

# Alexander Hegedus

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## EDUCATION

**UNIVERSITY OF MICHIGAN**  
**PHD IN SPACE SCIENCE AND**  
**SCIENTIFIC COMPUTING**  
Expected August 2019 | Ann  
Arbor, MI

**MASTERS IN ATMOSPHERIC,**  
**OCEANIC, AND SPACE SCIENCES**  
April 2017 | Ann Arbor, MI  
College of Engineering  
Advisor: Dr. Justin Kasper  
Cum. GPA: 3.690/4.0

**ALMA COLLEGE**  
**BS IN MATHEMATICS AND**  
**COMPUTER SCIENCE**  
April 2014 | Alma, MI  
*Summa Cum Laude*  
Honors in Math & Computer Science  
**Senior Thesis**  
Incompleteness: What We Can't  
Prove  
Cum. GPA: 3.9747 / 4.0  
Major GPA: 4.0 / 4.0

## SOCIETIES

Math Honorary IIME  
Music Fraternity  $\Phi$ MA  
American Geophysical Union

## SKILLS

### PROGRAMMING

Proficient  
Java • Python • C++ • C •  $\LaTeX$  •  
Bash • Matlab

Some Experience  
CUDA C • Mathematica • Maple  
Fortran 90 with OpenMP and MPI

### INSTRUMENTS

French Horn - 11 years  
Bagpipes - 8 years

## EXPERIENCE

**NASA JET PROPULSION LABORATORY | SUMMER FELLOW**  
May - Aug. 2016 + 2017 | Pasadena, CA

- Created software to simulate Radio Interferometry with orbiting receivers
- Worked with teams of scientists and engineers, delivering plots and simulation results to be put into major mission proposals
- Ran many simulations in parallel on servers with many cores, showing robustness of receivers & ability to fulfill mission objectives

**LAWRENCE BERKELEY NATIONAL LAB | SULI INTERN**  
June - Aug. 2014 | Berkeley, CA

- Worked between National Energy Research Scientific Computing Center and the Joint Genome Institute
- Benchmarked and profiled various parallel genetic assemblers on supercomputers and in the cloud
- Polished Linux and command line skills

**WQAC 90.9 | TECHNOLOGY DIRECTOR**  
May 2013 - April 2014 | Alma, MI

- Spearheaded modernization of radio station, e.g. adding an online stream and a mobile app
- Kept track of FCC records for the station

## RESEARCH

**BOISE STATE UNIVERSITY REU | STUDENT RESEARCHER**  
June - Aug. 2013 | Boise, ID

Worked in a research group with 4 other students and Dr. Liljana Babinkostova. We investigated the underlying algebraic structure in the Whirlpool Hash Function, a cryptographic function that is rich in complexity.

**MICHIGAN STATE UNIVERSITY REU | STUDENT RESEARCHER**

June - Aug. 2012 | Lansing, MI

Worked in a research group with 4 other students, supervised by Dr. Andrew Christlieb. We successfully implemented finite-difference time-domain algorithms in Python to numerically solve Maxwell's Equations.

**ALMA COLLEGE CS DEPT. | RESEARCH ASSISTANT**  
June - Aug. 2011 | Alma, MI

Assisted Dr. Andrew Thall in his research. Programmed in parallel on General Purpose Graphical Processing Units in CUDA C. Parallelized algorithms for problems such as solving a class of Diophantine equations and Mersenne Prime testing.

## AWARDS

National Merit Scholarship, NMSC	2010
Distinguished Scholar Award (Full Ride to Alma College)	2010 - 2014
Rackham Research Grant, University of Michigan	2015
NASA JPL Strategic University Research Partnership (SURP) Grant	2016 - 2017
Outstanding Student Paper Award, American Geophysical Union	2016
NASA JPL Strategic University Research Partnership (SURP) Grant	2017 - 2018
Rackham Research Grant, University of Michigan	2017
NASA JPL Strategic University Research Partnership (SURP) Grant	2018 - 2019

## SELECTED PRESENTATIONS

MathFest 2012 (Talk)	<i>Scientific Computing and Maxwell's Equations</i>
Joint Mathematics Meeting 2014	<i>Generalizing the Whirlpool Hash Function</i>
Alma College Senior Thesis Presentation	<i>Incompleteness: What We Can't Prove</i>
LBNL Undergraduate Poster Session 2014	<i>Profiling Highly Parallel Genetic Assemblers</i>
U. Michigan Engineering Graduate Symposium 2015	<i>GPU Beamforming and Pulsar Science with the LWA</i>
American Geophysical Union 2015	<i>Multi-scale Analysis of DSCOVR Data Using Wavelets</i>
American Geophysical Union 2016	<i>Simulating 3D Spacecraft Constellations for Low Frequency Radio Imaging</i>
NASA Exploration Forum 2017	<i>Low Frequency Solar Observations with Radio Interferometers on the Lunar Surface</i>
American Geophysical Union 2017	<i>Preliminary Data Pipeline for SunRISE: Assessing the Performance of Space Based Radio Arrays</i>
American Geophysical Union 2017 (Invited Talk)	<i>Integrating Measurements to Optimize Space Weather Strategies</i>
Triennial Earth-Sun Summit 2018 (Talk)	<i>Tracking Solar Type II Bursts to .5 AU with Radio Interferometers on the Lunar Surface</i>
American Astronomical Society 232nd Meeting (Talk)	<i>Tracking Solar Type II Bursts with Space Based Radio Interferometers</i>
NASA Exploration Forum 2018 (Talk)	<i>Tracking Solar Type II Bursts to .5 AU with Radio Interferometers on the Lunar Surface</i>
SHINE 2018	<i>Tracking Solar Type II Bursts with the Sun Radio Interferometer Space Experiment (SunRISE)</i>

## SELECTED PAPERS

Cranmer, M., Hegedus, A., et al. "Bifrost: A Python/C++ Framework for High-Throughput Stream Processing in Astronomy," *Journal of Astronomical Instrumentation* Vol. 6, No. 4 (2017).

Belov, K., Hegedus, A., et al. "A space-based decametric wavelength radio telescope concept," *Experimental Astronomy* (2018). <https://doi.org/10.1007/s10686-018-9601-6>

Alibay, F., Hegedus, A., et al. "SunRISE Status: Concept Development Update," 2018 IEEE Aerospace Conference. 10.1109/AERO.2018.8396371

## ADDITIONAL EDUCATION

NAIC/NRAO Single-Dish & NAASC Interferometry Summer School 2015  
Ecolé des Houches Plasma Physics Summer School 2017