

# JACOB CARDINAL TREMBLAY

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## EDUCATION

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### Universität Bonn

Master of Science in Astrophysics

*Projected Graduation Date - July 2022*

### West Virginia University

Bachelor of Science in Physics, Cum Laude

*August 2017 - May 2021*

## RESEARCH EXPERIENCE

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### Optimal Frequency Channelization for Pulsar Dispersion Measurements

January 2021 -

Present

*Advisors: Dr. Maura McLaughlin*

*West Virginia University*

- Simulated pulsar data based on known NANOGrav pulsars using the *Pulsar Signal Simulator* Python package.
- Currently developing a model to minimize the uncertainty in dispersion measure depending on different pulsar parameters to aid in the detection of gravitational waves from pulsar timing arrays.

### Analysis of Dispersion Measure Variations in NANOGrav Pulsars

May 2020 - August 2020

*Advisors: Dr. Cherry Ng and Dr. James McKee*

*University of Toronto*

- Used extremely high cadence observation data from CHIME to make high quality 2-D templates by creating and implementing BASH and Python pipelines, as well as manual RFI cleaning in order to measure TOAs through template matching.
- Evaluated DM variation statistics such as periodicity, Kolmogorov turbulence, solar wind signature and evidence of discrete plasma structures in order to increase NANOGrav sensitivity.

### Pulsar Searching from Fermi Gamma-ray Sources

August 2019 - August 2021

*Advisor: Dr. Maura McLaughlin*

*West Virginia University*

- Visual plot evaluation in an effort to discover new millisecond pulsars to be used by NANOGrav in pulsar timing arrays.

### Experimental Physics Research

February 2018 - August 2019

*Advisor: Dr. Matthew Johnson*

*West Virginia University*

- Developed a force sensor and computer program to analyse a gymnast's landing.
- Built circuits to control stepper-motors using LabView as an interface.
- Developed outreach demonstrations which explore many areas of physics.

## REFEREED PUBLICATIONS

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1. Kshitij Aggarwal, Devansh Agarwal, Evan F. Lewis, Reshma Anna-Thomas, **Jacob Cardinal Tremblay**, Sarah Burke-Spolaor, Maura A. McLaughlin, and Duncan R. Lorimer. Comprehensive Analysis of a Dense Sample of FRB 121102 Bursts. *The Astrophysical Journal*, arXiv:2107.05658, Sept. 2021.

## SKILLS

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### Computer Languages:

#### Proficient in

Bash, Python, Java, LaTeX

#### Basic knowledge of

LabView, MatLab

#### Skills & Training

Trained on WVU's 14" Celestron telescope, various machining tools, soldering, basic computer engineering

#### Languages

Fluent in English and French

## GRANTS AND AWARDS

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### BCGS Scholarship

University of Bonn

*2021-2023*

Scholarship which provides funding to cover full living expenses during the MSc. Awarded to the top applicants of the Bonn-Cologne Graduate School of Physics and Astronomy.

### IAU Grant

IAUGA

*2022*

Travel grant awarded for participation in the 2022 International Astronomers Union General Assembly in Busan, South Korea. Awarded by the IAU.

### Student KAS Grant

IAUGA

*2022*

Grant covering registration fees and accommodation awarded for participation in the 2022 International Astronomers Union General Assembly in Busan, South Korea. Awarded by the Korean Astronomical Society.

### BCGS Travel Grant

IAUGA

*2022*

Grant awarded for participation in the 2022 International Astronomers Union General Assembly in Busan, South Korea. Awarded by the Bonn-Cologne Graduate School of Physics and Astronomy.

### SURP Fellowship

University of Toronto

*Summer 2020*

Fellowship for research with the Summer Undergraduate Research Program (SURP) at the David A. Dunlap Department of Astronomy and Astrophysics and the Dunlap Institute for Astronomy and Astrophysics at the University of Toronto.

### Ratna and Vaman Naik Endowed Physics Scholarship

West Virginia University

*2020 - 2021*

Scholarship awarded to students who display excellence in academic merit.

### National Space Grant Foundation Undergraduate Fellowship

West Virginia University

*2019 - 2020, 2020-2021*

Fellowship and scholarship to aid in research projects.

### CSCAA Scholar All-American, First Team

West Virginia University

*2019 - 2020*

Athlete achieving a GPA of 3.5 or higher and invited to the NCAA Swimming and Diving Championships.

**President's List**

West Virginia University

*Spring 2020*

Students who receive a GPA of 4.0 for the given semester.

**Athletic Scholarship**

West Virginia University

*2017 - present*

Awarded athletic scholarship to compete on West Virginia University's NCAA division I diving team.

**International Student Scholarship**

West Virginia University

*2017 - present*

Scholarship awarded to international students with a GPA of 3.2 or higher.

**OUTREACH AND MENTOR POSITIONS**

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**West Virginia University Astronomy Club**

2020-2021

*President**West Virginia University*

- Gave bi-weekly interactive astronomy related presentations, organized events such as telescope nights and stargazing parties, and helped guide younger students through their undergraduate careers.

**Pulsar Search Collaboratory**

Sept 2019 - Present

*Mentor**West Virginia University*

- Outreach to high school students which involves both introducing pulsar astronomy and helping them learn to search for pulsars.

**Greenbank Observatory Open House**

September 8th, 2019

*WVU Department of Physics and Astronomy Ambassador**West Virginia University*

- Gave physics presentations to the general public and explained the concepts which makes them possible.