Anthony Carreón

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EDUCATION

Ph.D. Candidate in Aerospace Engineering | Rackham Merit Fellow Aug 2021 – Present
University of Michigan, Ann Arbor | Advisor: Venkat Raman | GPA: 3.80 / 4.00
Data Driven Modeling, Statistical Estimation/Inferencing/Learning, Computational Fluid Dynamics, Compressible Flow, Turbulence

B.S. in Computational Engineering Aug 2016 – May 2020
University of Texas at Austin | Advisor: David B. Goldstein | GPA: 3.66 / 4.00
Stochastic Processes, Software Engineering and Design, Scientific Programming, Applied Thermodynamics, Structural Analysis

SKILLS

AI & Statistics | LLMs, Generative Modeling, Agentic AI Orchestration, Bayesian modeling, Statistical Estimation Methods
Engineering & Science | CFD, Kinetics, Hydrogen Safety, HPC, Scientific Computing, Radiative Heat Transfer
Programming & Tools | Pydantic AI, PyTorch, CUDA, AMReX, OpenMPI, Python, C++, MATLAB
Human Skills | Mentorship, Outreach, Public Speaking, Science Communication, English, Spanish

RESEARCH EXPERIENCE

Senior PhD Researcher | Advanced Propulsion Concepts Laboratory Aug 2021 – Present
Ann Arbor, Michigan, USA

Build AI and HPC tools to accelerate simulation, analysis, and optimization of complex combustion and energy systems, including generative combustor flame models, multi-fidelity hydrogen dispersion prediction, GPU-based CFD optimization, and AI agent orchestration for systems optimization.

Visiting Researcher | Macquarie University School of Engineering Jul 2023 – Aug 2023
Sydney, Australia

Investigated rapid prediction of hydrogen leakage using Bayesian-based machine learning on assimilated experimental and simulation data.

Research Assistant | NASA Jet Propulsion Lab & UT Computational Fluid Physics Lab Dec 2018 – Jun 2021
Pasadena, California, USA

Investigated ice morphology on the surface of Europa and other icy moons by developing Monte Carlo simulation models; Collaborated with experimental and computational teams to predict a smooth Europa surface.

PUBLICATIONS

(2026) Automated Design Optimization via Strategic Search with Large Language Models (link)
Anthony Carreon, Vansh Sharma, Venkat Raman | Int 'l Journal of Supercomputing: AI Section (under review)

(2026) A GPU-based Compressible Combustion Solver for Apps. Exhibiting Disparate Space and Time Scales (link)
Anthony Carreon, Jagmohan Singh, Shivank Sharma, Shuzhi Zhang, Venkat Raman | Int'l. J. of High Performance Computing (under review)

(2025) GPU Performance Modeling and Assessment of High-Speed Combustion Simulations Using AMR (link)
Anthony Carreon, Shuzhi Zhang, Shivank Sharma, Jagmohan Singh, Venkat Raman | AIAA SciTech Forum

(2024) Bayesian Inference of Light-Gas Dispersion from Multi-Fidelity Data (link)
Anthony Carreon, Hengrui Liu, Fatemeh Salehi, Venkat Raman | International Journal of Hydrogen Energy

(2023) Simulating Heat Transfer in Multi-scatter Irregular Surfaces: Apps. to Snow & Ice Morphologies on Europa (link)
Anthony Carreon, Antonio Macias, Kevin P. Hand, David Goldstein, et al. | Journal of Geophysical Research: Planets

(2023) A GAN Approach to Creating Synthetic Flame Images from Experimental Data (link)
Anthony Carreon, Shivam Barwey, and Venkat Raman | Energy and AI

(2023) Molecular Transport Conditions Required for the Formation of Penitentes on Airless, Ice-covered Worlds (link)
Antonio Macias, Anthony Carreon, Kevin P. Hand, David Goldstein, et al. | Journal of Geophysical Research: Planets

TRAINING & WORKSHOPS

Argonne Training Program on Extreme-Scale Computing Aug 2024

Saint Charles, Illinois, USA

Intensive training in HPC systems and exascale architectures; advanced expertise in parallel programming, numerical algorithms, and big data applications.

Princeton Combustion Institute Summer School Jun 2022

Princeton, New Jersey, USA

Advanced training in combustion theory, experimental methods, and computational approaches focused on fundamental combustion processes and sustainable energy.

OUTREACH & VOLUNTEERING

Featured Alumni Speaker | AVID National Conference (NatCon) Dec 2025

San Diego, California, USA

Featured as a contributing alumnus in Not By Chance, AVID's alumni book; spoke with K-12 educators on how AVID's college-readiness framework shapes trajectories of first-generation STEM students.

Member | Society of Hispanic Professional Engineers (SHPE) Aug 2021 – Present

Various Locations

Active member contributing to Hispanic/Latinx representation in STEM through community building, professional development, and youth outreach.

Teaching Assistant | Social Data Science Summer Academy Aug 2024

Ann Arbor, Michigan, USA

Supported students in Python and R for image classification and unsupervised learning in a computational methods workshop for political science.

Mentor | Bryant Community Center (BCC) Aug 2022 – Dec 2023

Ann Arbor, Michigan, USA

Mentored K-12 students from under-resourced communities through after-school programs, providing academic support and fostering a nurturing learning environment.

TALKS & PRESENTATIONS

AUTO: An Agentic Framework for Systems Design and Optimization | Affinity Event Presentation
Latinx Research Week · Ann Arbor, Michigan, USA · Feb 2026

Can AI Function as a Virtual Combustion Researcher? | Conference Presentation
International Conference on Numerical Combustion · Rome, Italy · Oct 2025

From AVID to NASA: A Journey through the Wonders of Science and Computing | Invited Outreach Talk
Lewisville High School · Lewisville, Texas, USA · Feb 2025

GPU Performance Modeling and Assessment of High-Speed Combustion Simulations Using AMR | Conference Presentation
AIAA SciTech Forum · Orlando, Florida, USA · Jan 2025

Generative Adversarial Networks (GANs): A Hands-On Tutorial | Invited Talk
Michigan Institute for Data and AI in Society · Ann Arbor, Michigan, USA · Oct 2023

A GAN Approach to Creating Synthetic Flame Images from Experimental Data | Conference Presentation
12th Mediterranean Combustion Symposium · Luxor, Egypt · Jan 2023

Generation of Realistic Flow Field Data from Experiments using GANs | Poster Presentation
Dept. of Aerospace Engineering Homecoming Research Showcase · Ann Arbor, Michigan, USA · Sep 2022