

EDUCATION

- 02/2023– **Ph.D., Computational Science and Engineering**
Massachusetts Institute of Technology (MIT) - Cambridge, MA
Thesis: Stochastic integration for forward analysis of linearized chaotic dynamical systems
Advisor: David Darmofal
Funding: Department of Energy Computational Science Graduate Fellowship
- 09/2021–02/2023 **M.Sc., Aeronautics and Astronautics**
Massachusetts Institute of Technology (MIT) - Cambridge, MA
Thesis: [Assessment of wall-modeled large-eddy simulation for high-speed flows and novel modeling strategies](#)
Advisor: Adrián Lozano-Durán
Funding: Research Assistantship (MIT)
GPA: 5.00/5.00
- 08/2017–05/2021 **B.Sc., Aerospace Engineering**
University of Illinois Urbana-Champaign (UIUC) - Urbana, IL
Minor: Atmospheric Sciences
GPA: 3.94/4.00

RESEARCH EXPERIENCE

- 02/2023– **Department of Energy Computational Science Graduate Fellow, MIT**
Project: Discontinuous Galerkin method for the stochastic Lorenz attractor
Supervisor: David Darmofal, Darmofal Research Group
Implementing implicit and explicit time-stepping methods for deterministic and stochastic Lorenz attractors discretized using the discontinuous Galerkin method.
- 08/2022–02/2023 **Department of Energy Computational Science Graduate Fellow, MIT**
Project: Wall-modeled large-eddy simulation for supersonic aircraft
Supervisor: Adrián Lozano-Durán, Computational Turbulence Group
Performed novel wall-modeled large-eddy simulation of the Lockheed Martin X-59 QueSST with error convergence analysis and computational cost estimates.
Presented work at the American Physical Society Division of Fluid Dynamics 2022.
- 06/2021–06/2022 **Graduate Research Assistant, MIT**
Project: Error quantification and reduction for wall-modeled large-eddy simulation
Supervisor: Adrián Lozano-Durán, Computational Turbulence Group
Performed WMLES of high-speed turbulent channel flow and assessed error scaling properties with Mach number, Reynolds number, and grid resolution.
Implemented novel subgrid-scale model based on information-preserving principles

to improve mean profile predictions.

Presented work at the AIAA Aviation Forum 2022 and the American Physical Society Division of Fluid Dynamics 2021.

06/2020–05/2021 **Undergraduate Research Assistant, UIUC**

Project: Immersed boundary smooth extension method for Poisson problem

Supervisor: Andrés Goza, Numerics and Unsteady Flows Group

Investigated the use of higher-order methods for fluid-thermal-structure interaction problems.

01/2020–05/2021 **Undergraduate Research Assistant, UIUC**

Project: Fitting potential energy surfaces to acquire chemical reaction rates for hypersonic reentry systems

Supervisor: Marco Panesi, Center for Hypersonics and Entry Systems Studies

Used novel optimization techniques for understanding chemical reactions of hypersonic reentry systems.

Presented work at the UIUC Undergraduate Research Symposium 2021.

TEACHING EXPERIENCE

01/2019–05/2021 **Head Engineering Learning Assistant, UIUC**

Course: ENG 100 - Engineering Orientation

Supervisor: Gretchen Forman, Grainger First-Year Experience

Managed all ENG 100 course activities for the college while providing direction, guidance, and mentorship to two sections of 20+ first-year aerospace students.

01/2020–05/2020 **Course Developer and Instructor, UIUC**

Course: AE 199 - Introduction to CubeSat Design & Development

Supervisor: Laura Gerhold, Department of Aerospace Engineering

Created and instructed engineering technical elective course in satellite development for 25+ undergraduate students.

01/2020–05/2021 **Teaching Assistant, UIUC**

Course: ENG 177 - Grainger First-Year Experience Leadership Scholars

Supervisor: Angie Wolters, Grainger First-Year Experience

Restructured and taught engineering elective course to 25+ first-year students to introduce leadership opportunities on campus.

08/2018–05/2021 **Course Assistant, UIUC**

Course: CS 101 - Introduction to Programming for Engineers

Supervisor: Neal Davis, Department of Computer Science

Guided 100+ freshmen engineering students through introductory-level technical course while leading multiple laboratory sessions and office hours.

08/2019–05/2021 **Lead Tutor, UIUC**

Location: Center for Academic Resources in Engineering

Supervisor: Dana Tempel, Center for Academic Resources in Engineering

Developed improved curriculum and led exam review sessions while also leading in recruitment efforts and adjustments to COVID-19 while still providing academic assistance to all engineering undergraduate students.

