Application Guideline for the Ozaki Exchange Program for JFY 2025
(for students in Japan)

The Ozaki Exchange Program (hereinafter referred as the "Program"), established since 2018 in honor of the late Dr. Satoshi Ozaki, is a graduate student exchange program to strengthen the US-Japan scientific collaboration and in particular facilitate greater cooperation in the areas of accelerator and particle physics in projects of mutual benefit to Japan and the United States.

The program offers funding supports for a short-term (six to ten weeks) stay and a long-term (3 months or longer) stay.

If you are interested in joining the program, you are welcomed to apply in accordance with this guideline.

Eligible Applicants: All graduate students currently enrolled, or undergraduate students who have already accepted their enrollment in accredited Japanese Physics PhD programs. Entry is possible regardless of nationality.

Research Area: High energy physics, accelerator, beam, software or analysis
Applicants for the short-term program can choose from the coordinated programs at SLAC and FNAL, which are detailed in the annex of this guideline and the application form. (The list of the coordinated programs at SLAC is updated on Nov. 15th, 2024. The major change is shown in red.) In other cases, applicants should obtain confirmation from the DOE lab contacts, which can be found in the 'Contact Point' section below this guideline, or from mentors at the DOE labs regarding possible research areas.

Period of Dispatch:
Short-term: Six to ten weeks
Long-term: Within 6 months of the award date and is expected to start during the month of June. The duration of the award is for a three- to twelve- month period. One-time renewal proposals will be considered for a maximum fellowship of 24 months.

Research Place: Should be carried out at one of the following DOE national laboratories:
- Argonne National Laboratory (ANL)
- Brookhaven National Laboratory (BNL)

- Fermi National Accelerator Laboratory (FNAL)
- Thomas Jefferson National Accelerator Facility (JLab)
- Lawrence Berkeley National Laboratory (LBNL)
- SLAC National Accelerator Laboratory (SLAC)

Other DOE labs that host High Energy Physics programs can be considered upon request.

Number of Awardees: Up to five in total for both long-term and short-term proposals will be selected for funding.

Supports: (Funding - Travel & Subsistence allowance)
Travel, housing and cost of living expenses for the stay overseas based on KEK's regulation.

Required Documents:

Short-term

<All documents must be in English>

- Application form (KEK specified form)
- Proof of enrollment in a physics PhD program and course transcript.
- Supporting letter written by student mentor, (3-page limit).

Long-term

<All documents must be in English>

- Research proposal written by the student and proposed duration for the research program (5-page limit excluding references).
- Student CV.
- Proof of enrollment in a physics PhD program and course transcript.
- Supporting letter written by student mentor, indicating needed resources and expected availability (3-page limit).
- Supporting letter from receiving laboratory partner, if other than mentor (3-page limit).

Submission: The application documents shall be submitted by email to the contact point below.

Application Deadline: December 20th (JST), 2024

Selection: After screening submitted documents, we will conduct an interview in January at KEK.

Selection Results: The selection results will be announced at the end of February

2025.

Report on Achievement: A report on achievement during the dispatch written in English shall be submitted to the Contact Point as below within one month after the date of return.

Contact Point:

<For consultation about research at each DOE lab.>
ANL: John Power <JP@anl.gov>
BNL: Hong Ma <hma@bnl.gov>
FNAL: Fumio Furuta <ffuruta@fnal.gov>
JLab: Joe Grames <grames@jlab.org>
LBNL: Tony Spadafora <alspadafora@lbl.gov>
SLAC: John Seeman <seeman@slac.stanford.edu>

<For the application process, form or documents>
KEK International Affairs Division
E-mail: koryu1@mail.kek.jp / Phone: +81-(0)29-864-5132

SLAC Topics for Japanese Ozaki Exchange Program Students for Summer 2025

(John Seeman, editor)
November 14, 2024

1) ATLAS ITk Pixel Inner System Assembly and QC:
(Dr. Charles Young, (young@slac.stanford.edu), SLAC Atlas Group)

ATLAS is replacing its charged particle tracker with a new one, known as ITk, for the HL-LHC era. The Pixel Inner System, made up of the innermost two layers, is a US deliverable and is being assembled at SLAC. Prototypes have been built; tooling is being finalized; pre-production is about to begin. As detector modules are integrated into larger detector units, quality control (QC) tests will be applied to ensure proper functionality. There are many opportunities for intellectual contributions at this pre-production stage and to participate in the assembly of a real-life experimental detector. Hands-on experience in a laboratory is helpful.

