

Zoya Vallari

Postdoctoral Scholar Research Associate

Physics, Math & Astronomy Division
California Institute of Technology
Pasadena, United States

[2019 - Present]

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EDUCATION

Stony Brook University

PhD Particle Physics

Adviser: Prof. Chang Kee Jung

Dissertation: Measurement of Single π^0 Production in Neutral Current Neutrino Interactions on Water at the Near Detector of the T2K experiment

Stony Brook, NY

[2012 - 2018]

Indian Institute of Technology Bombay

Master of Science (M.Sc), Physics

Mumbai, India

[2010 - 2012]

St. Stephen's College, Delhi University

Bachelor of Science (B.Sc), Physics Honors

New Delhi, India

[2007 - 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

LEADERSHIP & PROFESSIONAL SERVICE

- Co-convener of DUNE's ND Prototypes Analysis physics working group. [2023 - Present]
- Co-convener of NOvA's 3-flavor oscillation analysis group. [2022 - Present]
- Executive Committee member of the NOvA experiment. [2022 - 2023, 2024 - Present]
- Co-organized several workshops to formulate and execute near-term analysis targets for DUNE, NOvA and NOvA-T2K collaborations. [(various dates) 2022 - 2024]
- Co-convener of the NOvA Production group. [2020 - 2021]
- Reviewer for Physical Review D and Physical Review Letters. [2020 - Present]
- Session chair at New Perspectives 2020, Fermilab Users' Meeting 2021, NDM 2022, and APS April 2022 conferences. [2020, 2021, 2022]
- First elected representative of T2K-Young to represent graduate students and postdocs and their interests in the collaboration. [2016 - 2017]

SELECTED CONFERENCES, COLLOQUIA, & SEMINARS

<i>Novel LArTPC technologies for near detectors</i> NNN 2024, Rio De Janeiro, Brazil	Invited plenary talk [Oct, 2024]
<i>New Results from the NOvA experiment & the joint-fit with T2K</i> NNN 2024, Rio De Janeiro, Brazil	Invited plenary talk [Oct, 2024]
<i>Probing fundamental symmetries through precision measurement of the neutrinos</i> Brookhaven National Laboratory, Brookhaven, US	Colloquium [May, 2024]
<i>DUNE: Physics, Plans & Progress</i> 56th Fermilab Users Meeting, Fermilab, US	Invited plenary talk [June, 2023]
<i>A tale of two experiments: NOvA & T2K</i> Neutrino Generators Workshop, Fermilab, US	Invited plenary talk [March, 2023]
<i>The Path to Precision: Role of the DUNE Near Detectors</i> NuFACT, Salt Lake City, US	Parallel talk [August, 2022]
<i>The Modular LArTPC: Design and Prototype for the DUNE ND</i> Snowmass Summer Study, Seattle, US	Parallel talk [July, 2022]
<i>Measuring long-baseline neutrino oscillations with NOvA and T2K</i> 7th Symposium on Neutrinos and Dark Matter in Nuclear Physics, Asheville, US	Invited plenary talk [May, 2022]
<i>Prospects for long-baseline neutrino physics in 2020s</i> APS April, New York City, US	Invited plenary talk [April, 2022]
<i>Neutrino Scattering and oscillation measurements with NOvA data</i> Interdisciplinary Developments in Neutrino Physics, KITP, Santa Barbara, US	Invited plenary talk [March, 2022]
<i>Exploring the neutrino sector with long-baseline experiments</i> Rising Star in Experimental Particle Physics Symposium, Chicago, US	Invited talk [October, 2021]
<i>Neutrino Oscillation Results from the NOvA Experiment</i> XIX International Workshop on Neutrino Telescopes, Padova, Italy	Parallel talk [February, 2021]

Particle Physics Seminars

Invited seminar

University of California, Santa Barbara, US	[December, 2024]
University of Pennsylvania, Philadelphia, US	[May, 2024]
University of Sussex, Brighton, UK	(Virtual)[March, 2024]
University of California, Irvine, CA	[March, 2024]
Joint Experimental-Theoretical Physics Seminar*, Fermilab	[February, 2024]
<i>*First public seminar on the joint NOvA-T2K analysis</i>	
Ohio State University, Columbus, OH	[February, 2024]
Columbia University, New York, NY	[January, 2024]
Notre Dame University, Notre Dame, IN	[September, 2023]
University of California, Davis, CA	[April 2023]
Neutrino Seminar, Fermilab, IL	[March, 2023]
University of Pittsburgh, Pittsburgh, PA	[February, 2023]

Indiana University, Bloomington, IN	[February, 2023]
Northwestern University, Evanston, IL	[October, 2022]
Lawrence Berkeley National Lab, Berkeley, CA	[April, 2021]
Michigan State University, East Lansing, MI	[February, 2021]

TEACHING

Science & Society [Summer 2020]
Co-developed and taught a month long course for an after-school program for high-school students from underserved communities in Pasadena, California

Introduction to Particle Physics [WSE 187] [Spring 2016]
Designed and taught a course for the Women in Science and Engineering (WISE) honors program at Stony Brook University for undergraduate women. Introduced them to experimental particle physics research with a focus on neutrino physics.

Astronomy Laboratory [AST 112] [Fall 2012, 2013 and Spring 2014]
Teaching Assistant, Stony Brook University

Classical Physics Laboratory I [PHY 133] [Spring 2013 and Summer 2013]
Teaching Assistant, Stony Brook University

MENTORING

- **Varun R. Raj** (Graduate Student, Caltech) [2019 - Present]
- **Scott Schwartz** (Graduate Student, Caltech) [2023 - Present]
- **Jude McLean** (Undergraduate Student, Caltech) [Summer 2023 & 2024]
- **Patill T. Daghlain** (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

- Winner of Leona Woods Distinguished Postdoctoral Lectureship award from the Brookhaven National Laboratory Department of Physics. [2023]
- Awarded 20,000 USD from the Universities Research Association's Visiting Scholar Program fellowship to conduct research at Fermilab. [2022]
- Won the Rising Star in Experimental Particle Physics award and was invited to present my work in a symposium held at U. Chicago. [2021]
- Awarded 20,000 USD from the American Association of University Women (AAUW) International Fellowship for academic achievement and commitment towards women and girls. [2017-2018]
- Selected for the Junior Research Fellowship award through the National Eligibility Test conducted by the University Grants Commission, India. (*Declined*) [2012 - 2014]
- Awarded the Institute Silver Medal for outstanding academic achievement in the masters program at Indian Institute of Technology, Bombay. [2012]

- Awarded INSPIRE Scholarship of 80,000 INR yearly to pursue an advanced degree in Natural Sciences by the Department of Science and Technology, India. [2007-2012]
- Recognized for exceptional achievements in academic and extracurricular activities during undergraduate studies at St. Stephen's College, Delhi University. [2010]

SCIENCE COMMUNICATION & OUTREACH

- Mentored undergraduate students as part of Caltech's Freshman 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]
- 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]
- Won the 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]
- Founding member of T2K-DEI that established a forum to discuss gender and equity issues in the T2K experiment. [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]
- Student representative of the Diversity Committee of the Department of Physics and Astronomy, Stony Brook University. [2016-2017]