

# PRANAVA TEJA SURUKUCHI

Department of Physics, Wright Laboratory  
Yale University  
266 Whitney Ave  
New Haven, CT 06520, USA

Cell: (630)-423-2468  
Email: [pranavateja.surukuchi@yale.edu](mailto:pranavateja.surukuchi@yale.edu)

## 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<sup>th</sup> 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	<b>PHYS 530/BBS 879: Theory and Practice of Scientific Teaching</b> Poorvu Center for Teaching and Learning, Yale University, New Haven, CT, USA
2021	<b>Mentorship Training Program for Postdocs</b> Yale Postdoctoral Affairs, Yale University, New Haven, CT, USA
2014	<b>Teaching Assistant</b> Department of Physics, Illinois Institute of Technology, Chicago, IL, USA
2013 - 2016	<b>Tutor</b> Academic Resource Center, Illinois Institute of Technology, Chicago, IL, USA
2012	<b>Program Instructor</b> 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<sup>th</sup> International Symposium on Physics in Collision (PIC 2020), Aachen, Germany, September 14 – 17, 2021

### **Latest Results from the CUORE Experiment (invited talk)**

20<sup>th</sup> 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 $^{235}\text{U}$ 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 $^{130}\text{Te}$ with CUORE**

CUORE Collaboration, Phys.Rev.Lett. 126 (2021) 17, 171801

### **Search for Double-Beta Decay of $^{130}\text{Te}$ to the $0^+$ States of $^{130}\text{Xe}$ with CUORE**

CUORE Collaboration, Eur.Phys.J.C volume 81 (2021) 567

### **Characterization of cubic $\text{Li}_2^{100}\text{MoO}_4$ crystals for the CUPID experiment**

CUPID Collaboration, Eur.Phys.J.C 81 (2021) 2, 104

### **A CUPID $\text{Li}_2^{100}\text{MoO}_4$ 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 $^{235}\text{U}$ 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 $^6\text{Li}$ -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 $^{235}\text{U}$ Antineutrino Spectrum by PROSPECT and STEREO**

PROSPECT and STEREO Collaborations, arXiv:2107.03371 (Currently under peer review)

### **Joint Determination of Reactor Antineutrino Spectra from $^{235}\text{U}$ and $^{239}\text{Pu}$ 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	<b>IT Manager</b> TechNews, student-run newspaper at Illinois Institute of Technology, Chicago, IL, USA
2012 - 2014	<b>Help Desk Assistant</b> Office of Technical Services, Illinois Institute of Technology, Chicago, IL, USA
2010 - 2011	<b>Assistant Systems Engineer</b> Tata Consultancy Services, Mumbai, India

## Languages

English	Full professional proficiency
Hindi	Native proficiency
Telugu	Native proficiency

*References available upon request*