

# AITOR BRACHO

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## EDUCATION

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### Duke University Graduate School

Ph.D. Candidate in Nuclear and Particle Physics.

August 2019 - present

### Florida International University

Bachelor of Science in Physics, *magna cum laude*.

Minor in Mathematics.

August 2016 - May 2019

Unweighted GPA: 3.71

## EXPERIENCE

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### Duke University, Triangle Universities Nuclear Laboratory

*PhD Candidate and Research Assistant, Barbeau lab*

August 2019 - Present

*Durham, NC*

- Collecting gamma ray spectra to optimize the summation method for modeling the reactor antineutrino anomaly by updating fission product yields in nuclear databases.
- Building a maximum-likelihood-based model of analysis thereby developing novel fitting procedures for gamma ray spectra in nuclear physics applications.
- Licensed operator of Triangle Universities Nuclear Laboratory (TUNL) tandem particle accelerator.
- Experience evaporating Lithium Fluoride targets for neutron beam production.
- Radiation safety certified.

### North Carolina League of Conservation Voters (NCLCV)

*Energy Storage Systems Fellow*

May 2024 - August 2024

*Raleigh, NC*

- Conducted in-depth research and policy analysis on nuclear energy and energy storage as a means to critically assess Duke Energy's Carbon Plan/Integrated Resource Plan (CPIRP).
- Led the creation of a comprehensive report evaluating Duke Energy's proposed energy storage initiatives, highlighting the insufficiency of these plans in meeting North Carolina's 2030 emissions reduction targets.
- Analyzed data from the U.S. Energy Information Administration's Preliminary Monthly Electric Generator Inventory database to benchmark North Carolina's energy storage efforts against other states and utilities.
- Conducted interviews with experts from the Conservation Voters network and external environmental advocacy groups to gain insights into energy storage practices and policies in other states.
- Evaluated the impact of federal and state policies on the availability, affordability, and feasibility of energy storage projects in the state, incorporating these findings into the final report.
- Authored a final report on energy storage in North Carolina, which will be submitted as a statement of public comment to the North Carolina Utilities Commission.
- Authored a report on the current and future state of nuclear energy in North Carolina, evaluating Duke Energy's proposals while delivering actionable recommendations to inform NCLCV's stance on nuclear energy developments in the state.

### TerraPower, LLC

*Experimental Methods Intern*

June 2023 - September 2023

*Bellevue, WA*

- Developed and compared multiple analytical models of neutron noise in the Molten Chloride Fast Reactor (MCFR).

- Utilized Python and the Advanced Reactor Modeling Interface (ARMI) to create predictive models for future neutron noise results in the Molten Chloride Reactor Experiment (MCRE).
- Conducted in-depth literature reviews by analyzing numerous academic publications related to neutron noise in Molten Salt Reactors.
- Communicated complex technical concepts and translated intricate technical details into a format understandable by a wider audience.
- Authored a comprehensive technical report documenting research findings, methodologies, and insights.

**Duke University, Department of Physics**

January 2020 - December 2020

*Teaching Assistant*

*Durham, NC*

- Assisted in the instruction of Introductory Physics 1 and Introductory Physics 2 courses, supporting undergraduate students in their understanding of fundamental physics principles.
- Conducted weekly discussion sessions to clarify course concepts, address student questions, and facilitate problem-solving exercises.
- Graded assignments, quizzes, and exams ensuring fair and consistent evaluation.
- Collaborated with course instructors to develop and refine course materials, assignments, and assessments.

**Florida International University, Department of Physics**

May 2018 - August 2018

*Student Researcher, Raue lab*

*Miami, FL*

- Constructed, characterized, and utilized a solenoid to determine the magnetic susceptibility of materials via a uniform, reversible magnetic field.
- Designed and coordinated the fabrication of custom non-magnetizable equipment.

**Florida International University, Department of Physics**

January 2018 - April 2019

*Educational Laboratory and Learning Assistant*

*Miami, FL*

- Undergraduate teaching assistant in both a classroom and laboratory setting.
- Aided lab facilitator in teaching proper data analysis techniques and laboratory methods.
- Verified student understanding of lecture material and assisted in instruction.

**Florida International University, Center for Academic Success**

January 2017 - July 2019

*Lead Physics Tutor*

*Miami, FL*

- Provided in-person instruction and assistance to undergraduate students at all levels of physics, calculus, and differential equations.
- Developed a novel, student-led, supplementary physics course with lead physics tutors and professors.

## OUTREACH AND UNIVERSITY SERVICE

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**Society for the Advancement of Chicanos/Hispanics and Native Americans in Science** Spring 2023

*Logistics Committee Member*

- Collaborated to revitalize and reestablish the Duke SACNAS chapter following a pandemic-induced hiatus, and coordinating future operations.

*Social & Community Committee Chair*

- Developed and executed plans for social and community events, fostering a cohesive and interconnected membership.

### *Scholarly Success Committee Co-Chair*

- Initiated and managed scholarly development events, encompassing practice presentations, writing workshops, and poster development workshops, to empower members in refining their oratory and scholarly prowess.

## **VOLUNTEERING EXPERIENCE**

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**Nate Baker Durham City Council Election Campaign Team** September 2023 - November 2023  
*Durham, NC*

- Collaborated with campaign staff to develop and execute strategic initiatives aimed at increasing voter engagement and support for Nate Baker's platform.

**North Carolina Leagues of Conservation Voters (NCLCV)** August 2024 - Present  
*Durham, NC*

- Contributing to the preparation of a statement of public comment for submission to the North Carolina Utilities Commission, aiming to influence the consideration of the 2025 Duke Energy Carbon Plan and the state's approach to energy storage.

## **FELLOWSHIPS AND AWARDS**

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2022 - present Academic Collaboration Team - University Program Award, *Lawrence Livermore National Laboratory*

2022 - present Alfred P. Sloan Foundation Minority PhD Merit Scholarship, *Duke University*

2019 Department of Physics Richardson Fellowship, *Duke University*

2018 Student Government Association STEM Scholarship, *Florida International University*

2018 Fred Hoover Memorial Scholarship, *Florida International University*

2016 Presidential Premier Merit Scholarship, *Florida International University*

2016 Bright Futures: Florida Academic Scholarship, *State of Florida*

## **POSTER AND ORAL PRESENTATIONS**

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**Stewardship Science Academic Programs (SSAP) Symposium** 2023  
*Fission Product Yields and their Impact on the Reactor Antineutrino Anomaly*

**The Maginificent  $CE\nu NS$  Workshop** 2023  
*Fission Product Yields and their Impact on the Reactor Antineutrino Anomaly and  $CE\nu NS$*