Pranava Teja Surukuchi

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Education

2014 - 2019 **Ph.D., Physics**
Illinois Institute of Technology, Chicago, IL, USA
Thesis Title: Search for Sterile Neutrino Oscillations with the Prospect Experiment

2012 - 2013 **M.S., Physics**
Illinois Institute of Technology, Chicago, IL, USA

2006 - 2010 **B.Tech., Mechanical Engineering**
Jawaharlal Nehru Technological University, Hyderabad, India

Appointments

2019 - Present **Postdoctoral Research Associate**
Yale University, New Haven, CT, USA
Advisor: Dr. Karsten Heeger

2014 - 2019 **Research Assistant**
Illinois Institute of Technology, Chicago, IL, USA
Advisor: Dr. Bryce Littlejohn

Research Projects

2019 - Present **Project 8** *(neutrino mass measurement experiment)*
https://www.project8.org
Advisor: Dr. Karsten Heeger

- ***Chair*** of Phase-III antenna array design working group (June 2020 - Present)
- ***Coordinator*** of Phase-III position, track, and event reconstruction group (Oct 2020 - Present)
- ***Early Career Representative*** to the science board (Jan 2020 - Present)
- Developed simulations for antenna array radiation detection and electron reconstruction
- Detector operator for the experiment's Phase II data taking campaigns

2019 - Present **CUORE and CUPID** *(neutrinoless double beta decay experiments)*
https://cuore.lngs.infn.it
Advisor: Dr. Karsten Heeger

- ***WBS lead*** on acoustic and vibration sensors for the CUPID experiment
- Lead on the design of the muon veto system for the CUORE/CUPID experiment
- Performed efficiency calculations in search for neutrinoless double beta decay on the CUORE experiment
- CUORE Vetting Board member (Nov 2019 - Nov 2021)
- Shifter calendar administrator (2019 - Present)

2014 - Present **PROSPECT** *(Precision Reactor Oscillation and Spectrum Experiment)*
https://prospect.yale.edu
Advisors: Dr. Bryce Littlejohn and Dr. Karsten Heeger

- ***Convener*** of oscillation working group (2017-2019)
- ***Lead*** of design, fabrication, QA, and assembly of the target segmentation system
- ***Developer*** of PROSPECT's official sterile neutrino search framework
- Performed PROSPECT's first oscillation search for eV-scale sterile neutrinos
- Member of PROSPECT analysis coordination group (2017-2019)

Awards and Recognition

2017 **2017 APS April meeting Travel Grant**
Awarded to support travel to APS April meeting to present research work

2016, 2015 **IIT Annual BCPS poster presentation award**
First(2016), second(2015) prize for presenting research poster at the Annual Biology, Chemistry and Physics poster session

2015 **Faculty nominated member to Sigma Pi Sigma**

Society Membership and Service

- Snowmass 2021 Neutrino Oscillations (NF02) - White Paper Editor
- Snowmass 2021 Neutrino Properties (NF05) - Liaison
- Nuclear Particle and Astrophysics Seminar Series - Organizer (2020–2021)
- Snowmass 2021 Early Career Long-Term Organization - Team Leader (2020)
- APS DNP Conference Experience for Undergraduates 2020 - Chair
- APS DNP Conference Experience for Undergraduates 2020 - Mentor
- APS DNP Conference Experience for Undergraduates 2019 - Mentor
- Yale Physics Olympics 2019 - Executive member
- Academy of Urban School Leadership 7^{th} annual STEAM fair 2018 - Judge
- Chicago Area STEM Exhibition 2018 - Judge
- Chicago Area Undergraduate Research Symposium 2017 - Judge
- International Conference on High Energy Physics 2016 - Outreach Volunteer
- Math Club, Illinois Institute of Technology - Vice-President (2012-2013)
- IIT High School Math Competition - Panel Member (2013, 2012)
- CSIM, IV International Military Games - Volunteer (2007)

Professional Development, Teaching, and Mentoring

2021	**PHYS 530/BBS 879: Theory and Practice of Scientific Teaching** Poorvu Center for Teaching and Learning, Yale University, New Haven, CT, USA
2021	**Mentorship Training Program for Postdocs** Yale Postdoctoral Affairs, Yale University, New Haven, CT, USA
2014	**Teaching Assistant** Department of Physics, Illinois Institute of Technology, Chicago, IL, USA
2013 - 2016	**Tutor** Academic Resource Center, Illinois Institute of Technology, Chicago, IL, USA
2012	**Program Instructor** Skyway Enrichment Program, Chicago Public Schools, Chicago, IL, USA

Students Advised

Samantha Pagan	2019 - Present	Graduate student at Yale University
Ridge Liu	2020 - Present	Graduate student at Yale University
Iris Ponce	2020 - Present	Graduate student at Yale University
Caitlin Gainey	2019 - Present	Undergraduate student at Yale University
Gabe Hoshino	2020 - Present	Graduate student at University of Chicago
Yonas Gebre	2016 - 2018	Graduate student at University of Colorado at Boulder

