EMILY WILLIAMS

emilyjw2@illinois.edu emlyjwllms.github.io emlyjwllms

EDUCATION

Massachusetts Institute of Technology Start Sept 2021
Doctor of Philosophy in Aeronautics and Astronautics

University of Illinois at Urbana-Champaign Aug 2017 - May 2021
Bachelor of Science in Aerospace Engineering GPA: 3.95 / 4.00
Minor in Atmospheric Sciences, Concentration in Computational Science and Engineering

RESEARCH EXPERIENCE

ALD Research Group Start Fall 2021
Advisor: Adrián Lozano-Durán, PhD Cambridge, MA

Numerics and Unsteady Flows (NUF) Group Summer 2020 – Spring 2021
Advisor: Andres Goza, PhD Champaign, IL

- Developed robust and efficient computational tools for simulating and analyzing fluid-structure interaction systems with a focus on viscous, incompressible Navier Stokes equations
- Optimized current time stepping algorithm into a higher order method using immersed boundary smooth extension method, employing the one-dimensional Poisson problem as a test case for verification
- Explored parallel applications with extended forcing made to result in a continuous derivative solution at the boundaries of the physical domain of the fluid-structure interface
- Developed algorithm script in both MATLAB and Python, while also providing typed up documentation outlining theory and implementation details

Center for Hypersonics & Entry Systems Studies (CHESS) Spring 2020 – Spring 2021
Advisor: Marco Panesi, PhD Champaign, IL

- Used TensorFlow neural networks to fit 3D potential energy surfaces to acquire the reaction rates of the hydrogen cyanide (HCN) system
- Employed optimization and regularization techniques on permutationally invariant polynomials with uncertainty quantification to determine the accuracy required on the diatomic potential fits
- Fit the kinetics data of hypersonic re-entry flight using sparse regression techniques to obtain an expression for the state-to-state dissociation rates in terms of the position of the centrifugal barrier
- Modeled the reactions that take place in the flow by selecting a large basis set of functions that include exponentials and polynomials motivated by derivations from transition state theory
- First recipient of the Scott R. White Aerospace Engineering Visionary Scholarship, awarded to an outstanding aerospace engineering undergraduate who excelled in undergraduate research
- Selected to present at the Undergraduate Research Symposium at the University of Illinois in April 2020

TEACHING EXPERIENCE

Head Engineering Learning Assistant Spring 2019 – Spring 2021
ENG 100: Engineering Orientation Champaign, IL

- Instructed and facilitated two ENG 100 sections of 20+ first-year aerospace undergraduate students each
- Provided direction, guidance, and mentorship to students in introductory engineering course
- Oversaw all Engineering Learning Assistants and ENG 100 course activities for all 11 departments within The Grainger College of Engineering as Head Engineering Learning Assistant

- Developed and restructured course lesson guides to better match overall objectives of orientation class in hybrid learning model, including implementing new student portal for registered student organizations
- Ranked “Outstanding" on Fall 2019 “List of Teachers Ranked as Excellent By Their Students" by the Center for Innovation in Teaching and Learning

Course Developer & Instructor
Spring 2020

AE 199 SAT: Introduction to CubeSat Design & Development — Champaign, IL

- Created and taught new engineering course to introduce 25+ underclassmen to satellite development research opportunities on campus
- Wrote and instructed course curriculum, including interactive coding projects and group presentations
- Provided an introduction to technical competencies in Python and LaTeX while serving as a prerequisite to ENG 491: CubeSat 1

Course Developer & Teaching Assistant
Spring 2020 – Spring 2021

ENG 177: Grainger Engineering First-Year Experience (GFX) Leadership Scholars — Champaign, IL

- Optimized and taught course to introduce 25+ first-year students to leadership opportunities on campus
- Provided a forum for strengthening leadership skills for underrepresented minorities in engineering
- Led in restructuring course to include built-in discussion time during scheduled lectures, leading to a more worthwhile and productive experience for enrolled students

PROFESSIONAL EXPERIENCE

The Boeing Company
Summer 2020

Space Electronics Product Design Automation Intern — El Segundo, CA (Remote)