01/2020–05/2021 **Cohort Lead, UIUC**

Location: Illinois Leadership Center (ILC)

Served as mentor to first-year students completing the Leadership Certificate.

SELECTED PUBLICATIONS

Papers

1. **Williams, E.**, Lozano-Durán, A., “Information-Theoretic Approach for Subgrid-Scale Modeling for High-Speed Compressible Wall Turbulence,” AIAA Aviation Forum, June 2022.

Presentations

1. **Williams, E.**, Arranz, G., and Lozano-Durán, A., “Wall-Modeled Large-Eddy Simulation of the Lockheed Martin X-59 QueSST,” American Physical Society Division of Fluid Dynamics, November 2022.
2. **Williams, E.**, Lozano-Durán, A., “Error Scaling of Wall-Modeled Large-Eddy Simulation of Compressible Wall Turbulence,” American Physical Society Division of Fluid Dynamics, November 2021.

Posters

1. **Williams, E.**, Ling, Y., Arranz, G., and Lozano-Durán, A., “Numerical Schlieren of the X-59 QueSST,” American Physical Society Division of Fluid Dynamics Gallery of Fluid Motion, November 2021.
2. **Williams, E.**, Sharma, M.P., Venturi, S., and Panesi, M., “Relation of Dissociation Rates to the Centrifugal Barrier,” University of Illinois Undergraduate Research Symposium, April 2020.

Thesis

1. **Williams, E.**, “Assessment of wall-modeled large-eddy simulation for high-speed flows and novel modeling strategies,” Master’s thesis, Massachusetts Institute of Technology, June 2023.

COMMUNITY INVOLVEMENT

01/2022–12/2022 **President**

Organization: Graduate Women in Aerospace Engineering, MIT

Led in diversity, inclusion, and equity efforts and assisted in planning and executing multiple department-wide events for graduate students.

Nominated and received Vickie Kerrebrock Award in first year for departmental leadership and advocacy.

- 08/2021–05/2022 **Social Committee Chair**
 Organization: Aerospace Computational Design Laboratory, MIT
 Planned and executed multiple social events for all lab members.
- 08/2017–05/2021 **President**
 Organization: Women in Aerospace, UIUC
 Planned multiple professional development conferences and expanded executive board to focus on fundraising, outreach, and networking.
 Nominated and received Dale Margerum Memorial Award for exemplifying outstanding leadership qualities.

HONORS & AWARDS

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| Jan 2023 | AIAA New England Community Award, MIT. |
| May 2022 | Vickie Kerrebrock Award, MIT. |
| Apr 2022 | DOE Computational Science Graduate Fellowship (CSGF). |
| Apr 2022 | NSF Graduate Research Fellowship Program (GRFP) - Declined. |
| Apr 2022 | DOD NDSEG Fellowship - Declined. |
| Jan 2022 | Gardner Fellowship, MIT. |
| Oct 2021 | AIAA Aviation Week Network 20 Twenties, UIUC. |
| May 2021 | University of Illinois Dean's List. |
| May 2021 | James Scholar Honors Program, UIUC. |
| Mar 2021 | Grainger Engineering Knight of St. Patrick, UIUC. |
| Mar 2021 | University of Illinois Tutor of the Year. |
| Mar 2021 | University of Illinois Senior 100 Honorary. |
| Mar 2021 | NSF Graduate Research Fellowship Program (GRFP) - Honorable Mention. |
| Oct 2020 | Scott R. White Aerospace Engineering Visionary Scholarship, UIUC. |
| Mar 2020 | Dale Margerum Memorial Award, UIUC. |
| Mar 2020 | Philip Lazzara Memorial Scholarship, UIUC. |
| Oct 2018 | Boeing Women in Engineering Scholarship, UIUC. |
| Oct 2018 | Illinois Space Grant Consortium (ISGC) Scholarship, UIUC. |
| Oct 2018 | GE Women's Network Scholarship, UIUC. |
| Mar 2018 | Aerospace Department Academic Scholarship, UIUC. |
| Mar 2018 | Ruth and Harold Hayward Tau Beta Pi Scholarship, UIUC. |

Mar 2018	H. S. Stillwell Memorial Scholarship, UIUC.
Aug 2017	Illinois Engineering Achievement Scholarship, UIUC.
Aug 2017	Turley Engineering Scholarship, UIUC.
Aug 2017	MSCI Central States Chapter Scholarship.

May 5, 2023