Invited Seminars

Latest Status on the Search for Sterile Neutrinos (invited talk)
40^{th} International Symposium on Physics in Collision (PIC 2020), Aachen, Germany, September 14 – 17, 2021

Latest Results from the CUORE Experiment (invited talk)
20^{th} Lomonosov Conference on Elementary Particle Physics, Remote, Aug 19 – 25, 2021

Latest Results from the CUORE Experiment (invited seminar)
Nuclear, Particle, and Astrophysics Seminar, Wright Laboratory, Yale University, Remote seminar, May 19, 2021

Direct Measurement of Neutrino Mass with the Project 8 Experiment (invited seminar)
Kavli Institute for Cosmological Physics Seminar Series, University of Chicago, Remote seminar, Feb 25, 2021

CUORE, CUPID, and the Nature of Neutrino Mass
Brookhaven National Laboratory Seminar, June 18, 2020

First search for short-baseline neutrino oscillations at HFIR with PROSPECT (Invited Seminar)
Fermilab Joint Experimental-Theoretical Physics Seminar, Fermilab, Batavia, IL, USA, Aug, 2018

Prospects for Sterile Neutrino Searches at Reactors (Invited)
Nu Horizons VII, Harish Chandra Research Institute, Allahabad, India, Feb 22, 2018

PROSPECT: A Precision Reactor Oscillation and Spectrum Experiment (Invited Seminar)
Indian Institute of Technology, Hyderabad, India, Feb 19, 2016

Conferences and Presentations

Latest Results from the CUORE Experiment in Search for $0\nu\beta\beta$
APS DNP Conference, Remote, Oct 12, 2021

Event Reconstruction in the Project 8 Free Space CRES Demonstrator
APS April Meeting, remote conference, Apr 19, 2021

Analysis Techniques for Background Reduction and Event Identification in the Search for $0\nu\beta\beta$ with CUORE
APS DNP Conference, Remote, Oct 30, 2020

Simulation and Signal Extraction for the Project 8 Free Space CRES Demonstrator
XXIX International Conference on Neutrino Physics and Astrophysics, Remote, June 22 – 2, 2020

Modeling Transmitting Antennas to Simulate Phase-III of the Project 8 Experiment
APS DNP Conference, Arlington, Virginia, USA , Oct 16, 2019

Measurement of Reactor Antineutrino Spectrum from ^{235}U using PROSPECT
APS DPF Conference, Northeastern University, Boston, MA, USA, Aug 8, 2019

Searching for Sterile Neutrino Oscillations with the PROSPECT Experiment (Poster)
51st Annual Users Meeting, Fermilab, Batavia, IL, USA, Jun 20, 2018

Prospects for Improved Understanding of Isotopic Reactor Antineutrino Fluxes
5th Annual PIKIO Conference, University of Illinois Urbana-Champaign, Urbana, IL, USA, Mar 17, 2018

Design of the PROSPECT Experiment (Poster)
International Neutrino Summer School, Chicago, IL, USA, Aug 16, 2017

PROSPECT: Precision Reactor Oscillation and Spectrum Experiment
APS DPF Conference, Fermilab, Chicago, IL, USA, Aug 8, 2017

Sterile Neutrino Search with the PROSPECT Experiment
New Perspectives Conference, Fermilab, Chicago, IL, USA, Jun 6, 2017

A Precision Reactor Oscillation and Spectrum Experiment
IPA 2017, Chicago, IL, USA, May 9, 2017

Sterile Neutrino Search with the PROSPECT Experiment
APS April Meeting, Washington DC, USA, Jan 28, 2017

Design of the PROSPECT Experiment (Poster)
International Conference on High Energy Physics, Chicago, IL, USA, Aug 6, 2016

Background and Detector Response Studies for PROSPECT Experiment
Prairie Section American Physical Society Meeting (PSAPS), Notre Dame University, South Bend, IN, USA, Nov 21, 2015

PROSPECT: A Precision Reactor Oscillation and Spectrum Experiment
New Perspectives Conference, Fermilab, Chicago, IL, USA, Jun 8, 2015

Relevant Publications

CUORE Opens the Door to Tonne-scale Cryogenics Experiments
CUORE Collaboration, PPNP (2021) 103902

Bayesian Analysis of a Future Beta Decay Experiment's Sensitivity to Neutrino Mass Scale and Ordering
Project 8 Collaboratiion, Phys.Rev.C 103 (2021) 6, 065501

Measurement of the $2\nu\beta\beta$ Decay Half-Life of ^{130}Te with CUORE
CUORE Collaboration, Phys.Rev.Lett. 126 (2021) 17, 171801

Search for Double-Beta Decay of ^{130}Te to the 0^+ States of ^{130}Xe with CUORE
CUORE Collaboration, Eur.Phys.J.C volume 81 (2021) 567

Characterization of cubic $Li_2^{100}MoO_4$ crystals for the CUPID experiment
CUPID Collaboration, Eur.Phys.J.C 81 (2021) 2, 104

