ve been up to with tactile sensing lately: from hardware to applications”, *5th RoboTac Workshop: Visuo-Tactile Perception, Learning, Control for Manipulation and HRI, IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2023
- “Model-based sampling helps model-free learning for highly dexterous in-hand manipulation”, *Workshop on Learning Meets Model-based Methods for Manipulation and Grasping, IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2023
- “Learning with Tactile Fingers”, *Workshop on Mobile Manipulation and Embodied Intelligence (MOMA), IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2022
- “Object recognition and manipulation with tactile fingers”, *Workshop on the Role of Uncertainty and How It Is Tackled in Robotic Grasping and Manipulation, IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2022
- “From Compliant Hand Mechanisms to Compliant Manipulation Policies, and Back”, *Workshop on Compliant Robot Manipulation: A Discussion on Challenges and New Opportunities, IEEE Intl. Conference on Robotics and Automation*, May 2022
- “MyHand: a Robotic Hand Orthosis for Stroke”, *Workshop on Challenges and Opportunities of Human-robot Symbiosis: from Wearable Robots to Neurorobotics, IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2021
- “Design Optimization, Sensor Development, and Dexterous Manipulation Learning for Multifingered Hands”, *Workshop on Advancing Artificial Intelligence and Manipulation for Robotics, Robotics: Science and Systems Conference*, July 2021
- “Towards dexterous manipulation with a tactile finger”, *ViTac 2021 Workshop on Trends and Challenges in Visuo-Tactile Perception, IEEE Intl. Conference on Robotics and Automation*, May 2021
- “How to Make, Sense, and Make Sense of Contact in Robotic Manipulation”, *Robotic Research Jam Sessions, University of Pisa*, July 2020

- “All Hands on Deck: New Designs, Sensors, and Models for Robot Hands”, Plenary talk, *Northeast Robotics Colloquium*, Philadelphia, October 2019
- “New Tactile and Proprioceptive Sensors for a Highly Sensorized Robot Hand”, *Workshop on New Challenges in Humanoid Grasping and Manipulation, IEEE Intl. Conf. on Humanoid Robots*, Toronto, October 2019
- “Case studies in hand sensors: a tactile finger, a proprioceptive controller, and a highly sensorized hand”, *Workshop on Bringing Perception-based Manipulation to the Real World, IEEE Intl. Conference on Robotics and Automation*, Montreal, May 2019
- “Modeling Contact with Coulomb Friction and the Maximum Dissipation Principle”, *Workshop on Optimal Planning and Control Fusing Offline and Online Algorithms, IEEE Intl. Conference on Robotics and Automation*, Montreal, May 2019
- “Smart Robotic Manipulation”, *MARS Conference* (invitation-only), Palm Springs, March 2019
- “Proprioception: the (Half) Forgotten Sensing Modality”, *Workshop on Examining Sensing Modalities for Robust and Dexterous Object Manipulation, IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Madrid, October 2018
- “A Tactile Sensor Designed for Learning-based Use: Successes, Limitations and Pitfalls”, *Workshop on New Progress in Tactile Perception and Learning in Robotics, IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Madrid, October 2018
- “MyHand: a Wearable Hand Orthosis for Stroke Patients”, *Workshop on Wearable Robotics for Motion Assistance and Rehabilitation (RoboAssist 2018), IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Madrid, October 2018
- “Optics-based Tactile Sensing: from Planar Arrays to 3D Fingertips”, *Workshop on The Intelligence of Touch: Haptics, Tactile, Interaction, IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Madrid, October 2018
- “Accurate Contact Localization with Few Wires”, *Workshop on Tactile Sensing for Manipulation, Robotics: Science and Systems Conference*, July 2017
- “Senses and Sensing Ability for Dexterous Hands”, *RSS 2017 Area Chair Symposium*, Carnegie Mellon University, April 2017
- “Towards an Active Hand Orthosis for Stroke Patients: Can We Achieve Dexterity in Wearable Form?”, *Workshop on Human-Oriented Approaches for Assistive and Rehabilitation Robotics, IEEE Intl. Symposium on Robot and Human Interactive Communication*, New York, August 2016
- “Contact Sensing for Manipulation: Thoughts on Why and How”, *Workshop on Exploiting Contact and Dynamics in Manipulation, IEEE Intl. Conference on Robotics and Automation*, Stockholm, May 2016
- “Recent Progress: Wearable Hand Orthoses and High-Resolution Contact Sensing”, *Robotics Workshop, Texas A&M University*, April 2016
- “Robotic Grasping: Complexity vs. Versatility”, Keynote Presentation, *Mini-Symposium on Hands and Haptics, Intl. Symposium on Robotics Research*, September 2015
- “Constraint-aware Teleoperation for Manipulation in Clutter”, *Towards a Unifying Framework for Whole-body and Manipulation Control Workshop, Robotics: Science and Systems Conference*, July 2015
- “More Hand for the Buck: Free Features through Design Optimization”, *Workshop on Robotic Hands, Grasping, and Manipulation, IEEE Intl. Conference on Robotics and Automation*, May 2015
- “Mobile Manipulation in and through the Cloud”, *Cloud Robotics Workshop, IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, November 2013
- “3D Printing: Research Prototypes and Beyond”, *Principal Investigator Meeting, National Robotics Initiative*, October 2013

