

# RYN GRUTKOSKI

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## EDUCATION

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*Currently a Ph.D. student at the University of Chicago, in the Department of Astronomy and Astrophysics*

**BA** Kenyon College, Physics May 2021  
Minor in Mathematics  
Concentration in Scientific Computing  
GPA: 3.94

## HONORS AND AWARDS

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**NSF Graduate Research Fellowship** 2021  
Awarded to outstanding graduate students pursuing research-based graduate degrees, to contribute significantly to both scientific innovation and teaching

**APS LeRoy Apker Award Finalist** 2021  
Awarded to undergraduate students in recognition of outstanding achievements in physics

**Goldwater Scholar** 2020  
Awarded to college sophomores and juniors who show exceptional promise of becoming the next generation of research leaders in the natural sciences, engineering, and mathematics

**Clare Boothe Luce Scholar** Jan. 2019-Dec. 2020  
Awarded to women doing research in physics, math, and chemistry

**Elbe H. Johnson Prize** 2018  
Awarded by the Kenyon physics department to "the student who shows the most promise in physics"

## RESEARCH EXPERIENCE

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**Theoretical Cosmology**, University of Chicago 2021-present  
Advisor: Dr. Austin Joyce

- Bootstrap modeling of inflation in early universe
- Formalism of de Sitter space and quantum field theory
- Vortex behavior of vector-field dark matter

**Cosmology Lab**, Kenyon College 2018-2021  
Advisor: Dr. Tom Giblin

- Lab manager
- Write non-linear computational simulations to model early universe
- Investigate leading questions about gauge field preheating with full general relativity, particularly in regards to primordial black holes

**IceCube**, University of Wisconsin-River Falls

Advisor: Dr. Surujhdeo Seunarine

2018

- Linearity modeling and testing of photomultiplier tubes

## **MENTORING EXPERIENCE**

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**BLAST/ATHENAS Middle School Science Outreach**, Kenyon College 2018-2021

- Student director (2019-2021)
- Design and implement fun science outreach programs for middle-school students
- Train volunteers in how to encourage middle-school students in science

**K-STEM Mentoring Program**, Kenyon College 2018-present

- Student coordinator (2020-2021)
- Mentor first-year students in the sciences
- Train and oversee around 10 mentor-mentee pairings, plan activities and outreach

## **PRESENTATIONS**

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### **Oral Presentations**

Grutkoski, R. (September, 2020). *Building more realistic models of preheating after cosmic inflation*. Kenyon College Physics Colloquium.

Grutkoski, R. (August, 2019). *Preheating with multiple gauge fields and local gravity*. 8th Annual Undergraduate Cosmology Workshop at Massachusetts Institute of Technology.

### **Poster Presentations**

Grutkoski, R, Giblin, J. (April, 2020). *Preheating with gauge fields and nonlinear gravity*. Accepted to American Physical Society for April 2020 meeting (virtual due to covid).

Grutkoski, R. (July, 2019). *Preheating with multiple gauge fields and local gravity*. Ohio College Summer Research Symposium.

Grutkoski, R. (December, 2019). *Modeling inflation using a scalar field*. Kenyon College Physics Colloquium.

## **COMPUTER SKILLS**

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**Programming languages:** C/C++, Python, Java

**Applications:** Mathematica, LATEX