

GLEN CHOU

Postdoctoral Associate

Computer Science and Artificial Intelligence Laboratory (CSAIL)
Massachusetts Institute of Technology
32 Vassar St, Room 32-380, Cambridge, MA, 02210

Email: gchou@mit.edu

Website: glenchou.github.io

Phone: 925-872-0268

[Google Scholar](#) | [ResearchGate](#) | [LinkedIn](#)

RESEARCH INTERESTS

Topics: *Robotics; control; learning; optimization; perception; planning; human-robot interaction; formal methods.*

Overview: I am broadly interested in building principled algorithms that can enable general-purpose autonomous robots to operate capably and safely around humans in the real world. To unify the flexibility of machine learning with the reliability of model-based control, I am building strong model-based tools for perception-based control that can accommodate humans in the loop and be safely powered with data. Beyond designing these algorithms and proving their properties, I also believe strongly in demonstrating their validity on real hardware platforms.

EDUCATION

University of Michigan, Ann Arbor PhD, Electrical and Computer Engineering	Sep. 2017 - Aug. 2022
University of Michigan, Ann Arbor MS, Electrical and Computer Engineering	Sep. 2017 - May 2019
University of California, Berkeley BS, Dual Major in Electrical Engineering and Computer Science, Mechanical Engineering, high honors	Aug. 2013 - May 2017

EXPERIENCE

Postdoctoral associate, Massachusetts Institute of Technology. Advised by Prof. Russ Tedrake.	Sep. 2022 -
Graduate student researcher, University of Michigan, Ann Arbor. Co-advised by Profs. Dmitry Berenson and Necmiye Ozay.	Sep. 2017 - Aug. 2022
Undergraduate student researcher, University of California, Berkeley. Advised by Prof. Claire Tomlin.	Feb. 2016 - Aug. 2017

JOURNAL PUBLICATIONS

- [J6] G. Chou*, H. Wang*, D. Berenson, **Gaussian Process Constraint Learning for Scalable Chance-Constrained Motion Planning from Demonstrations**, IEEE Robotics and Automation Letters (with presentation at ICRA 2022), vol. 7, no. 2, pp. 3827-3834, April 2022. *Equal contribution.
- [J5] G. Chou, N. Ozay, and D. Berenson, **“Learning Temporal Logic Formulas from Suboptimal Demonstrations: Theory and Experiments”**, Autonomous Robots (AuRo), vol. 46, no. 1, pp. 149-174, January 2022.
- [J4] G. Chou, D. Berenson, and N. Ozay, **“Learning Constraints from Demonstrations with Grid and Parametric Representations”**, International Journal of Robotics Research (IJRR), vol. 40, no. 10-11, pp. 1255-1283, September 2021.
- [J3] C. Knuth*, G. Chou*, N. Ozay, and D. Berenson, **“Planning with Learned Dynamics: Probabilistic Guarantees on Safety and Reachability via Lipschitz Constants”**, IEEE Robotics and Automation Letters (with presentation at ICRA 2021), vol. 6, no. 3, pp. 5129 - 5136, July 2021. *Equal contribution.
- [J2] G. Chou, N. Ozay, and D. Berenson, **“Learning Constraints from Locally-Optimal Demonstrations under Cost Function Uncertainty”**, IEEE Robotics and Automation Letters (with presentation at ICRA 2020), vol. 5, no. 2, pp. 3682-3690, April 2020.

- [J1] G. Chou*, Y. E. Sahin*, L. Yang*, K. J. Rutledge, P. Nilsson, and N. Ozay, **Using control synthesis to generate corner cases: A case study on autonomous driving**, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (ESWEEK-TCAD special issue). *Equal contribution.

