BRIAN K. PLANCHER

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EDUCATION

HARVARD UNIVERSITY: AUG 2018 – PRESENT — Cambridge, MA

- PhD in Engineering Sciences: Electrical Engineering with a focus in Robotics and Control.
- Research focused on developing and implementing algorithms for realtime model predictive control for complex high dimensional robots by exploiting both the mathematical structure of algorithms and the design of computational platforms.
- Advisors: Vijay Janapa Reddi and Scott Kuindersma.

HARVARD UNIVERSITY: AUG 2016 – MAY 2018 — Cambridge, MA

- MEng in Engineering Sciences: Electrical Engineering with a focus in Robotics and Control; GPA: 3.9/4.0.
- Thesis: "Parallel and Constrained Differential Dynamic Programming for Model Predictive Control," Advisor: Scott Kuindersma

MASSACHUSSETS INSTITUTE OF TECHNOLOGY (MIT): AUG 2015 – JUNE 2016 — Cambridge, MA

- Advanced Study Non-Degree Student; GPA: 5.0/5.0

HARVARD UNIVERSITY: AUG 2009 - MAY 2013 — Cambridge, MA

- B.A. Magna Cum Laude in Computer Science with a Minor in Economics; GPA: 3.9/4.0
- Thesis: "Hacking the White House: Election Fraud in the Digital Age," Advisor: Greg Morrisett

AWARDS AND RECOGNITON

- Derek Bok Center Distinction in Teaching Award — FALL 2017, 2018, 2019
- National Science Foundation Graduate Research Fellowship (NSF GRFP) — APR 2018

TEACHING EXPERIENCE

HARVARD UNIVERSITY: FALL 2019 – *Head Teaching Fellow (Head TA)* — Cambridge, MA

- For CS 249r: Special Topics in Edge Computing: Autonomous Machines
- Co-designed a new course at the intersection of robotics and computer architecture / systems serving as the robotics instructor
- Designed and gave lectures for the robotics section of the course
- Co-developed course assignments and course infrastructure/tools (e.g., the online paper discussion forum)

HARVARD UNIVERSITY: FALL 2017,18 – *Head Teaching Fellow (Head TA)* — Cambridge, MA

- For CS 182: Introduction to Artificial Intelligence
- Ran a team of 11 teaching fellows to ensure sections and office hours were held, exams and homework assignments were graded, and student questions on the online forum were answered.
- Gave two lectures: "Introduction to Robotics and Path Planning I/II"
- Aided in the development of course assignments, and course infrastructure/tools (e.g., autograders)

MIT / HARVARD UNIVERSITY: FALL 2017,18 – *Teaching Assistant* — Cambridge, MA

- For Harvard section of MIT's MAS.863: How to Make Almost Anything
- Held office hours, led introductory sessions for course software, aided students in lab work, machine usage, and project design

MIT LINCOLN LABORATORIES BEAVER WORKS: SUMMER 2016,17,18,19 – *Associate Instructor* — Cambridge, MA

- For the RACECAR Mini Grand Prix Challenge: a hands-on, intensive, residential, 4-week program for rising high school seniors
- Worked with 9-12 teams of 4-6 students to teach programming concepts and robotic algorithm design through the completion of fast autonomous navigation tasks using 1/10 scale racecars using Python/ROS

HARVARD UNIVERSITY: FALL 2010, SPRING 2011 – *Course Assistant* — Cambridge, MA

- For Math 1a (Fall) and 1b (Spring): Introduction to Calculus I and II and Introduction to Differential Equations
- Taught a weekly breakout section, staffed the Math Question Center to aid students in problem sets, and graded problem sets

CONFERENCE PAPERS

- **B. Plancher,** C. Brumaar, I. Brumar, L. Pentecost, S. Rama, D. Brooks, "Application of Approximate Matrix Multiplication to Neural Networks and Distributed SLAM," in IEEE High Performance Extreme Computing Conference (HPEC), Waltham, MA, September 2019.
- **B. Plancher** and S. Kuindersma, "A Performance Analysis of Parallel Differential Dynamic Programming on a GPU," in the Workshop on the Algorithmic Foundations in Robotics (WAFR), Merida, MX, December 2018.
- **B. Plancher**, Z. Manchester, and S. Kuindersma, "Constrained Unscented Dynamic Programming," in IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Vancouver, CA, September 2017.

- Sertac Karaman, Ariel Anders, Michael Boulet, Jane Connor, Kenneth Gregson, Winter Guerra, Owen Guldner, Mubarik Mohamoud, **Brian Plancher**, Robert Shin, and John Vivilecchia, "Project-based, collaborative, algorithmic robotics for high school students: Programming self-driving race cars at MIT," in IEEE Integrated STEM Education Conference (ISEC), Princeton, NJ, March, 2017.

POSTERS, WORKSHOPS AND ABSTRACTS

- **B. Plancher** and S. Kuindersma, "Realtime Model Predictive Control using Parallel DDP on a GPU," in the workshop Toward Online Optimal Control of Dynamic Robots at the International Conference on Robotics and Automation (ICRA), Montreal, CA, May 2019.

INVITED TALKS AND SEMINARS

- **B. Plancher**, "Custom Accelerator Chips (ASICs) for Robotics / Autonomous Systems," Pillar VC, Boston, MA, April 2020
- **B. Plancher**, "Accelerating Real Time Model Predictive Control," Optimus Ride, Boston, MA, October 2019

ADVISING

UNDERGRADUATE THESES

- Lev Jacob Grossman: *Reinforcement Learning to Enable Robust Robotic Model Predictive Control* AUG 2019 – MAY 2020
- John Alex Keszler: *FPGA Acceleration of Motion Planning Algorithms For Robotics Applications* AUG 2018 – MAY 2019

REFERENCES

Vijay Janapa Reddi
Associate Professor of Electrical Engineering, John A. Paulson School of Engineering, Harvard University
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Scott Kuindersma
Research Scientist Boston Dynamics, Former Professor at Harvard University
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Zachary Manchester
Assistant Professor of Aeronautics and Astronautics, Stanford University
zacmanchester@stanford.edu

Greg Morrisett
Professor of Computer Science, Dean of Computing and Information Sciences (CIS), Cornell University
greg.morrisett@cornell.edu

PROFESSIONAL SERVICE

- *Member*: IEEE Robotics and Automation Society (IEEE-RAS)
- *Member:* IEEE-RAS Technical Committee for Model-Based Optimization for Robotics