

Manoa Andriamirado

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EDUCATION

Illinois Institute of Technology

Chicago, IL

PhD student in Elementary Particle Experiment

Aug. 2019 – Apr. 2025

Thesis Title: *Probing New Physics with the PROSPECT Reactor Antineutrino Experiment.*

Advisor: Prof. Bryce Littlejohn

University of Antananarivo

Antananarivo, Madagascar

Master of Science in Physics

May 2017 – Jul. 2019

Dissertation Title: *Study of Neutron Background in the 3D-projection Scintillator Detector.*

Advisors: Prof. David Martinez Caicedo and Prof. Raboanary Roland

University of Antananarivo

Antananarivo, Madagascar

Bachelor of Science in Physics

May 2014 – Mar. 2017

APPOINTMENTS

Research Assistant

Aug. 2019 – Present

Illinois Institute of Technology

Chicago, IL

Teaching Assistant

Fall 2019

Illinois Institute of Technology

Chicago, IL

RESEARCH EXPERIENCES

Sterile Neutrino Search at the PROSPECT Experiment

Aug. 2019 – Present

Illinois Institute of Technology

Chicago, IL

- Led the oscillation analysis for the final sterile neutrino search at PROSPECT.
- Primary editor of final PRL-directed manuscript.
- Primary developer and administrator of PROSPECT's oscillation analysis framework.

PROSPECT-I Optical Grid Decommissioning and PROSPECT-II R&D

Jan. - Jun. 2022

Illinois Institute of Technology

Chicago, IL

- Mentored 4-person undergraduate team in inspecting and documenting optical panel failures.
- Used findings to improve conceptual design of upgraded PROSPECT-II Optical Grid.

Boosted Dark Matter Search at the PROSPECT Experiment

Jul. 2019 - Apr. 2021

Illinois Institute of Technology

Chicago, IL

- Developed new event selection targeting light WIMP-proton scatters in PROSPECT-I.
- Characterized sidereal time variation of candidate WIMP-proton scattering signal and background sidebands.
- Co-produced final results and PRD manuscript with collaboration-external particle theorists.

DUNE 3DST Near Detector Neutron Response Study

Dec. 2018 - Jul. 2019

University of Antananarivo

Antananarivo, MG

- Developed analysis for and characterized response of DUNE ND to neutrino-produced neutrons.

AWARDS

- **Best Poster:** NuFact 2024.
- **Travel Grant:** National Nuclear Physics Summer School 2022.

PUBLICATIONS

**indicates major contribution*

- ***Final Search for Short-Baseline Neutrino Oscillations with the PROSPECT-I Detector at HFIR**
PROSPECT Collaboration, arXiv:2406.10408
- **Reactor Antineutrino Directionality Measurement with the PROSPECT-I Detector**
PROSPECT Collaboration, arXiv:2406.08359
- **Final Measurement of the ^{235}U Antineutrino Energy Spectrum with the PROSPECT-I Detector at HFIR**
PROSPECT Collaboration, Phys. Rev. Lett. 131, 021802 (2023)
- **Calibration strategy of the PROSPECT-II detector with external and intrinsic sources**
PROSPECT Collaboration, JINST 18 P06010 (2023)
- ***Limits on Sub-GeV Dark Matter from the PROSPECT Reactor Antineutrino Experiment**
PROSPECT Collaboration and C. V. Cappiello, Phys. Rev. D 104, 012009 (2021)
- ***PROSPECT-II Physics Opportunities**
PROSPECT Collaboration, J. Phys. G: Nucl. Part. Phys. 49, 070501 (2022)
- **Joint Measurement of the ^{235}U Antineutrino Spectrum by PROSPECT and STEREO**
PROSPECT Collaboration, Phys. Rev. Lett. 128, 081802 (2022)
- **Joint Determination of Reactor Antineutrino Spectra from ^{235}U and ^{239}Pu Fission by Daya Bay and PROSPECT**
PROSPECT Collaboration, Phys. Rev. Lett. 128, 081801 (2022)
- ***Improved Short-Baseline Neutrino Oscillation Search and Energy Spectrum Measurement with the PROSPECT Experiment at HFIR**
PROSPECT Collaboration, Phys. Rev. D 103, 032001 (2021)
- ***Deep Underground Neutrino Experiment (DUNE) Near Detector Conceptual Design Report**
DUNE Collaboration, arXiv:2103.13910

