

Henry Varona

hvarona2@illinois.edu

EDUCATION

University of Illinois at Urbana-Champaign Grainger College of Engineering, Urbana-Champaign, IL

PhD in Aerospace Engineering

TBD

Advisor: Professor Francesco Panerai

GPA: 4.00

Boston University College of Engineering, Boston, MA

Bachelor of Science in Mechanical Engineering with a Concentration in Aerospace Engineering

May 2019

GPA: 3.37

Dean's List: Fall 2016, Fall 2017, Spring 2019

RESEARCH INTERESTS

My primary areas of research interest are in high-speed fluid mechanics, fluid-material/fluid-surface interactions, and gas flow through porous media

ACADEMIC EXPERIENCE

Graduate Research Assistant, Center for Exascale-enabled Scramjet Design, University of Illinois at Urbana-Champaign, Urbana-Champaign, IL

Fall 2020-Present

- Investigating phenomena relevant to scramjet combustion environments experimentally to inform computational modeling abilities and contribute to the technological readiness of these systems
- Focusing on decoupling thermo-chemical loading with species of interest for scramjet combustion as well as thermo-mechanical loading on candidate thermal management materials to model candidate material response as it interacts with high-temperature gas flows

Graduate Research Assistant, Center for Hypersonic and Entry System Studies, University of Illinois at Urbana-Champaign, Urbana-Champaign, IL

Fall 2019-Present

- Looking at the material response of thermal protection systems to hypersonic flows, specifically for application in atmospheric entry vehicles
- Focusing on entry into high hydrocarbon/hydrogen atmospheric conditions

Research Engineer, BU Space Physics and Technology Lab, Boston University, Boston MA

Summer 2019

- Curriculum and experiment development for a new course at BU: *ENG EK 131 - Introduction to Rocket Science*
- Developed procedures, designed and tested experiments, and worked with the professor to enable the course goals
- Assisted in other ongoing group projects

Research Assistant, Fluid Lab, BU College of Engineering, Boston MA

January 2018 - Summer 2019

- Studied droplet dynamics from bursting bubbles with a neighboring bubble in order to determine if there were effects on the droplet behaviors
- Performed the experimental data collection using high-speed videography, analysis using various image analysis methods, and worked to develop mathematical and mechanical models to explain the observed behavior
- Participated in training and transferring projects to an incoming undergraduate student as well as worked on experiments on a volunteer basis during the summer of 2019
- *Dynamics of Jet Drop Formation in Multi-Bubble Systems*: presented as a poster at the BU Undergraduate Research Opportunities Program symposium and as an oral presentation at the APS 2019 March meeting

Grader, Engineering Mechanics 1: Statics, BU College of Engineering

Fall 2017

FUNDING AND AWARDS

Graduate Assistance in Areas of National Need Fellowship

Academic Years 2019-2020 and 2020 - 2021

APS March Meeting: Outstanding Presentation Award and Top Presenter Award

March 2019

BU Undergraduate Research Opportunities Program Student Research Award

Fall 2018

BU Undergraduate Research Opportunities Program Faculty Matching Grant

Summer 2018

BU Engineering Summer Term Alumni Research Scholars Program

Summer 2018

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SKILLS

Characterization Methods: High-speed Videography, Oil Flow Visualization, Schlieren Photography, Laser Doppler Velocimetry, Computer Tomography, Mechanical Loading Systems, Scanning Electron Microscopy, Nano-indentation

Manufacturing: Milling, Turning, CNC Machining (GibbsCAM)

Programming: Python, MATLAB, C

Operating Systems: Windows, Linux (Ubuntu)

Other: LaTeX, Effective Communication to Broad Audiences, German (Conversational)

LEADERSHIP & AFFILIATIONS

Lead Engineering Ambassador, BU College of Engineering

BU Rocket Propulsion Group

AIAA @ BU

BU Astronomical Society

American Physical Society

AIAA @ University of Illinois at Urbana-Champaign

AIAA

Spring 2016 - Summer 2019

Spring 2017 - Spring 2019

Fall 2018 - Summer 2019

Fall 2018 - Spring 2019

Fall 2018 - Present

Fall 2019 - Present

Spring 2021 - Present

SELECTED PROJECTS

Low Altitude Demonstrator Rocket, BU Rocket Propulsion Group

Spring 2018

Responsible Engineer: Structures and Manufacturing

- A large solid fuel rocket designed to demonstrate control and recovery capabilities
- Lead engineer responsible for the structures and the manufacturing teams with an emphasis on design responsibilities, organization of project logistics, and assisting team members with their responsibilities
- Led BURPG's manufacturing education program teaching manufacturing methods for continuity of knowledge

GSE Horizontal Test Environment, BU Rocket Propulsion Group

Fall 2017

Lead Assembly Engineer

- Rapidly deployable Ground Support Equipment used to test BURPG's liquid rocket engine
- Led a team in manufacturing using CNC machining and GibbsCAM and assembly