CONFERENCE PUBLICATIONS

- [C15] G. Chou and R. Tedrake, **Synthesizing Stable Reduced-Order Visuomotor Policies for Nonlinear Systems via Sums-of-Squares Optimization**, Proc. 62nd IEEE Annual Conference on Decision and Control (CDC), Singapore, December 2023.
- [C14] H.J. Suh, G. Chou*, H. Dai*, L. Yang*, A. Gupta, and R. Tedrake, **Fighting Uncertainty with Gradients: Offline Reinforcement Learning via Diffusion Score Matching**, Proc. 7th Conference on Robot Learning (CoRL), Atlanta, GA, USA, November 2023. *Equal contribution.
- [C13] C. Knuth, G. Chou, J. Reese, and J. Moore, **Statistical Safety and Robustness Guarantees for Feedback Motion Planning of Unknown Underactuated Stochastic Systems**, Proc. 40th IEEE International Conference on Robotics and Automation (ICRA), London, UK, May 2023.
- [C12] J. Pan, G. Chou, and D. Berenson, **Data-Efficient Learning of Natural Language to Linear Temporal Logic Translators for Robot Task Specification**, Proc. 40th IEEE International Conference on Robotics and Automation (ICRA), London, UK, May 2023.
- [C11] G. Chou, N. Ozay, and D. Berenson, **Safe Output Feedback Motion Planning from Images via Learned Perception Modules and Contraction Theory**, Proc. 15th International Workshop on the Algorithmic Foundations of Robotics (WAFR), College Park, MD, USA, June 2022.
- [C10] G. Chou, N. Ozay, and D. Berenson, **“Model Error Propagation via Learned Contraction Metrics for Safe Feedback Motion Planning of Unknown Systems”**, Proc. 60th IEEE Conference on Decision and Control (CDC), Austin, TX, USA, December 2021.
- [C9] K. Rutledge*, G. Chou*, and N. Ozay, **“Compositional Safety Rules for Inter-Triggering Hybrid Automata”**, Proc. 24th International Conference on Hybrid Systems: Computation and Control (HSCC), Nashville, TN, USA, May 2021. *Equal contribution.
- [C8] G. Chou, N. Ozay, and D. Berenson, **“Uncertainty-Aware Constraint Learning for Adaptive Safe Motion Planning from Demonstrations”**, Proc. 4th Conference on Robot Learning (CoRL), Cambridge, MA, USA, November 2020.
- [C7] G. Chou, N. Ozay, and D. Berenson, **“Explaining Multi-stage Tasks by Learning Temporal Logic Formulas from Suboptimal Demonstrations”**, Proc. Robotics: Science and Systems XVI (R:SS), Corvallis, Oregon, July 2020. **Invited to AuRo special issue.**
- [C6] C. Knuth, G. Chou, N. Ozay, and D. Berenson, **“Inferring Obstacles and Path Validity from Visibility-Constrained Demonstrations”**, Proc. 14th International Workshop on the Algorithmic Foundations of Robotics (WAFR), Oulu, Finland, June 2020.
- [C5] G. Chou, N. Ozay, and D. Berenson, **“Learning Parametric Constraints in High Dimensions from Demonstrations”**, Proc. 3rd Conference on Robot Learning (CoRL), Osaka, Japan, October 2019.
- [C4] G. Chou, D. Berenson, and N. Ozay, **“Learning Constraints from Demonstrations”**, Proc. 13th International Workshop on the Algorithmic Foundations of Robotics (WAFR), Mérida, Mexico, December 2018. **Invited to IJRR special issue.**
- [C3] G. Chou*, Y. E. Sahin*, L. Yang*, K. J. Rutledge, P. Nilsson, and N. Ozay, **Using control synthesis to generate corner cases: A case study on autonomous driving**, ACM SIGBED International Conference on Embedded Software (EMSOFT), Torino, Italy, October 2018. *Equal contribution.
- [C2] G. Chou, N. Ozay, and D. Berenson, **Incremental Segmentation of ARX Models**, Proc. 18th IFAC Symposium on System Identification (SYSID), Stockholm, Sweden, July 2018.
- [C1] A. Dhinakaran*, M. Chen*, G. Chou, J. C. Shih, C. J. Tomlin, **A Hybrid Framework for Multi-Vehicle Collision Avoidance**, Proc. 57th IEEE Conference on Decision and Control (CDC), Melbourne, Australia, December 2017. *Equal contribution.

UNDER REVIEW

- [U1] Y. Lin, G. Chou, D. Berenson, **Improving Out-of-Distribution Generalization of Learned Dynamics by Learning Pseudometrics and Constraint Manifolds**, Under review at ICRA 2024.

TECHNICAL REPORTS

- [T1] F. Jiang*, G. Chou*, M. Chen, C. J. Tomlin, **Using neural networks to compute approximate and guaranteed feasible Hamilton-Jacobi-Bellman PDE solutions**, Pre-print. *Equal contribution.

REFEREED WORKSHOP PAPERS

- [W3] G. Chou, **Safely Integrating Perception, Planning, and Control for Robust Learning-Based Robot Autonomy**, RSS Pioneers Workshop, June 2022.
- [W2] H. Wang*, G. Chou*, D. Berenson, **Gaussian Process Constraint Learning for Scalable Safe Motion Planning from Demonstrations**, RSS Workshop on Integrating Planning and Learning, July 2021.
- [W1] G. Chou, D. Berenson, N. Ozay. **Learning Parametric Constraints in High Dimensions from Demonstrations**, RSS Workshop on Robust Autonomy, June 2019.

