# DAEUN JUNG, Ph.D.


**PostDoc of Particle Physics experiment**

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**RESEARCH & COLLABORATION PROFILE**


**KEY WORDS**: Experimental Neutrino Physics, Cherenkov, Liquid scintillation




**Research Snapshot.** Dr. Jung focuses on experimental particle physics, particularly the development and performance optimization of optical particle detectors for neutrino experiments. Her research experience spans detector development, calibration, and experimental data analysis, with an emphasis on understanding detector response and improving measurement reliability. Through the JSNS², RENE and Super-K experiments, she has worked on detector instrumentation, trigger systems, detector performance evaluation, and neutrino data analysis. Her research interests also include Cherenkov and scintillation detection technologies, optical detector media, and photodetection systems. She aims to integrate detector material properties, signal detection, simulation, and event reconstruction to improve detector performance and support precision measurements in neutrino and particle physics.

## RESEARCH EXPERTISE

• **Optical particle detector development:** Development and evaluation of Cherenkov and scintillation-based detectors, including detector media, light collection, and photodetection systems.
• **Detector instrumentation**: Trigger and data acquisition systems, detector commissioning, and experimental performance evaluation.
• **Detector calibration and simulation:** Energy, charge, timing, and spatial response characterization, supported by Monte Carlo simulation and experimental validation.
• **Experimental data analysis:** Event selection, signal discrimination, statistical analysis, and reconstruction methods for particle physics experiments.
• **Neutrino physics:** Experimental studies of neutrino oscillations and interactions using accelerator- and reactor-based neutrino sources.

## RECENT RESEARCH HIGHLIGHTS

• JSNS² trigger studies (Neutrino 2022): Investigated trigger schemes for efficient neutrino event acquisition and presented the study at the International Conference on Neutrino Physics and Astrophysics.
• Neutrino data analysis (JSNS²): Investigated correlated backgrounds affecting sterile neutrino searches, focusing on event characteristics and background contributions to neutrino candidate samples.
• Detector commissioning and calibration (RENE): Performed prototype detector commissioning and radioactive-source measurements to evaluate detector response and position-dependent calibration characteristics.
• Optical detection and detector media: Studied Cherenkov and scintillation detection technologies, including optical properties and their implications for detector performance and particle identification.
• Timing reconstruction studies (ongoing): Investigating low-photoelectron timing, time-walk correction, and electronic noise effects to improve detector response modeling and reconstruction accuracy.

## POTENTIAL COLLABORATION RESEARCH

**Best-fit collaborator areas:** Optical detector R&D | Cherenkov and scintillation materials | Detector instrumentation and simulation | Event reconstruction and neutrino physics

• 1. Advanced optical detector development: Joint development and characterization of Cherenkov and scintillation detection media, photodetection systems, and detector configurations.
• 2. Detector characterization and optimization: Collaborative studies of detector response, calibration methods, optical simulation, and systematic effects to improve measurement performance.
• 3. Signal processing and event reconstruction: Development of advanced methods for timing, energy, position reconstruction, and particle identification.
• 4. Neutrino and particle physics applications: Application of detector technologies and analysis methods to neutrino oscillation, interaction measurements, and searches for physics beyond the Standard Model.

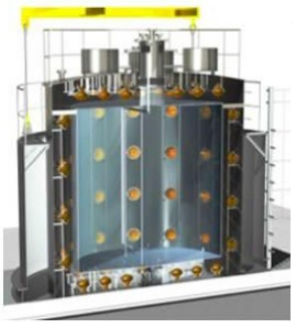
## SELECTED RECENT PUBLICATIONS

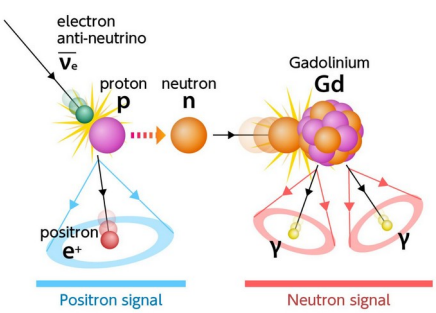
• PTEP 2026, 053H02 — Characterization of the 20-inch Photomultiplier Tubes for the RENE Detector.
• PTEP 2026, 033C01 — Integrated Monitoring and Predictive Maintenance System for the Reactor Experiment for Neutrino and Exotics (RENE).
• JINST 2025, 20, T10003 — PMT calibration for the JSNS²-II far detector with an embedded LED system.
• PTEP 2025, 093C03 — Reactor Experiment for Neutrinos and Exotics (RENE) for the Sterile Neutrino Search Using Reactor Neutrinos.
• **Phys. Rev. D 113, 112011—** First results from the search for an excess of $\bar{\nu}_e$ events in JSNS²

## CONTACT


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https://scholar.google.com/citations?user=gnuZWzgAAAAJ&hl=en
https://sites.google.com/view/lepplab/home


## REPRESENTATIVE RESEARCH FIGURES / SCHEMES






R3600-02 (20 inch)