2) ATLAS Physics Analysis:
(Dr. Charles Young, (young@slac.stanford.edu), SLAC Atlas Group)

The SLAC ATLAS group is deeply invested in the study of the Higgs boson. Current activities include studying properties of the Higgs boson as well as the search for the production of two Higgs bosons in multiple final states. The student will work on one of these analyses with local researchers. Familiarity with computing tools such as Jupyter and Python are helpful.

3) Higgs Factory Detector R&D:
(Dr. Charles Young, (young@slac.stanford.edu), SLAC Atlas Group)

The Particle Physics Project Prioritization Panel (P5) advocated for participation in a future e+e- Higgs Factory. Our current involvements in Detector R&D range from sensor development to global experiment design optimization. We encourage interested students to get in touch with us to help define the project best suited rto their interests and needs within the very broad range of possibilities.

4) Transverse Laser Fluctuations in Electron Photo-Injectors
(Dr. Nicole Neveu, (nneveu@slac.stanford.edu), SLAC Accelerator Physics Group)

The beam injector project is a study on how transverse laser fluctuations effect optimization results by finding a robust optimum by sampling a database of real laser images taken during LCLS-II Injector Commissioning and using them as the initial distributions for the simulations. This would mostly be simulation work and working with recent VCC camera images. The student would learn about photo-injector beam dynamics and simulations. Python experience preferred, but they could also learn that as part of the project.

5) **Neutrino Physics:**
(Prof. Hirohisa Tanaka, (tanaka@slac.stanford.edu), SLAC Fundamental Science)

The SLAC neutrino group participates in several accelerator-based neutrino oscillation experiments, including T2K, MicroBooNE, ICARUS, and DUNE. The student would work on one of the activities of our group: 1. Development of algorithms to reconstruct neutrino interactions using modern machine learning techniques. 2. Neutrino detector development, particularly for the DUNE near detector 3. Development and testing of front end electronics for the DUNE far detector. In the next several months, the group is also expected to be active in looking at early data from the ICARUS detector, which will start operations at Fermilab.

6) **Additive Manufacturing:**
(Asst. Prof. Emilio Nanni, (nanni@slac.stanford.edu), Technology Innovation Directorate)

The topic covers 3D additive manufacturing of manufacturing of THz accelerating structures. The student would help use advance fabrication tools (Nanoscribe) to additively manufacture accelerating structures with nanometer scale precision. Perform measurements to test quality and performance of resonant structures. Gain experience in modern design and manufacturing techniques, understand novel concepts in accelerator physics.

7) **Superconducting Thin Films:**
(Asst. Prof. Emilio Nanni, (nanni@slac.stanford.edu) Technology Innovation Directorate)

The topic covers superconducting thin-film quantum transducers. The student would participate in the design and fabrication of superconducting thin film transducers to link resonators to quantum sensors. Develop new technologies in quantum transduction for dark matter searches.

8) **Topics in High Power RF Generation:**
(Asst. Prof. Emilio Nanni, (nanni@slac.stanford.edu) Technology Innovation Directorate)

The student would work on one of the following:
a) Writing codes for finite element based simulations to model complicated RF sources that relay on novel beam wave interaction configurations
b) Help in the experimental setups of mm-wave measurements and quasi-optical components measurement.
c) Simulation of advanced plasma physics apparatus
d) Simulation of deposition systems for creating thin layers of superconducting materials.
e) Growth and characterization of superconducting thin films for high-power RF.

9) Particle Collider Physics:

(Prof. Michael Peskin, (mpeskin@slac.stanford.edu) Particle Theory Group)
The student would work on a topic related to a physics program of a e+e- or gamma-gamma collider at a center of mass energy above 10 TeV. The project could involve physics reactions or the beam-beam interaction in collisions. The student should have some practical knowledge of Feynman diagrams and quantum field theory.

10) Detectors and Sensors:

(Dr. Christopher Kenney, (kenney@slac.stanford.edu), Fundamental Science Directorate)

The student would help with one of the following projects:

a) Help design and/or test unique Low Gain Avalanche Diode pixel sensors.
b) Testing of novel, high-density interconnects at cryogenic temperatures.
c) Post processing and/or characterization of CMOS pixel sensors with thin entrance windows for full depletion.

11) LSST Camera Commissioning and Characterization, Vera Rubin Observatory

Prof. Aaron Roodman, Dr. Utsumi, Yousuke (youtsumi@slac.stanford.edu) , Fundamental Science Directorate)

A student would work with the team commissioning the LSST Camera on the Vera Rubin Observatory. Possible topics include:

1. Characterization and correction of CCD-level and Camera-level systematic effects on image quality, astrometry and photometry in commissioning or early operations of the Rubin Observatory
2. Analysis of In-dome and on-sky photometric calibration data for precision photometry
3. Point spread function characterization and estimation
4. Weak gravitational lensing shear estimation and systematics