- “The Humans in the Cloud: Shared Autonomy Over the Internet”, *IEEE/NSF Workshop on Cloud Manufacturing and Automation, IEEE Intl. Conf. on Automation Science and Engineering*, August 2013
- “From Co-robot to Extension of Self: Mobile Manipulation through an Assistive Home Robot”, *Workshop on Human Robot Collaboration, Robotics: Science and Systems Conference*, June 2013
- “The Humans in the Cloud: Shared Autonomy Over the Web”, *Cloud Robotics Workshop, European Robotics Forum*, March 2013
- “Assistive Robotics for Motor Impaired Users: Manipulation in the Home Through A Mobile Robot”, *Piper Health Solutions Workshop on Rehabilitation Robotics*, Tempe, Arizona, February 2013
- “Mobile Manipulation Through an Assistive Home Robot”, *UTARI Symposium in Assistive Robotics*, Arlington, Texas, February 2013
- “Mobile Manipulation Through an Assistive Home Robot” - Keynote Presentation, Workshop on Assistance and Service Robotics in a Human Environment, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Vilamoura, October 2012
- “Manipulation in ROS: the Good, the Bad and the Research”, Handling ROS Tutorial, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Vilamoura, October 2012
- “Interactive Manipulation with the PR2 Robot” (joint with Kaijen Hsiao), Robotics Workshop, *AAAI Conference on Artificial Intelligence*, San Francisco, August 2011
- “Towards Reliable Grasping and Manipulation in Household Environment: Applications on the PR2 Robot using ROS”, Towards a Robotics Software Platform Workshop, *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Taipei, October 2010
- “Grasp Planning and Hand Design Optimization”, Workshop on Grasp Acquisition: How to Realize Good Grasps, *Robotics: Science and Systems Conference*, June 2010
- “Combining Perception and Manipulation in ROS”, Workshop on Representations for Object Grasping and Manipulation, *IEEE Intl. Conference on Robotics and Automation*, May 2010

Universities and Industry

- “Manipulation: A <<Full Stack>> Problem”, *Mechanical Engineering and Applied Mechanics Colloquium, University of Pennsylvania*, April 2026
- “Robotic Manipulation: The Final Frontier”, *New York Scientific Data Summit (NYSDS)*, September 2025
- “Robotics and Embodied Intelligence: Is the Age of the General-Purpose Robot Around the Corner?”, Data Science Day, *Data Science Institute, Columbia University*, March 2025
- “We (finally) have dexterous robotic manipulation. Now what?”, *Contextual Robotics Institute Seminar Series, University of California San Diego*, February 2025
- “We (finally) have dexterous robotic manipulation. Now what?”, Robotics Colloquium, *University of Washington Paul G. Allen School of Computer Science and Engineering*, January 2024
- “We (finally) have dexterous robotic manipulation. Now what?”, Boston Dynamics AI Institute Seminar Series, *BDAI*, December 2023
- “We’re (finally) getting dexterous robotic manipulation. Now what?”, NYU Robotics Seminar Series, *New York University*, May 2023
- “Confidence-Aware Reinforcement Learning for Human-in-the-loop Decision Making” (joint w. Shuran Song), Columbia Amazon AI Center Research Showcase, May 2023
- “Mechanisms, Sensors and Policies for Dexterous Robotic Manipulation”, Autonomy Talks Series, Institute for Dynamic Systems and Control, *ETH Zurich*, December 2022
- “Mechanisms, Sensors and Policies for Dexterous Robotic Manipulation”, Department of Computer Science, *Rice University*, October 2022

