Abigail Andy Hammer

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Education

May 2029	**Ph.D. in Software Engineering**, *Carnegie Mellon University* Advised by Dr. Eunsuk Kang
May 2023	**B.S in Aerospace Engineering**, *Iowa State University* Minor in Computer Science *Magna Cum Laude;* GPA: 3.73/4.00 Research Advisor: Kristin Y. Rozier University Honors Program
May 2018	**High School Diploma** Pleasant Valley High School GPA: 4.37; Graduated with Honors

Research Experiences and Internships

2023 – **Graduate Research Assistant** *Carnegie Mellon University, Pittsburgh, PA*

- Verified security of multi-party computation protocols against multiple threat models
- Surveyed open-source multi-party computation libraries to analyze deployment configuration parameters

2022 – 2023 **Software Development Intern** *Collins Aerospace, Cedar Rapids, Iowa*

- Programmed and debugged different avionics programs according to requirements
- Detailed high level requirements according to customers' needs to create benchmarks
- Created test procedures to ensure programs and verify systems met required benchmarks
- Effectively communicated with coworkers to complete tasks and satisfy customer needs

2018 – 2023 **Undergraduate Research Assistant** *Dr. K.Y. Rozier, Iowa State University*

- Researched Formal Methods applications for Unmanned Aerial Systems
- Co-authored industrial case-study on specification implementation for a UAS Traffic Manager
- Lead research project on specification patterns and generation
- Lead research project on exploitation of patterns for algorithm optimization

May – July '21 **NASA Intern** *NASA, Ames Research Center, California*

- Debugged and located security and memory errors in advanced programs
- Integrated static analyzer into flight software for a core flight system
- Created trouble shooting guide to allow following programmers easy use of integrated tool
- Analyzed compiler output and verified program success

Grants and Awards

- National Science Foundation, Graduate Research Fellowship, *2025–2029*
- Boeing Undergraduate Research Fellowship, *2021–2022*
- NASA Iowa Space Grant Consortium Undergraduate Research Scholarship, *2021–2022*
- Dean's List, *2018–2019, 2021–2022*
- Cardinal Leadership Scholar I, *2018–2022*
- President's ACE, *2018–022*

Research Publications

1 **Abigail Hammer**, Changjian Zhang, Vick Dini, Ryan Wagner, Bradley Schmerl, Eunsuk Kang, and David Garlan. "Resilience of Systems Under Maximum Component Deviations". In: Software Engineering and Formal Methods. SEFM 2025. Lecture Notes in Computer Science, volume TBA. Toledo, Spain, November 10–14, 2025.

2 **Abigail Hammer**, Matthew Cauwels, Benjamin Hertz, Phillip Jones, and Kristin Yvonne Rozier."Integrating Runtime Verification into a Automated UAS Traffic Management System". In the 7th IEEE International Symposium on Systems Engineering, volume 18, Vienna, Austria, September 13–15, 2021.

3 Matthew Cauwels, **Abigail Hammer**, Benjamin Hertz, Phillip Jones and Kristin Yvonne Rozier. "Integrating Runtime Verification into an Automated UAS Traffic Management System". In Proceedings of DETECT: international workshop on moDeling, vErification and Testing of dEpendable CriTical systems, volume 1269, Springer, L'Aquila, Italy, September 14-18, 2020.

Oral and Poster Presentations

4 **Abigail Hammer** and Kristin Yvonne Rozier. "Exploiting Assume-Guarantee Contract Patterns to Optimize the Discovery of Design Space Dependencies." *Iowa Space Grant Consortium Student Research Symposium*, Iowa City, Iowa, April 4, 2022.

5 **Abigail Hammer**, Matthew Cauwels, Benjamin Hertz, and Kristin Yvonne Rozier. "Implementation of Specifications onto a Runtime Verification Unit". *National Conference on Undergraduate Research (NCUR)*. Virtual, March 12–14, 2021.

6 **Abigail Hammer**, Matthew Cauwels, Benjamin Hertz, and Kristin Yvonne Rozier. "Implementing Specifications onto a Runtime Verification Unit". *Symposium on Undergraduate Research and Creative Expression*. Iowa State University, Ames, Iowa, April 29, 2020.

7 **Abigail Hammer**, Benjamin Hertz, and Kristin Yvonne Rozier. "Design and Analysis of Sensor Specification". *Spring 2019 Poster Presentation*, Iowa State University, Ames, Iowa, April 17, 2019.

Teaching Experience

Aug – Oct '24 **Head Teaching Assistant**, *Carnegie Mellon University*
Formal Methods

- Coordinated grading of assignments and exam and ensured all teaching assistants completed grading
- Responded to students requests for grading corrections in a timely manner
- Facilitated recitations and weekly office hours

2020 – 2023 **Head Peer Mentor**, *Iowa State University, Dept. Of Aerospace*
Aerospace Engineering Problems
Numerical, Graphical, and Laboratory Techniques

- Taught classes about campus resources and materials once per week to 10–20 students
- Attended labs and helped students with programming and lecture materials
- Provided timely updates and attended weekly meetings for status updates

Feb. – Jun. '20 **Tutor for Academic Success Center**, *ISU Academic Services*
Physics
Calculus

- Met with 2–4 groups of students 2–3 times per week
- Created lesson plans for each individual session

Aug. – Dec '19 **Peer Facilitator**, *Women in Science and Engineering*
Introduction to Leadership

- Wrote lesson plans and co-conducted lessons each week
- Attended weekly meetings to present status reports and discuss class plans
- Graded and submitted assignments and papers on a timely basis

Technical Skills

- Programming Languages: Java, C, C++, Python, Ada, Matlab
- Operating Systems: Windows, Linux
- Software: Solidworks, Latex
- Verification Tools: Alloy, LTSA, Tamarin

Leadership Experiences

2025 – 2026   Graduate Student Assembly Vice President of Internal Affairs

- Developed and pursued strategic initiatives to enhance graduate student experiences
- Oversaw internal operations including management of graduate representatives and coordination with university administration

2025 – 2026   Graduate Student Assembly Software Engineering PhD Representative

- Represented graduate student constituents by proposing legislation and relaying constituent concerns to executive leadership
- Fulfilled governance and service obligations through committee participation and hosting social events for constituents

2024 – 2026   University Leadership Student Advisory Council

- Communicated and discussed student experience at university and desired changes
- Strategized actionable priorities to improve experience of student body

2020 – 2023   Ames Middle School First Lego League Coach

- Introduced students to new engineering and programming concepts
- Meet with students weekly to innovate solutions to engineering problems

2020 – 2022   Iowa State University Undergraduate Research Ambassadors

- Worked with others to engage new students with undergraduate research
- Lead groups to connect students with research opportunities and resources