Zoya Vallari

Assistant Professor **[Jan 2025 - Present]**
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Education & Employment

California Institute of Technology Pasadena, CA
Postdoctoral Scholar Research Associate [Jan 2019 - Dec 2024]

Stony Brook University Stony Brook, NY
PhD Particle Physics [Aug 2012 - Dec 2018]

Indian Institute of Technology Bombay Mumbai, India
Master of Science (M.Sc), Physics [July 2010 - Aug 2012]

St. Stephen's College, Delhi University New Delhi, India
Bachelor of Science (B.Sc), Physics Honors [July 2007 - July 2010]

Research Interests

I study the origin and implications of neutrino masses, neutrino properties, weak-sector mixing, and leptonic charge-parity violations, using accelerator neutrino beams at long-baseline experiments. My projects broadly fall into the following categories:

- Analyzing neutrino flavor transformations to determine the mass ordering of neutrinos, test the completeness of the three-flavor paradigm to describe neutrino properties, and to search for charge-parity violation in leptons.
- Advancing the understanding of neutrino-nucleus interactions
- Designing & building the next-generation neutrino detector
- Development & adaptation of high-performance computing in high-energy particle physics

Scientific Leadership & Professional Service

- Physics Analysis Coordinator for NOvA experiment [2026 - Present]
- Bridge Program Committee, Ohio State University [2025 - Present]
- Co-chair of Neutrino Sector, 32nd International Symposium on Lepton Photon Interactions at High Energies. [2025]
- Co-convener of DUNE's ND Prototypes Analysis physics working group. [2023 - Present]
- Co-convener of NOvA's 3-flavor oscillation analysis group. [2022 - 2025]
- Elected member of the Executive Committee of the NOvA experiment. [2024 - Present]
- Elected early-career member of the Executive Committee of NOvA experiment. [2022 - 2023]
- Co-organized several workshops to formulate and execute near-term analysis targets for DUNE, NOvA and NOvA-T2K collaborations. [*(various dates)* 2022 - 2026]
- Co-convener of the NOvA Production group. [2020 - 2021]

- Reviewer for Nature, European Physics Journal C, Physical Review D and Physical Review Letters. [2020 - Present]
- Session chair at DPF 2026, Global Physics Summit 2025, Intersections-CIPANP 2025, APS April 2022, NDM 2022, and New Perspectives 2020 conferences. [2021 - 2026]
- Elected representative of T2K-Young for graduate students and postdocs of T2K Collaboration. [2016 - 2017]

Selected Conferences, Colloquia, & Seminars

DUNE: Science & Status — Invited talk
DPF 2026, Fermilab, US — [July, 2026]

Probing the 3-Flavor paradigm with NOvA — Invited plenary talk
Neutrino 2026, Irvine, US — [June, 2026]

Recent Results & Future Directions in Long-Baseline Neutrino Oscillations — Invited talk
15th Conference on the Intersections of Particle and Nuclear Physics, Madison, US — [June, 2025]

Long-baseline Neutrino Measurements & Implications on Unitarity — Invited plenary talk
New Physics Opportunities at Neutrino Facilities (NPN), Cincinnati, US — [June, 2025]

Search for leptonic CP Violation: Insights from the contemporary neutrino oscillation experiments — Invited plenary talk
APS Global Physics Summit, Anaheim, US — [March, 2025]

Status of the Long-baseline Neutrino Oscillations — Invited plenary talk
CERN Neutrino Platform Pheno Week, CERN, Switzerland — [Feb, 2025]

Novel LArTPC technologies for near detectors — Invited plenary talk
NNN 2024, Rio De Janeiro, Brazil — [Oct, 2024]

New Results from the NOvA experiment & the joint-fit with T2K — Invited plenary talk
NNN 2024, Rio De Janeiro, Brazil — [Oct, 2024]

DUNE: Physics, Plans & Progress — Invited plenary talk
56th Fermilab Users Meeting, Fermilab, US — [June, 2023]

A tale of two experiments: NOvA & T2K — Invited plenary talk
Neutrino Generators Workshop, Fermilab, US — [March, 2023]

The Path to Precision: Role of the DUNE Near Detectors — Parallel talk
NuFACT, Salt Lake City, US — [August, 2022]

The Modular LArTPC: Design and Prototype for the DUNE ND — Parallel talk
Snowmass Summer Study, Seattle, US — [July, 2022]

Measuring long-baseline neutrino oscillations with NOvA and T2K — Invited plenary talk
7th Symposium on Neutrinos and Dark Matter in Nuclear Physics, Asheville, US — [May, 2022]

Prospects for long-baseline neutrino physics in 2020s — Invited plenary talk
APS April, New York City, US — [April, 2022]

Neutrino Scattering and oscillation measurements with NOvA data — Invited plenary talk
Interdisciplinary Developments in Neutrino Physics, KITP, Santa Barbara, US — [March, 2022]

Exploring the neutrino sector with long-baseline experiments — Invited talk
Rising Star in Experimental Particle Physics Symposium, Chicago, US — [October, 2021]

Neutrino Oscillation Results from the NOvA Experiment — Parallel talk
XIX International Workshop on Neutrino Telescopes, Padova, Italy — [February, 2021]