A CUPID $Li_2^{100}MoO_4$ scintillating bolometer tested in the CROSS underground facility
CUPID Collaboration, JINST 16, P02037 (2021)

A novel technique for the study of pile-up events in cryogenic bolometers
CUPID Collaboration, Phys. Rev. C 104, 015501 (2021)

Other Publications

Limits on Sub-GeV Dark Matter from the PROSPECT Reactor Antineutrino Experiment
PROSPECT Collaboration, Phys.Rev.D 104 (2021) 1, 012009

Improved Short-Baseline Neutrino Oscillation Search and Energy Spectrum Measurement with the PROSPECT Experiment at HFIR
PROSPECT Collaboration, Phys. Rev. D 103, 032001 (2021)

Nonfuel antineutrino contributions in the ORNL High Flux Isotope Reactor
PROSPECT Collaboration, Phys.Rev.C 101 (2020)

Diagnosing the Reactor Antineutrino Anomaly with Global Antineutrino Flux Data
C. Giunti , Y.F. Li, B.R. Littlejohn, P.T. Surukuchi, Phys. Rev. D 99, 073005 (2019)

Measurement of the Antineutrino Spectrum from ^{235}U Fission at HFIR with PROSPECT
PROSPECT Collaboration, Phys. Rev. Lett. 122, 251801 (2019)

The Radioactive Source Calibration System of the PROSPECT Reactor Antineutrino Detector
PROSPECT Collaboration, Nuclear Inst. and Methods in Physics Research, A (2019), 162465

A Low Mass Optical Grid for the PROSPECT Reactor Antineutrino Detector
PROSPECT Collaboration, JINST 14, P04014 (2019)

Lithium-loaded Liquid Scintillator Production for the PROSPECT experiment
PROSPECT Collaboration, JINST 14, P03026 (2019)

The PROSPECT Reactor Antineutrino Experiment
PROSPECT Collaboration,Nuclear Inst. and Methods in Physics Research, A (2018), Pages 287-309

First search for short-baseline neutrino oscillations at HFIR with PROSPECT
PROSPECT Collaboration, Phys. Rev. Lett. 121 251802 (2018)

Performance of a segmented ^{6}Li-loaded liquid scintillator detector for the PROSPECT experiment
PROSPECT Collaboration, arXiv:1805.09245, JINST 13, P06023 (2018)

Prospects for improved understanding of isotopic reactor antineutrino fluxes
Y.Gebre, B. R. Littlejohn, P. T. Surukuchi, Phys. Rev. D 97, 013003 (2017)

The PROSPECT Physics Program
PROSPECT Collaboration, J. Phys. G: Nucl. Part. Phys. 43 113001 (2016)

Background radiation measurements at high power research reactors
PROSPECT Collaboration, Nuclear Inst. and Methods in Physics Research, A (2016), pp. 401-419

Light collection and pulse-shape discrimination in elongated scintillator cells for the PROSPECT reactor antineutrino experiment
PROSPECT Collaboration, JINST 10, P11004 (2015)

Proposals, Reports, and Preprints

High sensitivity neutrinoless double-beta decay search with one tonne-year of CUORE data
CUORE Collaboration, arXiv:2104.06906 (Currently under peer review)

PROSPECT-II Physics Opportunities
PROSPECT Collaboration, arXiv:2107.03934 (Currently under peer review)

Joint Measurement of the ^{235}U Antineutrino Spectrum by PROSPECT and STEREO
PROSPECT and STEREO Collaborations, arXiv:2107.03371 (Currently under peer review)

Joint Determination of Reactor Antineutrino Spectra from ^{235}U and ^{239}Pu Fission by Daya Bay and PROSPECT
Daya Bay and PROSPECT Collaborations, arXiv:2106.12251 (Currently under peer review)

Note on arXiv:2005.05301, 'Preparation of the Neutrino-4 experiment on search for sterile neutrino and the obtained results of measurements'
PROSPECT Collaboration and STEREO Collaboration, arXiv:2006.13147

CUPID pre-CDR
CUPID Collaboration, arXiv:1907.09376

PROSPECT - A Precision Reactor Oscillation and Spectrum Experiment at Short Baselines
PROSPECT Collaboration, arXiv:1309.7647

Technical Skills

Programming Languages	C, C++, ROOT, Bash, Java, LaTeX Mathematica, Python, mySQL, PostgreSQL, Geant4
Platforms	Linux, Mac OSX, Microsoft Windows
Tools and Technologies	AutoCAD Inventor, Microsoft Office, Additive manufacturing techniques

Other Work Experience

2012 - 2015	**IT Manager** TechNews, student-run newspaper at Illinois Institute of Technology, Chicago, IL, USA
2012 - 2014	**Help Desk Assistant** Office of Technical Services, Illinois Institute of Technology, Chicago, IL, USA
2010 - 2011	**Assistant Systems Engineer** Tata Consultancy Services, Mumbai, India

Languages

English	Full professional proficiency
Hindi	Native proficiency
Telugu	Native proficiency

References available upon request