

**Zachary Curtis-Ginsberg**  
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## EDUCATION

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| <b>The University of Chicago</b><br><i>Honors Bachelor of Arts in Physics, Minor in Media, Arts, and Design</i><br><b>Awards:</b> Enrico Fermi Institute Award;<br>Applied for <b>NSF GRFP</b> , Awaiting Response | Chicago, IL<br>Expected June 2022<br><b>GPA:</b> 3.59 |
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## RESEARCH

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| <b>Vieregg Lab</b> , Kavli Institute for Cosmological Physics<br><i>Research Assistant</i><br>Beamforming Elevated Array for Cosmic Neutrinos ( <a href="#">BEACON</a> ) | Chicago, IL<br>June 2020-Present |
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- Recently deployed to the prototype array to rebuild antenna supports and performed an improved calibration of the array's antennas by pulsing radio waves from nearby locations in field of view and increasing measurement sensitivity using in-situ monitoring of pulses.
- Designed, calculated, and implemented improved firmware values for the interferometric triggering system to improve sensitivity and triggering of the experiment.
- Performed an in-depth search for anthropogenic radio sources to classify and eliminate background sources. Utilized these sources to improve calibration of experimental system.
- Performed an improved calibration of the experiment using pulsing data and background sources by chi-squared minimization techniques. Compared different minimization techniques to improve statistical precision.

### Radio Neutrino Observatory in Greenland ([RNO-G](#))

- Constructed data acquisition systems (DAQ) for the first deployment of RNO-G in summer 2021. Constructed photo-voltaic and battery systems to power DAQ and antennas.
- Designed testing systems to determine extreme precision limits of next-generation timing GPS units.

### All-Terrain Data Acquisition System (TerraDAQ)

- Designed custom enclosures and communication systems for next-generation DAQ in extreme environments.
- Created testing setups to test extreme condition viability of the DAQ.

## PUBLICATIONS, PROCEEDINGS

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- J. A. Aguilar et al. "Reconstructing the neutrino energy for in-ice radio detectors: A study for the Radio Neutrino Observatory Greenland (RNO-G)." In review to be published in European Phys. Journal.
  - S. Wissel et al. "The Radio Neutrino Observatory Greenland (RNO-G)." PoS(ICRC2021)001 (2021)
  - I. Plaisier et al. "Direction Reconstruction for the Radio Neutrino Observatory Greenland (RNO-G)." PoS(ICRC2021)1026 (2021)
  - C. Welling et al. "Energy Reconstruction with the Radio Neutrino Observatory Greenland (RNO-G)." PoS(ICRC2021)1033 (2021)
  - D. Smith et al. "Hardware Development for the Radio Neutrino Observatory in Greenland (RNO-G)." PoS(ICRC2021)1058 (2021)
  - A. Zeolla et al. "Modeling and Validating RF-Only Interferometric Triggering with Cosmic Rays for BEACON." PoS(ICRC2021)1072 (2021)
  - D. Southall et al. "Searching for RF-Only Triggered Cosmic Ray Events with the High-Elevation BEACON Prototype." PoS(ICRC2021)1084 (2021)

## CONFERENCE PRESENTATIONS

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- APS 2021 (virtual): “Towards Precision Pointing with a Mountaintop Radio Neutrino Detector.” Poster SP01.00037
- COSMO’21 (virtual): “Overview of the Radio Neutrino Observatory in Greenland (RNO-G).” Poster D16

## COURSEWORK & RELEVANT SKILLS

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- Graduate Advanced Methods of Data Analysis
  - Developed Python skills for Monte Carlo simulations, Bayesian statistics, blind analysis, and hypothesis testing.
- Experimental Physics
  - Designed the experimental apparatuses to perform six different physics experiments
  - Collected and analyzed data to find values for things like the neutron mass or hyperfine splitting energy levels
  - Succinctly communicated findings through written papers justifying experimental setup and analysis.
- Experimental Captures
  - Developed skills with Field2 (JavaScript and GUI) and created interactive exhibits to teach physics in non-traditional ways
- Creative Coding
  - Created artistic and educational representations of physics through JavaScript programming

## AFFILIATIONS

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- Radio Neutrino Observatory Collaboration
- BEACON Collaboration
- Kavli Institute for Cosmological Physics
- University of Chicago

## OTHER EXPERIENCE

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**Three Mile Island**, Appalachian Mountain Club Meredith, NH  
*Croo (Crew/Caretaker)* June 2018-August 2018 & June 2019-August 2019

- Performed daily maintenance of buildings, cooked three meals a day for 100 people, washed dishes for every meal, and was waitstaff for the guests during the meals
- Organized daily and weekly schedules of 18 other crew members to ensure all tasks were completed
- Led daily meetings to discuss work and delegate responsibilities

## LEADERSHIP ACTIVITIES

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**D1 Club Ultimate**, University of Chicago Chicago, IL  
*Captain, President* September 2018-present

- Balance 10+ hour weekly commitment to Ultimate with full course load
- Manage and organize team workouts, practices, team activities, tournaments, and participation

## SKILLS

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**Software:** Python, Jupyter, JavaScript, Field2, Arduino, Inventor, AutoCAD, R, Vectorworks, Adobe Photoshop, Adobe Illustrator, Microsoft Office

**Skilled Labor:** Machining, Soldering, Carpentry, Commercial Level Baking & Cooking