NESHAD DEVA PATHIRANA

Ph.D. Candidate in Physics

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Facility for Rare Isotope Beams, Michigan State University, 640 South Shaw Lane, East Lansing, MI 48824, USA

PROFILES AND WEBSITES

Neshad Deva Pathirana

Neshad Amarasinghe

BBC Documentary

PERSONAL INFORMATION

- Gender: Male
- Nationality: Sri Lankan
- DOB: 09/19/1996
- Status: Married

SKILLS

MS Office Package

TALYS

Oslo Method Package

PROFESSIONAL SUMMARY

A dedicated and proactive researcher with a strong work ethic and a passion for scientific discovery. Seeking opportunities in a professional research setting that values innovation, collaboration, and continuous learning, where I can contribute meaningfully to scientific advancement by applying my academic training and technical skills

EDUCATION

Doctor of Philosophy in Physics-Michigan State University, USA
| August 2022 - Current |

- Ongoing (4th year Ph.D. Candidate)
- Course Duration: Five Years (Full Time)
- Medium of Instruction: English
- Subjects: Physics (Major)
- GPA: 4.00

Graduate Certificate of Instrumentation in High Energy Physics-Michigan State University, USA
| August 2023 – December 2024 |

- Course Duration: One Year (Full Time)
- Medium of Instruction: English
- Subjects: Physics (Major)
- GPA: 4.00

Master of Science in Physics-Michigan State University, USA
| August 2022 - August 2024 |

- Course Duration: Two Years (Full Time)
- Medium of Instruction: English
- Subjects: Physics (Major)
- GPA: 4.00

Bachelor of Science (Honors) in Physics-University of Peradeniya, Sri Lanka
| January 2017 - June 2021 |

- First Class Honors
- Course Duration: Four Years (Full Time)
- Medium of Instruction: English
- Subjects: Physics (Major)
- GPA: 3.90 (Physics GPA: 3.93, Mathematics GPA: 4.00)

C++

Root

LaTeX software

NuGrid Simulations

MARLEY Simulations

Python

PAW

MATLAB Software

Origin Software

Wolfram Mathematica Software

Geant4 simulation

RESEARCH EXPERIENCE

Graduate Research Assistant-Facility for Rare Isotope Beams (FRIB), USA
| November 2022 – Current |

- Solving the Puzzle of the Cosmochronometer 92Nb Production Sites (Ongoing): Extracting astrophysical reaction rates relevant to the production of 92Nb via the CC neutrino–nucleus reaction rate using the Gamow–Teller strength from the 92Zr(3He,t) charge-exchange experimental data.
- Development of the CE-Oslo Method : Developed the Charge-Exchange Oslo (CE-Oslo) method for the very first time and extracted astrophysical reaction cross sections for the 92Zr(n,g)93Zr from the charge-exchange 93Zr(t,3He+γ)93Zr experimental data.
- Extracting Neutrino–208Pb CC Cross Sections (ongoing): Determining neutrino–208Pb charged-current (CC) cross sections relevant for neutrino detection applications by extracting the Gamow–Teller strength from 208Pb to 208Bi using charge-exchange data for the first time through the 208Pb(3He,t)208Bi reaction.
- Detector Development at FRIB: Contributing to the upgrade of the Low Energy Neutron Detector Array (LENDA) at FRIB through testing and evaluation of novel scintillator materials for enhanced neutron detection.

Visiting Scientist-University of Oslo, Norway
| April 2025 - July 2025 |

- Solving the Puzzle of the Cosmochronometer 92Nb Production Sites: Extracted reaction rates relevant to the production-destruction of 92Nb via the 92Nb(g,n)91Nb reaction rate using the Oslo Method and TALYS from the 90Zr(α,d)92Nb experimental data.

Undergraduate Research Assistant-University of Peradeniya, Sri Lanka
| July 2019 - June 2021|

- Construction of Ionization Chamber: The main objective of the undergraduate research project was to construct a portable ionization chamber that can be used in the laboratory to identify ionization particles separately. Built a cylindrical ionization chamber using aluminum and a differential amplifier with Darlington transistors to detect ionizing particles. Output signals were processed via an ARDUINO Uno for particle identification through graphical analysis.
- Electromagnetic and Hadronic Calorimeters: Conducted an independent study on the principles and developments of calorimeters used in particle detectors. Presented findings in a report and oral presentation awarded at the Undergraduate Seminar Series–2020, evaluated by a faculty panel.

Junior Research Assistant-National Institute of Fundamental Studies (NIFS), Sri Lanka
| May 2016 - September 2016 |

- Quantum Physics: Employed as a Volunteer in Quantum Physics Project which engaged in investigating fundamental aspects of Quantum to Classical transition, Quantum Chaos, Quantum Computing and Quantum non-locality.
- Applied Electronics: Employed as a Volunteer in Applied Electronics Project which engaged in identification of new mental activities that can be utilized in Brain-Computer Interface (BCI) systems as well as designing and construction of low-cost hardware and software for BCI to be used in Sri Lanka.

