

# Kevin Tracy

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[🌐 kevin-tracy](#) • [in kevin-tracy](#)

## Education

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### Carnegie Mellon University

*Ph.D. Robotics, GPA 4.14/4*

Advisor: Zac Manchester

### Stanford University

*M.S. Mechanical Engineering, GPA 4.05/4*

Advisor: Zac Manchester

### Rice University

*B.S. Mechanical Engineering, GPA 3.91/4*

**Pittsburgh, PA**

*2020–Present*

**Stanford, CA**

*2018–2020*

**Houston, TX**

*2014–2018*

## Research Experience

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### Carnegie Mellon University

*Researcher, Robotic Exploration Laboratory*

- Developing optimization-based motion planning and control algorithms.

### Stanford University

*Researcher, Robotic Exploration Laboratory*

- Trajectory optimization for low-thrust orbit maneuvers and flexible-body attitude control.

**Pittsburgh, PA**

*Sep 2020–Present*

**Stanford, CA**

*Jan 2018–Aug 2020*

## Professional Experience

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### Space Exploration Technologies (SpaceX)

*Associate Engineer: Guidance, Navigation, and Control*

- Implemented a novel closed-form solar array occlusion prediction algorithm
- Wrote a primal-dual interior point solver for quadratic programs in C++
- Developed reaction wheel allocation algorithms using convex optimization

### Astranis Space Technologies

*Guidance, Navigation, and Control Intern*

- Built high-fidelity orbital simulation environment from scratch in Julia
- Implemented fuel-optimal low-thrust trajectory methods for orbit-raising
- Designed orbital relocation algorithm for moving between GEO slots
- Developed novel attitude control algorithms using convex optimization

### Lockheed Martin Space Systems

*Guidance, Navigation, and Control Intern*

- Worked in GNC group for DOD Secret hypersonic and counter-hypersonic efforts
- Designed hardware in the loop test setup for Multiple Object Kill Vehicle (MOKV)
- Contributed to 6-DOF hypersonic missile simulation tools
- Published a paper internally on attitude parameterization conventions at LM Space

### Maxar Technologies (Formerly Space Systems/Loral)

*Spacecraft Systems Intern*

- Completed three internships in the spacecraft systems engineering organization
- Created subsystem models for attitude control, solar array, and electric power subsystem sizing in MATLAB for Monte Carlo optimization of spacecraft architecture
- Redesigned equipment list system for bus subsystems and provided relevant training for engineers

**Hawthorne, CA**

*May 2021–Aug 2021*

**San Francisco, CA**

*Jan 2020–Mar 2020*

**Sunnyvale, CA**

*July 2019–Sep 2019*

**Palo Alto, CA**

*May 2016–Sep 2018*

## Teaching Experience

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### Carnegie Mellon University

Teaching Assistant, 16745: *Optimal Control and Reinforcement Learning*  
Teaching Assistant, 16715: *Advanced Robot Dynamics and Simulation*

Pittsburgh, PA

Spring 2022  
Fall 2021

### Stanford University

Teaching Assistant, AA273: *State Estimation and Filtering for Robotic Perception*  
Teaching Assistant, ENGR205: *Introduction to Control Design Techniques*

Stanford, CA

Spring 2020  
Fall 2019

### Rice University

Teaching Assistant, ENGI120: *Introduction to Engineering Design*  
Teaching Assistant, STAT305: *Statistics for Biosciences*

Houston, TX

Fall 2016, 2017  
Fall 2015

## Awards

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### Best Paper (Avionics and Electronics for Space Applications)

*IEEE Aerospace Conference*

2022

"Ultra-Fine Pointing for Nanosatellite Telescopes With Actuated Booms"

### Best Student Paper Finalist

*IEEE Robotics and Automation Society*

2021

"Planning with Attitude"

### Tau Beta Pi

*Rice University*

2018

Awarded to the top 20% of students in the school of engineering.

### Rice Scholar Athlete

*Rice University*

2017

Awarded to upperclassmen varsity athletes for athletic and academic contributions.

### Commissioners Medal

*NCAA Conference-USA (Division I)*

2016

Awarded to two Rice football players with GPA's higher than 3.75.

## Publications

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### Journal Papers

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1. B. E. Jackson, K. Tracy, and Z. Manchester, "Planning With Attitude," en, *IEEE Robotics and Automation Letters*, 2021.
2. E. S. Douglas, K. Tracy, and Z. Manchester, "Practical Limits on Nanosatellite Telescope Pointing: The Impact of Disturbances and Photon Noise," en, *Frontiers in Astronomy and Space Sciences*, vol. 8, Aug. 2021.

### Conference Papers

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3. K. Tracy and Z. Manchester, "CPEG: A Convex Predictor-corrector Entry Guidance Algorithm," in *IEEE Aerospace Conference*, Big Sky, MT, USA, Mar. 2022.
4. K. Tracy, Z. Manchester, and E. Douglas, "Ultra-Fine Pointing for Nanosatellite Telescopes With Actuated Booms," in *IEEE Aerospace Conference*, Big Sky, MT, USA, Mar. 2022.
5. B. E. Jackson, T. Punnoose, D. Neamati, K. Tracy, R. Jitosh, and Z. Manchester, "ALTRO-C: A Fast Solver for Conic Model-Predictive Control," in *2021 IEEE International Conference on Robotics and Automation (ICRA)*, Xi'an, China, May 31, 2021.
6. K. Tracy and Z. Manchester, "Low-Thrust Trajectory Optimization Using the Kustaanheimo-Stiefel Transformation," in *AAS/AIAA Space Flight Mechanics Meeting*, Charlotte, NC, Jan. 31, 2021.
7. K. Tracy and Z. Manchester, "Model-Predictive Attitude Control for Flexible Spacecraft During Thruster Firings," in *AAS/AIAA Astrodynamics Specialist Conference*, Lake Tahoe, CA, Aug. 9, 2020.