COLE MACPHERSON

(949) 244-6592 | cole.e.macpherson@gmail.com

EDUCATION

UNIVERSITY OF COLORADO - BOULDER Boulder, CO

Master of Science in Aerospace Engineering Aug 2022 - May 2023

Focus on Autonomous Systems and Controls

Relevant Coursework: Algorithmic Motion Planning, Decision Making Under Uncertainty, sUAS GNC, Spacecraft Design, Linear Control Systems, Statistical Estimation for Dynamical Systems, Systems Engineering, Project Management

Bachelor of Science in Aerospace Engineering Aug 2018 - May 2022

Minor in Economics

WORK EXPERIENCE

NASA - JET PROPULSION LABORATORY Remote - Boulder, CO

Software Engineer Intern - Mars 2020 EO Uplink Jun 2022 – Aug 2023

- Collaborated in a Python-based environment to develop, maintain, and enhance critical tools for generating uplink products, validating data, and coordinating with Mars orbiters, streamlining day-to-day rover operations planning.
- Played a pivotal role in maintaining and optimizing essential web tools and APIs, ensuring seamless communication and data relay between the Mars 2020 rover and Earth-based teams.
- Responded to GitHub issues and stakeholder requests, swiftly addressing software bugs, implementing new features, and ensuring the reliability of tools crucial to mission success.

ULA SENIOR PROJECT Boulder, CO

Systems Engineer Aug 2021 – May 2022

- Led a multidisciplinary team through the design, manufacturing, and testing phases of a significant ESPA ring redesign project, reducing mass by over 75% while accommodating the removal of a key design requirement.
- Presented regular project updates and design reviews to customers and a panel advisory board, effectively communicating progress, successes, and addressing technical challenges, showcasing strong leadership and communication skills.
- Managed technical oversight of the project, ensuring successful outcomes through expert coordination of team efforts and meticulous attention to system design, manufacturing, and testing intricacies.

UNIVERSITY PROJECTS

PORTFOLIO ALLOCATION USING REINFORCEMENT LEARNING Jan 2023 - May 2023

- Conducted a comprehensive comparative study of deep reinforcement learning algorithms for portfolio allocation in the stock market, showcasing expertise in AI/ML methodologies and their real-world application.
- Leveraged Python to achieve portfolio allocation strategies that outperformed the Dow Jones Industrial Average after 5 and 10 years of trading, demonstrating the practical implementation of AI-based autonomous decision-making systems.

OPTIMAL RACING LINE USING MOTION PLANNING ALGORITHMS Aug 2022 - Dec 2022

- Developed and implemented a sophisticated motion planning model in C++ utilizing advanced algorithms like RRT and SRT to optimize the racing line of an F1 car on a track.
- Showcased practical experience in motion planning, optimization, and algorithmic problem-solving, resulting in reduced lap times for the provided vehicle setup and highlighting relevant skills for autonomous systems design.

SMALL UAS AUTOPILOT DESIGN Jan 2023 - May 2023

- Designed and implemented a sophisticated nonlinear autopilot simulation for a small Uncrewed Aircraft System (UAS), showcasing expertise in autonomous systems and control algorithms.
- Demonstrated proficiency in closed-loop guidance, wind mitigation, and stabilization techniques, validating the autonomous control system's performance in real-world conditions.

PREDICTING WILDFIRES USING SUPERVISED MACHINE LEARNING Aug 2021 - Dec 2021

- Conducted a graduate-level data science project aimed at combating wildfires, where Support Vector Machine (SVM) based data mining techniques were developed and applied to a novel dataset of climate model data and American wildfire data.
- Demonstrated proficiency in data collection, data cleaning, feature engineering, and applying machine learning algorithms in a real-world context.

ADDITIONAL

Programming Languages: Python, C/C++, MATLAB
Software Tools: Git, Jira, Docker, Jenkins
AI/ML: RL, DL, Motion Planning, TensorFlow, PyTorch

Skills: Autonomous System Design, Optimal Control, GNC, Data Analytics, State Estimation, Software Development, Probabilistic Decision Making, Systems Engineering