TEACHING EXPERIENCE

Graduate Teaching Assistant-Michigan State University, USA
| August 2022 - December 2024 |

- Instructor in charge: PHY 252 – Introductory Physics Laboratory II for 200 level (sophomore) major science students (conducting and supervising classes, preparing marking schemes, compiling laboratory handouts and evaluating student lab reports).
- Instructor in charge: ISP 205L - Visions of the Laboratory for 200 level (sophomore) non-major science students (conducting and supervising classes, preparing marking schemes, compiling laboratory handouts and evaluating student lab reports).
- Tutor in charge: PHY415 – Mathematical Modeling in Physics for 400 level (Senior) Physics Honors students (grading tutorials and conducting discussion sessions – in class & off class).

Graduate Teaching Assistant-University of Peradeniya, Sri Lanka
| August 2021 - July 2022 |

- Instructor in Charge: Demonstrating and supervising Nuclear Physics Laboratory sessions which comprises for the students who are following Master of Science in Physics (compiling laboratory handouts and evaluating student lab reports).
- Instructor in Charge: Demonstrating and supervising 300 and 400 levels Advanced Laboratory sessions which comprises for the students who are following Honors Degree program in Physics (compiling laboratory handouts and evaluating student lab reports).
- Tutor in Charge: PH430 - Quantum Mechanics I, PH431 - Quantum Mechanics II & PH458 – General Relativity for 400 level Physics Honors students (preparing marking schemes, grading tutorials and conducting discussion sessions).
- Help Desk Sessions: Conducting help desk sessions of PH 230– Quantum Mechanics and Atomic Physics for 200 level students.

ACCOMPLISHMENTS

- Galonsky International Travel Award in MSU
- Norwegian Nuclear Research Center (NNRC) Scholarship in UiO
- FRIB Fellowships in MSU
- Herbert T. Graham Scholarship in MSU
- Graduate School Travel Fellowship in MSU
- Prof. Lakshman Dissanayake Gold Medal for Excellence in Physics in UoP
- Prof. George Dissanaike Memorial Gold Medal in Physics in UoP
- Dr. C.A. Hevavitharana Memorial Prize in Physics in UoP
- Prof. A.W. Wolfendale Prize in Physics in UoP
- University of Peradeniya Award for Academic Excellence in UoP
- Eramudugolla Dunuwila Prize in Mathematics in UoP
- Merit Award in SURS Symposium in UoP
- Diploma in Visharad, Bhatkhande Sangit Vidyapith
- Best Student in Dharmaraja College
- Best Performances in Dharmaraja College's Art Festivals

CONFERENCES, WORKSHOPS AND SUMMER SCHOOLS

- **Participation**: *"FRIB Theory Alliance summer school: Emergence of Collective Motion in Atomic Nuclei"* at FRIB, Michigan, USA in 2025.
- **Participation**: *"Open Questions and Research Tools in Nuclear Astrophysics: A Combined Summer School and Hackathon Event"* at Beaver Island, Michigan, USA in 2025.
- **Oral and poster presentation**: The topic of *"Solving the Puzzle of the Cosmochronometer 92Nb Production Sites"* at the "*1st s, i & r Element Nucleosynthesis (sirEN) Conference"*, Giulianova, Italy in 2025.
- **Oral presentation**: The topic of *"The Development of the Charge-Exchange Oslo Method and Application Towards Constraining Reaction Rates for Nucleosynthesis of Cosmochronometer 92Nb"* at the *"Seminar Series"*, University of Oslo, Norway in 2025.
- **Participation**: *"Mini-symposium on Precision Measurements at Low Energies*", FRIB, USA in 2025.
- **Oral presentation**: The topic of *"The Development of the Charge-Exchange Oslo Method and Application Towards Constraining Reaction Rates for Nucleosynthesis of Cosmochronometer 92Nb"* at the "*8th p-process workshop"*, Konkoly Observatory in Budapest, Hungary in 2024.
- **Poster presentation**: The topic of *"The Development of the Charge-Exchange Oslo Method and the first application to Constraint (n,g) cross sections"* at the "*11th Nuclear Physics in Astrophysics International Conference"*, Technische University Dresden in Dresden, Germany in 2024.
- **Participation**: *"11th Nuclear Physics in Astrophysics International Summer School*" at Stolpen, Germany in 2024.
- **Poster presentation**: The topic of *"First Application of the Charge-Exchange Oslo Method to Constraint (n,g) cross sections"* at the "*21st Exotic Beam Summer School (EBSS2024)"*, the ATLAS facility at Argonne National Laboratory in Chicago, USA in 2024.
- **Poster presentation**: The topic of *"First Application of the Charge-Exchange Oslo Method to Constraint (n,g) cross sections"* at the "*9th Workshop on Nuclear Level Density and Gamma Strength"*, University of Oslo, Norway in 2024.
- **Oral presentation**: The topic of *"The Development of the Charge-Exchange Oslo Method and Application Towards Constraining Reaction Rates for Nucleosynthesis of Cosmochronometer 92Nb"* at the "*Research Presentation Seminar"*, FRIB in East Lansing, USA in 2024.
- **Poster presentation**: The topic of *"Charge-Exchange Reactions in Conjunction with the Oslo Method"* at the 1st IReNA-Ukakuren international conference on "*Advancing Professional Development in Nuclear Astrophysics and Beyond"*, NAOJ campus in Tokyo, Japan in 2023.
- **Participation**: International conference of *"IReNA Workshop on Weak Interactions in Nuclear Astrophysics"* at FRIB in the USA in 2023.
- **Participation**: International conference of *"CeNAM Frontiers in Nuclear Astrophysics Meeting"* at FRIB in the USA in 2023.
- **Participation**: *"IReNA Frontiers in Nuclear Astrophysics* Summer School" at FRIB in the USA in 2023.
- **Oral presentation**: The topic of *"Construction of an Ionization Chamber to Detect Alpha and Beta Particles"* at the symposium "*RESCON-Research Congress of the Postgraduate Institute of Science*", University of Peradeniya, Sri Lanka in 2021.
- **Poster presentation**: The topic of *"Construction of an Ionization Chamber*

