

Thomas Antony

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EDUCATION

PURDUE UNIVERSITY

PH.D. AERONAUTICS &
ASTRONAUTICS

May 2018 | West Lafayette, IN

Advisor: Prof. Michael J. Grant

*Dissertation: Large Scale Constrained
Trajectory Optimization using Indirect
Methods*

PURDUE UNIVERSITY

MS AERONAUTICS & ASTRONAUTICS

December 2014 | West Lafayette, IN

Major: Aerospace Systems, Minor:

Astrodynamics

Advisor: Prof. Michael J. Grant

*Thesis: Rapid Indirect Trajectory
Optimization on Highly Parallel Computing
Architectures*

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

B.TECH MECHANICAL ENGINEERING

June 2011 | Kochi, India

COURSEWORK

GRADUATE

Hypersonic Performance and Design

Astronautical Navigation and Guidance

Guidance and Control of Aerospace
Vehicles

Optimization in Aerospace Engineering

Multidisciplinary Design Optimization

Principles of Dynamics

Orbital Mechanics

Spacecraft Attitude Dynamics

SKILLS

SOFTWARE

Proficient

Rust • C++ • Python • Matlab • \LaTeX

Intermediate

Unix shell • C • Javascript • Assembler

Familiar

Clojure • Simulink

OTHER

Git • Docker

MISCELLANEOUS

Private Pilot w/ Instrument Rating

INDUSTRY

RAVEN INDUSTRIES | RESEARCH ENGINEER

via acquisition of Smart Ag

Nov 2019 - Present | Ames, IA

- Helped bring to production the first driverless grain cart on the market
- Architecting/developing a general high-level, executive control framework for multiple agricultural vehicles and operations
- Wrote low-level device drivers for a QNX RTOS embedded system

SMART AG | INTERN → AUTONOMOUS VEHICLE ENGINEER

Jan 2017 - Aug 2017, Feb 2018 - Nov 2019 | Ames, IA

- Developed high-level executive control software for autonomous tractor
- Multi-channel redundant communication system using MQTT
- Guidance algorithm for "sync" operation between a combine harvester and autonomous tractor
- Designed basic perception system that utilizes radar and cameras to detect obstacles
- Simulator for automated testing of vehicle control software

RESEARCH

RAPID DESIGN OF SYSTEMS LABORATORY | GRADUATE RESEARCH ASSISTANT

Aug 2013 - Feb 2018 | West Lafayette, IN

- Open source mission design framework (**beluga**) that uses indirect methods
- GPU-accelerated indirect trajectory solver for Matlab

AFRL MATHEMATICAL MODELING AND OPTIMIZATION INSTITUTE | VISITING RESEARCHER

May 2015 - Aug 2015 | Shalimar, FL

Developed an adaptive numerical method for solving two-point boundary value problems

PROJECTS

APOLLO ENTRY GUIDANCE IMPLEMENTATION IN PYTHON •

3BLUE1BROWN SUMMER OF MATH EXPOSITION 2021

MONTE CARLO SIMULATION OF A HIAD MARS LANDER • NASA

BIG IDEA CHALLENGE 2016, FINALIST

AEROCAPTURE TRAJECTORY DESIGN • INSPIRATION MARS

STUDENT DESIGN COMPETITION, 2014

SELECTED PUBLICATIONS

- [1] T. Antony and M. J. Grant. Rapid Indirect Trajectory Optimization on Highly Parallel Computing Architectures. *Journal of Spacecraft and Rockets*, 54(5):1081-1091, 2017.
- [2] T. Antony and M. J. Grant. Quasilinear Chebyshev-Picard Iteration Method for Indirect Trajectory Optimization. In *AIAA Atmospheric Flight Mechanics Conference*, 2019.
- [3] M. J. Grant and T. Antony. Rapid Indirect Trajectory Optimization of a Hypothetical Long Range Weapon System. In *AIAA Atmospheric Flight Mechanics Conference*, 2016.