SEMINARS

6. **Final Search for Short-Baseline Neutrino Oscillations with the PROSPECT-I Reactor Detector and Roads to PROSPECT-II**
HEP Seminar, Northwestern University, Feb. 17, 2025
5. **Probing New Physics with the PROSPECT Reactor Antineutrino Experiment**
NPA Seminar, Yale Wright Laboratory, Jan. 30, 2025
4. **Final Search for Short-Baseline Neutrino Oscillations with the PROSPECT-I Reactor Detector and Roads to PROSPECT-II**
HEP/Astro Seminar, University of Cincinnati, Jan. 27, 2025
3. **Probing New Physics with the PROSPECT Reactor Antineutrino Experiment**
Lawrence Livermore National Laboratory, Oct. 4, 2024
2. **Final Search for Short-Baseline Neutrino Oscillations with the PROSPECT-I Detector at HFIR**
Fermilab Joint Experimental and Theoretical Physics Seminar, Fermi National Laboratory, Sep. 27, 2024
1. **Probing New Physics with the PROSPECT Reactor Antineutrino Experiment**
HEP Seminar, University of Pittsburgh, Jan 25, 2024

PRESENTATIONS

12. **Final Search for Short-Baseline Neutrino Oscillations with the PROSPECT-I Detector at HFIR**
APS DNP Meeting 2024, Boston, MA, Oct. 7-10, 2024
11. **Final Search for Short-Baseline Neutrino Oscillations with the PROSPECT-I Detector at HFIR**
NuFact 2024, Lemont, IL, Sep. 16-21, 2024
10. **Final Search for Short-Baseline Neutrino Oscillations with the PROSPECT-I Detector at HFIR**
APS April Meeting 2024, Sacramento, CA, Apr. 3-6, 2024
9. **Final Search for Short-Baseline Neutrino Oscillations with the PROSPECT-I Detector at HFIR**
APS DNP Meeting 2023 Big Island, HI, Nov. 26- Dec. 1, 2023
8. **PROSPECT-II Physics Goals**
APS April Meeting 2023, Minneapolis, MN, Apr. 15-18, 2023
7. **PROSPECT-II Physics Goals**
APS DNP Meeting 2022 New Orleans, LA, Oct. 27-30, 2022
6. **Limits on Sub-GeV Dark Matter from the PROSPECT Reactor Antineutrino Experiment (Poster)**
Neutrino 2022, Virtual, May 30 - Jun. 4, 2022
5. **PROSPECT-II Oscillation Physics Goals and Beyond**
APS April Meeting 2022, Virtual, Apr. 9-12, 2022
4. **Recent Physics Results from the PROSPECT Experiment**
Topics in Astroparticle and Underground Physics 2021, Virtual, Aug. 26 - Sep. 3, 2021
3. **Limit on sub-GeV Dark Matter from the PROSPECT Experiment**
New Perspective 2021, Virtual, Aug. 16-19, 2021
2. **Cosmic ray Boosted Dark Matter at PROSPECT – Experimental Analysis**
APS April Meeting 2021, Virtual, Apr. 17-20, 2021
1. **PROSPECT-II Detector Upgrade and Sterile Neutrino Oscillation Sensitivity**
APS Prairie Section Fall Meeting, Virtual, Nov. 11-13, 2020

PROFESSIONAL DEVELOPMENT

14th International Neutrino Summer School 2023 <i>Fermi National Laboratory</i>	Aug. 7-18, 2023 <i>Batavia, IL</i>
Computational and Data Science for High Energy Physics 2023 <i>Princeton University</i>	Jul. 17-21, 2023 <i>Princeton, NJ</i>
National Nuclear Physics Summer School 2022 <i>Massachusetts Institute of Technology</i>	Jul. 11-22, 2022 <i>Boston, MA</i>
13th International Neutrino Summer School 2021 <i>Conseil Européen pour la Recherche Nucléaire</i>	Aug. 2-13, 2021 <i>Virtual</i>
PyTorch Scholarship Challenge from Facebook <i>Udacity</i>	Nov. 9, 2018 - Jan. 9, 2019 <i>Virtual</i>
<ul style="list-style-type: none">◦ Developed a deep learning model using PyTorch to classify 108 flower species.◦ Achieved an accuracy of 83% on the validation set by fine-tuning the ResNet18 model.	

2nd Big Data Africa School 2018

Sep. 10–17, 2018

SARAO

Cape Town, SA

- Developed an image classifier to identify retinopathy in medical images using machine learning algorithms.
- Used image processing techniques for feature extraction and data augmentation.

JEDI Workshop in Big Data Science

May. 25-29, 2018

SKA

Nosy Be, MG

- Performed an image-based data mining to improve radiotherapy for cancer treatment.

TECHNICAL SKILLS

- **Computer Languages:** C, C++, Python, Bash
- **Frameworks:** ROOT, Scikit-learn, Pytorch
- **Tools:** Vim, L^AT_EX, Github, CMake, Valgrind, Perf
- **Operating Systems:** Linux, Microsoft Windows

LANGUAGES

- **English:** Full Professional Proficiency
- **French:** Full Professional Proficiency
- **Malagasy:** Native