Institutional Colloquium and Seminars
Department Colloquium, University of Kansas, Kansas, US — [November, 2025]
Department Colloquium, University of Rochester, New York, US — [October, 2025]
Department Colloquium, University of Cincinnati, Cincinnati, US — [March, 2025]
HEP Seminar, University of California, Santa Barbara, US — [December, 2024]
HEP Seminar, University of Oxford, Oxford, UK — *(Virtual)*[May, 2024]
Lab Colloquium, Brookhaven National Laboratory, Brookhaven, US — [May, 2024]
HEP Seminar, University of Pennsylvania, Philadelphia, US — [May, 2024]
HEP Seminar, University of Sussex, Brighton, UK — *(Virtual)*[March, 2024]
HEP Seminar, University of California, Irvine, CA — [March, 2024]
Joint Experimental-Theoretical Physics Seminar*, Fermilab — [February, 2024]
**First public seminar on the joint NOvA-T2K analysis*
Department Colloquium, Ohio State University, Columbus, OH — [February, 2024]
HEP Seminar, Columbia University, New York, NY — [January, 2024]
HEP Seminar, University of Notre Dame, Notre Dame, IN — [September, 2023]
Department Colloquium, University of California, Davis, CA — [April 2023]
Neutrino Seminar, Fermilab, IL — [March, 2023]
HEP Seminar, University of Pittsburgh, Pittsburgh, PA — [February, 2023]
HEP Seminar, Indiana University, Bloomington, IN — [February, 2023]
HEP Seminar, Northwestern University, Evanston, IL — [October, 2022]
INPA Seminar, Lawrence Berkeley National Lab, Berkeley, CA — [April, 2021]
HEP Seminar, Michigan State University, East Lansing, MI — [February, 2021]

Teaching

International Neutrino Summer School — [July 2026]
Long-baseline Neutrino Oscillation Instructor, UC Santa Barbara

DUNE Data Analysis School — [May 2026]
DUNE Near Detector Science Instructor, Fermilab

Mechanics, Work & Energy, Thermal Physics [PHY 1250] — [Spring 2026]
Recitation and Laboratory Instructor, Ohio State University

Neutrino University — [July 2025]
Accelerator Neutrino Physics Instructor, Fermilab

Teaching Assistant [AST 112, PHY 133] — [2012-2014]
Laboratory Instructor, Stony Brook University

Mentoring

- **Kevin Vockerodt** (Postdoctoral Scholar, Ohio State University) [2025 - Present]
- **Ariam Acevedo Lopez** (Graduate Student, Ohio State University) [2025 - Present]
- **Oliver Alban** (Undergraduate Student, Ohio State University) [2025 - Present]
- **Jaansi Chaurasia** (Undergraduate Student, Ohio State University) [2026 - Present]
- **Varun R. Raj** (Graduate Student, Caltech) [2019 - 2024]
- **Scott Schwartz** (Graduate Student, Caltech) [2023 - 2024]
- **Billy Wang** (Graduate Student, Caltech) [2024]
- **Jude McLean** (Undergraduate Student, Caltech) [Summer 2023 & 2024]
- **Patill T. Daghlian** (Undergraduate Student, Caltech) [Summer 2022]
- **Juan Granieri** (Undergraduate Student, University of Notre Dame) [Summer 2022]
- **Cellie L. Cap**(Undergraduate Student, Caltech) [Summer 2021]

Awards & Fellowships

- Leona Woods Distinguished Postdoctoral Lectureship, Brookhaven National Laboratory [2024]
- Visiting Scholar Program Fellowship (USD 20,000), Universities Research Association [2022]
- Rising Star in Experimental Particle Physics, University of Chicago [2021]
- International Fellowship (USD 20,000), American Association of University Women (AAUW) [2017–2018]
- Junior Research Fellowship, National Eligibility Test by University Grants Commission, India (*Declined*) [2012–2014]
- Institute Silver Medal, Indian Institute of Technology Bombay [2012]
- INSPIRE Scholarship (INR 80,000/year), Department of Science and Technology, India [2007–2012]

Science Communication & Outreach

- Nature News & Views article on first results from JUNO experiment. [2026]
- Featured in articles on the first NOvA–T2K joint analysis by Reuters and Ohio State News. [2025]
- Mentored undergraduate students as part of Caltech's First-Year Summer Research Institute (program designed to provide academic support to the incoming class of underrepresented students) and WAVE Fellows (program aimed at fostering diversity by increasing the participation of students from historically marginalized identities in STEM). [Summer-2021,2022]
- Co-developed and taught a month long course on *Science and Society* for an after school program for high-school students of underserved communities in Pasadena, California. [April-May, 2021]
- Featured in an article on neutrino mass hierarchy in *Symmetry Magazine*. [2021]
- Showcased various science demos at *Taste of Science Festival* in New York City and open science day at Caltech, California. [2019, 2021]

- Featured on the *Story Collider* podcast. [2019]
- First prize and people's choice award at the university-wide 3 Minute Thesis competition for presenting my thesis research to a non-expert audience. [2017]
- President of Graduate Women in Science and Engineering group at Stony Brook University, leading a team of 10 council members to organize talks, workshops and other events to promote women and other minoritized groups in STEM fields. [2016-2017]
- Designed and taught a course on *Introduction to Particle Physics* for the Women in Science and Engineering honors program at Stony Brook University. [Spring 2016]