HONORS AND AWARDS

- **Robotics: Science and Systems (R:SS) Pioneer (34%)** June 2022
- **Dept. Nominee for Richard and Eleanor Towner Prize for Outstanding Ph.D. Research** Nov 2021
- **National Defense Science and Engineering Graduate (NDSEG) Fellowship (5%)** Apr 2019
- **National Science Foundation Graduate Fellowship (NSF GRFP) (16%)** Apr 2019
- **Social Impact Award, University of Michigan Engineering Graduate Symposium** Oct 2018
One award given out of 44 submissions.

TEACHING

- **EECS 598, Motion Planning (University of Michigan)** Winter 2021
Guest lecturer.
- **EECS 563, Hybrid Systems and Control (University of Michigan)** Fall 2020
Course grader.
- **CS 188, Introduction to Artificial Intelligence (UC Berkeley)** Spring 2017
Undergraduate student instructor. Led weekly discussion sections, held office hours, wrote exam problems.
- **EE 221A, Linear Systems Theory (UC Berkeley)** Fall 2016
One-on-one tutor.

MENTORED STUDENTS

- **Craig Knuth** (*MS in Robotics, UMich*); coauthor on [[C6], [J3], [C13]] Jan. 2019 - Sep. 2022
Currently: Robotics Research Scientist at Johns Hopkins University Applied Physics Laboratory
- **Adarsh Karnati** (*MS in Robotics, UMich*) Aug. 2020 - May 2021
Currently: Engineer at Tesla
- **Hao Wang** (*Undergraduate in CS/ME, UMich*); coauthor on [[J6]] Jan. 2021 -
Currently: PhD student at USC
- **Yating Lin** (*MS student in Robotics, UMich*); coauthor on [[U1]] Jan. 2022 - Mar. 2023
Currently: PhD student at University of Michigan
- **Jiayi Pan** (*Undergraduate in CSE, UMich*); coauthor on [[C12]] Jun. 2022 - Sep. 2022
Currently: PhD student at UC Berkeley
- **H.J. Terry Suh** (*PhD student in EECS, MIT*); coauthor on [[C14]] Feb. 2023 - Jun. 2023
- **Lujie Yang** (*PhD student in EECS, MIT*); coauthor on [[C14]] Feb. 2023 -
- **Yi Tian** (*PhD student in EECS, MIT*) Aug. 2023 -

ORGANIZED WORKSHOPS

- **ACC Workshop on Safe and Robust Learning for Perception-Based Planning and Control, 2023.**
Lead workshop organizer. May 2023
- **ICRA Workshop on Safe and Reliable Robot Autonomy under Uncertainty, 2022.**
Lead workshop organizer. May 2022

INVITED TALKS

- **UIUC Robotics Seminar, 2023.** March 2023
- **UIUC Coordinated Science Laboratory Student Conference, 2022.**
Student keynote talk. February 2022

PRESENTATIONS

- **RSS Pioneers Workshop, 2022.** Safely Integrating Perception, Planning, and Control for Robust Learning-Based Robot Autonomy. *Talk and poster.* June 2022
- **RSS Workshop on Integrating Planning and Learning, 2021.** Gaussian Process Constraint Learning for Scalable Safe Motion Planning from Demonstrations. *Poster presentation.* July 2021
- **RSS Workshop on Safe Autonomy, 2019.** Learning Parametric Constraints in High Dimensions from Demonstrations. *Selected for long talk.* June 2019
- **L4DC 2019.** Learning Constraints from Demonstrations. *Poster presentation.* May 2019
- **UM Robotics Graduate Colloquium.** Learning Constraints from Demonstrations. Dec 2018
- **UM Engineering Graduate Symposium.** Using control synthesis to generate corner cases: A case study on autonomous driving. *Poster presentation, **Won Social Impact Award.*** Oct 2018

ACADEMIC SERVICE AND OUTREACH

- **Reviewer:** EMSOFT ('19-'21), CDC ('19-'23), CCTA ('19), ICCPS ('19-'21), ACC ('19-'20,'22), CoRL ('19-'23), RA-L ('19,'21-'23), ICRA ('20-'24), IROS ('21,'23), CASE ('20), WAFR ('20,'22), L4DC ('20,'22-'23), T-RO, RSS ('22-'23), AAAI ('23-'24), TAC, TMECH
- **Program Committee:** AAAI '24
- **BudDEEs** 2020 - 2021
One-on-one mentorship with first-year University of Michigan ECE PhD student.
- **MEZ (Michigan Engineering Zone)** 2018 - 2019
Serving as a FIRST robotics competition mentor for underprivileged high school students in Detroit, MI.
- **BEAM (Berkeley Engineers and Mentors)** 2017
Led elementary school students in Oakland, CA. through weekly science experiments.