





# Ross B. Alexander

## CONTACT INFORMATION

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## RESEARCH OBJECTIVES

Graduate research is focused on statistical machine learning, reinforcement learning, decision theory, autonomous driving, and human-centered autonomous systems.

## EDUCATION

**Ph.D. Aeronautics & Astronautics**, Stanford University **06/2024**  
Advisor: Mykel Kochenderfer, Ph.D.  
*Supported by 3-year Stanford Graduate Fellowship in Science & Engineering (SGF)*  
**M.S. Aeronautics & Astronautics**, Stanford University **06/2021**  
**B.S. Aerospace Engineering** (Honors), Texas A&M University **05/2019**

## ACADEMIC EXPERIENCE

**Graduate Researcher** **03/2020 – Present**  
Stanford Intelligent Systems Lab (SISL), Stanford University  
**Decomposition Methods for Object Detection on Occluded Sidewalk** **03/2020 – Present**  
PIs – Mykel Kochenderfer, Ph.D. (Stanford)  
Umair Ibrahim (Ford Motor Company)  
Supervisor – Ransalu Senanayake, Ph.D. (Stanford)  
**Adaptive Intervention Strategies for Control of Epidemics on Graphs** **06/2020 – Present**  
PIs – Mykel Kochenderfer, Ph.D. (Stanford)  
Rajmonda Caceres, Ph.D. (MIT Lincoln Laboratory)

## TEACHING EXPERIENCE

*Stanford Pre-Collegiate Studies (SPCS)*  
**Numerical Simulation**, Instructor **August 2021**  
Two-week undergraduate-level course for 11th-12th graders that covers efficient computational methods for solving mathematical equations with a high degree of precision. Topics include function evaluation, interpolation, extrapolation, regression; solution of linear and nonlinear algebraic equations; numerical optimization, differentiation, and integration; solution of differential equations and eigenvalue problems; simulation of real-world dynamical systems.  
**Artificial Intelligence**, Instructor **June 2020, August 2020, June 2021**  
Two-week undergraduate-level course for 11th-12th graders that provides an overview of modern artificial intelligence; development of mathematical and programming proficiency in machine learning and optimization, including supervised learning, unsupervised learning, and reinforcement learning algorithms.  
*Eduexplora*  
**Artificial Intelligence**, Instructor **January 2021**  
Two-week survey course for 7th-9th graders that provides an overview of artificial intelligence; understanding the core concepts of AI: perception, representation & reasoning, learning, natural interaction, and societal impact; recognizing AI in their daily lives; investigating high-level unsupervised and supervised learning algorithms; critical thinking about fairness, bias, and ethics in AI.

## *Stanford University*

**Decision Making Under Uncertainty** (AA 228/CS 238), Teaching Assistant **Autumn 2020**  
Techniques for decision making under uncertainty and overview of necessary tools for building autonomous and decision-support systems; computational methods for solving

decision problems with stochastic dynamics, model uncertainty, and imperfect state information; Bayesian networks, influence diagrams, dynamic programming, reinforcement learning, and partially observable Markov decision processes (POMDPs).

*Texas A&M University*

**Advanced Numerical Simulation** (AERO 430), Teaching Assistant **Fall 2018, Spring 2018-2019**

Numerical and analytical simulation of physical problems in sciences and engineering using applied methods; developing and using numerical techniques for physical problems described by nonlinear algebraic equations, ordinary and partial differential equations.

**Engineering Mathematics II** (MATH 152), Teaching Assistant **Spring 2017**

Differentiation and integration techniques and their applications (area, volumes, work), improper integrals, approximate integration, analytic geometry, vectors, infinite series, power series, Taylor series, computer algebra.

**Engineering Mathematics** (ENGR 289), Teaching Assistant **Fall 2016**

Study of functions, graphs of polynomial and rational functions, radical functions, exponential and logarithmic functions, inequalities, trigonometric functions, fundamental identities, right triangles, trigonometric equations.