- Worked virtually in digital and array electronics product design for the Boeing Satellite Development Center headquartered in El Segundo, CA, under Boeing Defense, Space & Security (BDS)
- Optimized component object model (COM) automation process by interfacing between integrated printed circuit board (iPCB) layout application and ANSYS for thermal analysis using Visual Basic Script (VBS)
- Developed new baseline workflow model for streamlining database curation of thermal parameters for product design and testing
- Hired through the Engineering Accelerated Hiring Initiative (EAHI) program

GE Aviation
Summer 2018

Product Operations Intern — Cincinnati, OH

- Executed technical solutions with cross-functional global teams in time-sensitive cases involving changes in design with FARO arm elimination and forward fan shaft
- Reallocated 300+ GEnx 1B booster fan blades in spares inventory to usable parts kitted for application on the assembly line, expediting the development of 20 affected engines
- Orchestrated joint GE-customer tour at the Delta Technical Operations facility at their airport hub in Cincinnati accommodating 50+ co-ops
- Implemented program for tracking forecasted commits across multiple product lines to proactively address maintenance repair and overhaul (MRO) issues with executive team
- Hired through the Early Identification (EID) program

CAMPUS INVOLVEMENT

Lead Tutor
Fall 2019 – Spring 2021

Center for Academic Resources in Engineering — Champaign, IL

- Developed curriculum and led exam review sessions and tutoring hours for undergraduate students throughout The Grainger College of Engineering

- Led recruitment efforts for new tutors and administration logistics for walk-in tutoring and interactive portal used to streamline communication throughout the Center for Academic Resources in Engineering

Women in Aerospace

Fall 2017 – Spring 2021

Department of Aerospace Engineering

Champaign, IL

- Created Departmental Development Committee of 6 representatives to improve female retention rate by coordinating outreach events with prominent women in engineering and industry leaders
- Collaborated with Aerospace Undergraduate Advisory Board of 8 to execute social mixers and other department-wide fundraising events while overseeing 5 standing committees
- Planned and executed week-long professional development trips and conferences for executive board members and overall membership of 40+
- Expanded executive board from 5 to 10+, creating new positions to focus on fundraising, outreach, and professional endeavors
- Nominated by faculty committee of the department to receive the Dale Margerum Memorial Award, given to an aerospace engineering undergraduate who exemplifies outstanding leadership qualities by participation in departmental extracurricular activities

PROFESSIONAL AFFILIATIONS

Tau Beta Pi Engineering Honor Society	2019
Women of Aeronautics and Astronautics	2019
Space and Satellite Professionals International	2018
Order of Omega Greek Leadership Honor Society	2018
Alpha Omega Epsilon Engineering Sorority	2017
American Institute of Aeronautics and Astronautics	2017
Society of Women Engineers	2017
Women in Aerospace	2017

POSTERS & PRESENTATIONS

Williams, E., Sharma, M.P., Venturi, S., and Panesi, M, “Relation of Dissociation Rates to the Centrifugal Barrier," Undergraduate Research Symposium (URS), University of Illinois at Urbana-Champaign, April 2020.

HONORS & AWARDS

Grainger Engineering James Scholar Honors Program	2017 - Present
University of Illinois Dean’s List	2017 - Present
NSF GRFP Honorable Mention	2021
Scott R. White Aerospace Engineering Visionary Scholarship	2020
Dale Margerum Memorial Award	2020
Philip Lazzara Memorial Scholarship	2020
Boeing Women in Engineering Scholarship	2018
Illinois Space Grant (ISGC) Scholarship	2018
GE Women’s Network Scholarship	2018
Department of Aerospace Engineering Academic Scholarship	2018
Harold and Ruth Hayward/Tau Beta Pi Scholarship	2018
College of Engineering Scholarship for Continuing Students	2018
H.S. Stillwell Memorial Scholarship	2018
Illinois Engineering Achievement Scholarship	2017
Margorie M. Voigt Turley and William H. Turley Scholarship	2017
MSCI Central States Chapter Scholarship	2017