- “Confidence-Aware Reinforcement Learning for Human-in-the-loop Decision Making”, *Columbia Amazon AI Center Research Showcase*, June 2022 (joint with Shuran Song)
- “An Intelligent Mind for an Intelligent Hand: Sensor, Mechanism and Policy Design for Versatile Manipulators”, Matrix AI Consortium Seminar Series, *University of Texas San Antonio*, October 2021
- “An Intelligent Mind for an Intelligent Hand: Sensor, Mechanism and Policy Design for Versatile Manipulators”, Distinguished Lecture in Robotics, Department of Computer Science, *The University of Hong Kong*, May 2021
- “New Sensors and Data-driven Methods for Robot Motor Skills”, Data Science Institute Seminar, *Columbia University*, March 2021
- “Mechanisms for Manipulation: From Humans to Robots and Back”, Department of Mechanical, Engineering Seminar, *Stevens Institute of Technology*, November 2020
- “How to Make, Sense, and Make Sense of Contact in Robotic Manipulation”, Robotics Seminar, *NVIDIA Robotics Research Lab*, November 2020
- “How to Make, Sense, and Make Sense of Contact in Robotic Manipulation”, Robotics Seminar, *University of Utah*, September 2020
- “How to Make, Sense, and Make Sense of Contact in Robotic Manipulation”, joint seminar for the NSERC Canadian Robotics Network, *McGill University Computer Science Department and Samsung AI Research Center Montreal*, June 2020
- “How to Make, Sense, and Make Sense of Contact in Robotic Manipulation”, Mechanical Engineering Seminar, *Rutgers University*, March 2020
- “How to Make, Sense, and Make Sense of Contact in Robotic Manipulation”, CITRIS Seminar, *University of California, Berkeley*, April 2019
- “Robot Hands for Earth and Space”, *NASA Ames Research Center*, April 2019
- “How to Make, Sense, and Make Sense of Contact in Robotic Manipulation”, Robotics Seminar, *Stanford University*, April 2019
- “How to Make, Sense, and Make Sense of Contact in Robotic Manipulation”, Robotics Institute Seminar, *University of California, San Diego*, March 2019
- “How to Make, Sense, and Make Sense of Contact in Robotic Manipulation”, Mechanical Engineering seminar, *University of California, Los Angeles*, March 2019
- “How to Make, Sense, and Make Sense of Contact in Robotic Manipulation”, Robotics Seminar, *University of Southern California*, March 2019
- “Smart Robotic Manipulation”, *Samsung AI Research Center New York*, February 2019
- “How to Make, Sense, and Make Sense of Contact in Robotic Manipulation”, Robotics Seminar, *Massachusetts Institute of Technology*, September 2018
- “Embodied Intelligence for Robotic Hands”, *New York City Artificial Intelligence Meetup*, June 2018
- “Senses and Sensing Ability for Robot Hands”, Brain Robotics Team, *Google Inc.*, January 2018
- “Inner Sense: The Wealth of Data Inside a Robot (or Human) Body”, Sense, Collect and Move Data Center, *Data Science Institute, Columbia University*, November 2017
- “Smart Robotic Manipulation: From Healthcare to Material Handling”, New Frontiers in Robotics Showcase, *Columbia Technology Ventures*, October 2017
- “Robot Hands: Elements of Design, Grasp Analysis and Tactile Sensing”, *NASA Johnson Space Center*, August 2017
- “Senses and Sensing Ability for Robot Hands”, Department of Computer Science, *Rice University*, August 2017
- “Robotic Manipulation: Design, Sensing and Planning”, Dept. of Mechanical Engineering Colloquium Series, *City College of New York*, April 2016

- “Versatility in Robotic Manipulation: the Long Road to Everywhere”, Robotics Institute Seminar, *Carnegie Mellon University*, September 2015
- “Brain-Machine Interfaces for Robotic Manipulation: Tales from the Machine Side”, Center for Neural Engineering and Computation Seminar, *Columbia University*, January 2015
- “Brain-Machine Interfaces for Robotic Manipulation: Tales from the Machine Side”, Biomedical Engineering Seminar, *SUNY Downstate Medical Center and NYU Polytechnic School of Engineering*, January 2015
- "Versatile Mobile Manipulation: the Long Road to Everywhere", GRASP Laboratory, *University of Pennsylvania*, December 2014
- "Versatile Mobile Manipulation: the Long Road to Everywhere", Robotics and State Estimation Lab, *University of Washington*, June 2013
- "Versatile Mobile Manipulation", *Microsoft Corporation*, June 2013
- "Versatile Mobile Manipulation: the Long Road to Everywhere", Automation Sciences Lab, *University of California Berkeley*, March 2013
- “Robotic Manipulation in the Home: Challenges, Solutions and Perspectives”, EECS Seminar, *University of California Merced*, October 2011
- “From Human Hands to Robot Hands: Ideas and Applications for Robotic and Prosthetic Manipulation”, Neural Prosthetic Systems Laboratory, *Stanford University*, February 2011
- “Mobile Manipulation for Human Environments”, *Samsung Robotics Group* (via telepresence robot), Suwon, Korea, November 2010
- “Towards Reliable Grasping in Unstructured Environments”, Centre for Autonomous Systems, *KTH Royal Institute of Technology*, September 2010
- “Low-dimensional Robotic Grasping”, Dept. of Mechanical Engineering, *Yale University*, November 2009
- “Robotic Grasping: the Brains and the Brawn”, Dept. of Computer Science, *Brown University*, May 2009