to Detect Alpha and Beta Particles" at the symposium SURS on undergraduate research findings of the final year students of the Science Faculty, University of Peradeniya, Sri Lanka in 2021.

- **Oral presentation**: The topic of "*Construction of an Ionization Chamber to Detect Alpha and Beta Particles*" related to an individual research project *at Department of Physics, University of Peradeniya, Sri Lanka* in 2021.
- **Oral presentation**: The topic of *"Use of Electromagnetic & Hadronic Calorimeters in Particle Detection"* related to a self-study at Department of Physics, University of Peradeniya, Sri Lanka in 2019.

PUBLICATIONS

- **Journal paper (first-author):** "*Solving the puzzle of the cosmochronometer 92Nb production using the Oslo method*", Physical Review Letters (PRL), Ongoing
- **Journal paper (first-author):** "*Experimental study on supernova neutrino-induced nucleosynthesis of 92Nb via the 92Zr(3He,t)92Nb charge-exchange-reaction*", Physical Review Letters (PRL), Ongoing
- **Journal paper (first-author):** "*Charged-current neutrino-208Pb cross sections via the 208Pb(3He,t) charge-exchange-reaction*", Physical Review Letters (PRL), Ongoing
- **Journal paper (first-author):** "*Extraction of neutron capture cross sections on 92Zr using the charge-exchange Oslo method* ", Physical Review C (PRC), published, https://doi.org/10.1103/qdsh-ygry
- **Journal paper (co-author):** "*Single-nucleon transfer unveils NiCu cycle in astrophysical X-ray bursts*", Physical Review Letters (PRL), Submitted, https://doi.org/10.21203/rs.3.rs-7660136/v1
- **Journal paper (co-author):** "*Determination of proton and neutron contributions to the 0+gs →2+1 excitations in 42Si and 44S using inelastic proton scattering in inverse kinematics and intermediate energy Coulomb excitation*", Physical Review C (PRC), published, https://doi.org/10.1103/b8xj-ycqk
- **Journal abstract (first-author):** "*Construction of an Ionization Chamber to Detect Alpha and Beta Particles*", Research Congress (RESCON 2021), http://www.pgis.pdn.ac.lk/rescon2021/abstracts/PS/134.pdf

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EXTRA-CURRICULAR ACTIVITIES

- Elected Member of the Honor Society of Phi Kappa Phi
- Elected Member of the Sigma Xi, The Scientific Research Honor Society
- Member of American Physical Society
- Member of International Research Network for Nuclear Astrophysics (IReNA)
- Member of Joint Institute for Nuclear Astrophysics Center for the Evolution of the Elements (JINA-CEE)
- Member of Center for Nuclear Astrophysics Across Messengers (CeNAM)
- Former Secretary of Sri Lankan Student Association at Michigan State University (SLSA)
- Former Secretary & Member of Physical Society, Member of Astronomical Society, Member of Mathematical Society, Member of Ceylon University Dramatic Society, Member of Music Society at University of Peradeniya

- Former Vice President of the Astronomical Society, Vice president of the Quiz Society, Member of the Science Society at Dharmaraja College

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REFERENCES

- **Prof. Remco Zegers (Ph.D. Research Supervisor)**
  Department of Physics and Astronomy, Michigan State University, USA
  Phone: +15173661387 | Email: zegers@frib.msu.edu
- **Prof. Artemis Spyrou (Ph.D. Committee Member)**
  Department of Physics and Astronomy, Michigan State University, USA
  Phone: +15179087141 | Email: spyrou@frib.msu.edu
- **Prof. Ann-Cecilie Larsen (Visiting Research Supervisor)**
  Department of Physics, University of Oslo, Norway
  Phone: +47 22855486 | Email: a.c.larsen@fys.uio.no