PROFESSIONAL  
EXPERIENCE

**Machine Learning & Simulation Intern** **05/2019 – 08/2019**

CFD Research Corporation, Huntsville, AL

**Hypersonics Intern** **05/2018 – 08/2018**

CFD Research Corporation, Huntsville, AL

**Computational Analyst Intern** **05/2017 – 08/2017**

Corvid Technologies, Mooresville, NC

HONORS & AWARDS

*Stanford University*

**Stanford Graduate Fellowship in Science & Engineering (SGF)** (2019-2022)

*Texas A&M University*

**Dean's Honor Roll** (Spring 2016, Fall 2016, Spring 2017, Spring 2018, Fall 2018)

**Larry J. McQuien '76 "Take Flight" Award** (2018-2019)

**Donna and Dub Jett '68 Aerospace Engineering Scholar** (2017-2018)

**Hugh G. Robinson Endowed Opportunity Award** (2015-2019)

**Mildred & Willy F. Bohlmann, Jr. '50 President's Endowed Scholar** (2015-2019)

*Other Awards*

**General James H. Doolittle Scholar** (05/2019), Communities Foundation of Texas (CFT)

**Charles Hoult Award for Modeling & Simulation** (06/2017), Experimental Sounding Rocketry Assoc.


**Eagle Scout** (08/2014), Boy Scouts of America

SKILLS

**Languages** – Proficient in Julia, Python, MATLAB, Bash, LaTeX.

**Operating Systems** – Proficient in macOS, Linux/Unix, Windows.

PRE-PRINT  
PUBLICATIONS

1.  A. L. Kaminsky, **R. B. Alexander**, S. H. Hong, Y. Wang, K. Pant, K. Flynn, and R. Thompson, "A surrogate-assisted genetic algorithm for design of guided weapons with stochastic Monte Carlo evaluation," to appear in AIAA SciTech Conference, 2021.

PUBLICATIONS  
(UNREFEREED)

6. [!\[\]\(0551a83d441798e532995956b603f604\_img.jpg\)](#) **R. B. Alexander**, "Active learning for efficiently constructing surrogate models," final project for CS 361: Engineering Design Optimization graduate course at Stanford University, 2020.
5. [!\[\]\(54ee180c0037b66a36ce2219a481afde\_img.jpg\)](#) **R. B. Alexander** and J. S. Ling, "Multi-segment dynamic pricing for airline tickets using model-free reinforcement learning," final project for CS 238: Decision Making Under Uncertainty graduate course at Stanford University, 2019.
4. [!\[\]\(73ae654e8897db9b21f1bf9d9efc07ef\_img.jpg\)](#) **R. B. Alexander** and A. L. Kaminsky, "Optimization of guided weapon designs with a stochastic objective function using a genetic algorithm," report produced for CFD Research Corporation during summer internship, 2019.
3. [!\[\]\(278ecf8622de254ce2917d264729f4b0\_img.jpg\)](#) **R. B. Alexander**, J. M. Caesar, R. C. Doddanavar, and J. Q. Doll, "Integrated flight modeling: trajectory analysis and hybrid engine performance," in Spaceport America Cup Conference, 2018.
2. [!\[\]\(3b5d74d5eba68301b1a5c22417b6b52c\_img.jpg\)](#) **R. B. Alexander**, "Correlation study of CFD turbulence modeling approaches for an axisymmetric missile concept," report produced for Corvid Technologies during summer internship, 2017.
1. [!\[\]\(95826e66cf958c3135662f918c38faf5\_img.jpg\)](#) **R. B. Alexander**, "CFD analysis and optimization of flow deflector geometry for a supersonic free jet," in Spaceport America Cup Conference, 2017.

PRESENTATIONS

4. *Integrated Flight Modeling: Trajectory Analysis and Hybrid Engine Performance*, 2019 Texas A&M University Student Research Symposium, College Station, TX, March 2019
3. *Design, Development, and Testing of a Hybrid Sounding Rocket*, Southwest Aerospace Symposium (AIAA North Texas Chapter), Arlington, TX, September 2018
2. *Integrated Flight Modeling: Trajectory Analysis and Hybrid Engine Performance*, 2018 Spaceport America Cup Conference, Las Cruces, NM, June 2018
1. *CFD Analysis and Optimization of Flow Deflector Geometry for a Supersonic Free Jet*, 2017 Spaceport America Cup Conference, Las Cruces, NM, June 2017

PROFESSIONAL  
SERVICE

**Journal referee**

**IEEE RA-L**, IEEE Robotics & Automation Letters

**2020 – Present**

**JAIR**, Journal of Artificial Intelligence Research

**2020 – Present**

**Member**, Association for the Advancement of Artificial Intelligence (AAAI)

**2019 – Present**

**Member**, Institute of Electrical and Electronics Engineers (IEEE)

**2019 – Present**

**Member**, American Institute of Aeronautics and Astronautics (AIAA)

**2018 – Present**