OUTREACH

Outreach and Engagement with Under-Represented Groups

- Host for engineering lab demos, Girl Scout Troop 3780, 5th grade Hunter College Elementary School, Spring 2023.
- Columbia University ENG Program: host for high-achieving minority high school students, Summer 2022. Hosted and mentored two participating students. Continued mentoring both students after internship throughout the college applications process. Both students were accepted by and enrolled in four-year colleges with exceptional engineering programs (WPI and Cooper Union respectively).
- Panel Member, “Transitioning to Industry” Panel organized by the IEEE Robotics and Automation Society Student Activities Committee, July 2021
- Host for World Science Academy Festival, providing New York City high schoolers with access to scientists and research labs, February 2019.
- Lab participation in the 10th Annual Harlem STEM EXPO, an event held in partnership between Manhattan’s Community School District 5 and Harlem Children’s Zone, with a hands-on demo of a prototype robotic hand orthosis for stroke patients, May 2018.
- Host for the IDEAL School's Robotics Club “Inside Engineering” Columbia SEAS visit, Spring 2018.

- Invited speaker at the Family Astronomy Night Series hosted by the Intrepid Sea, Air and Space Museum, led project team presenting our work on rehabilitation robotics to an audience of children and their families, July 2017.
- Host for the Columbia Inside Engineering program, hosting women high school students for hands-on demos of engineering projects, Spring 2017.
- Workshop host for the Engineering Exploration Experience program organized by the Columbia Society of Women Engineers, Spring 2017.
- Columbia University Young Scholars Program: host for high-achieving minority high school students, Summer 2016. Paper co-authored with student members submitted for peer review.

Media Highlights

- “Reading Muscle Intent: A New AI Tool for Hand Movement After Stroke”, Columbia University Data Science Institute Newsletter, December 2025
- “The ‘Hands Problem’ Holding Back the Humanoid Revolution”, Wall Street Journal, October 2025
- “A Sense of Touch: Columbia University Robotic Hand”, Time Magazine Best Inventions of 2023, November 2023
- “Highly Dexterous Robot Hand Can Operate in the Dark — Just Like Us”, Columbia SEAS News, picked up by numerous national and international outlets, including Popular Science, IEEE Spectrum, Ars Technica, NSF homepage, IT Home (China), and many more, May 2023
- “Mechanical Hands to Help Stroke Victims”, Columbia Engineering Magazine, March 2022
- “Smarter Machines”, Columbia Engineering Big Idea Series, June 2021
- “Columbia from Anywhere: A new series of short courses offers both executive overviews and deeper dives”, Columbia Engineering News (online), September 2020
- “Q&A: Tactile Robot Finger with No Blind Spots”, Tech Briefs, June 2020
- “To feel the Force, first sense a force: New tactile fingers for robot hands”, Columbia Engineering Celebrates Star Wars Day, April 2020
- “This Clever Robotic Finger Feels with Light”, Wired.com, February 2020
- “Humans beat robots, hands down”, Knowable Magazine, August 2018
- “Robotic muscle and sensitive polymer fingers in Columbia University’s robotics labs”, Ars Technica, March 2018
- “Inside Columbia University's secretive robot labs”, Business Insider, October 2017
- “Columbia Pioneers Launch Online Micromasters in Artificial Intelligence”, Columbia Engineering Magazine, Spring 2017
- “How NASA's Astrobee Robot Is Bringing Useful Autonomy to the ISS”, *IEEE Spectrum Robotics (online)*, February 2017
- “Columbia professors develop robotic glove to help stroke survivors recover”, *Columbia Spectator*, February 2016
- “Is It Really a Robot?”, *Forbes Magazine*, December 2012
- “Willow Garage scientists who make robots to help disabled people”, *San Jose Mercury News*, November 2012
- “Robot developer attempts to speed up A.I. tech”, *CBS This Morning*, November 2012
- “Willow Garage Introduces Velo 2G Adaptive Gripper”, *IEEE Spectrum Robotics (online)*, October 2012
- “How You Could Help Your Future Robot Coworker”, *MIT Technology Review (online)*, September 2012
- “'Co-robots' Join Workforce” (cover story), *EETimes*, August 2012
- “New robots give disabled some freedom”, *CBS Evening National News*, June 2012

- “America Revealed: Robots”, *PBS Network*, May 2012
- “Prophets of Science Fiction: Isaac Asimov”, *Science Channel*, March 2012
- “Innovation Nation: Artificial Intelligence”, *SCN Network (Canada)*, June 2011
- “Robot Manipulation Challenge: Clean Up Dining Table, Load Dishwasher”, *IEEE Spectrum Robotics (online)*, November 2009
- “Helping Robots Get a Grip”, *MIT Technology Review (print)*, July 2009