

Sowjanya Gollapinni

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Education

- Ph.D., Physics, Wayne State University, 2012
Thesis: Search for Contact Interactions in the Di-muon Channel at CMS, *Advisor:* Paul Karchin
- M.S., Physics, Wayne State University, 2009
- M.Sc., Physics, Particle Physics specialization, University of Hyderabad, India, 2005
- B.Sc., Physics, Maths & Comp. science, Sri Venkateswara University, India, 2003

Employment

- Scientist 4 (senior scientist), Physics Division, Los Alamos National Lab, 2019 – present
- Adjunct Assistant Professor, University of Tennessee, Knoxville, 2019 – present
- Assistant Professor, University of Tennessee, Knoxville, 2016 – 2019
- Post-doctoral Research Associate, Kansas State University, 2012 – 2016
- Graduate Research Assistant, Wayne State University, 2009 – 2012
- Graduate Teaching Assistant, Wayne State University, 2007 – 2009

Fellowships, Awards and Scholarships

- Department of Energy (DOE) Early Career Award (ECA), 2019
- Intensity Frontier Fellow, Fermilab, 2015
- Dissertation Fellowship, Wayne State University, 2012
- Universities Research Association (URA) Visiting Scholar Award, Fermilab, 2011
- 5th CERN-Fermilab Hadron Collider Physics Summer School Scholarship, Fermilab, 2010

Scientific Leadership:

- DUNE Co-Editor/Author, Technical Design Report (TDR) for Calibration
- DUNE Laser Calibration System Working Group Leader, 2019-present
- DUNE Executive Board, Member, 2018-present
- DUNE Slow Controls & Cryogenic Instrumentation Consortium Leader, 2017- present
- DUNE Calibration Task Force Co-Leader, 2017-present
- DUNE Technical Board, Member, 2017-present
- SBN Joint Detector Controls and Monitoring Group, Co-Convener, 2017-present
- SBND Detector Controls and Monitoring, Level-3 Manager, 2015-present
- MicroBooNE Neutrino Cross-section Physics Group, Co-Convener, 2015-2016
- MicroBooNE Cosmogenics Task Force Leader, 2014-2015
- MicroBooNE Detector Controls & Monitoring Installation & Commissioning Leader, 2014-2015
- MicroBooNE Software Tools Group Co-Convener, 2013-2016

Collaboration Membership: CMS, MicroBooNE, SBND, SBN, DUNE

DUNE (2016-present)

– The Deep Underground Neutrino Experiment (DUNE), currently a 1100+ member international collaboration will be the largest Liquid Argon Time Projection Chamber (LArTPC) ever to be built for neutrinos I am currently one of the 9 leaders elected to lead the DUNE Far Detector construction project. I am the leader of the DUNE Far Detector Slow Controls and Cryogenic Instrumentation Consortium and will lead the effort to plan and execute the construction, installation and commissioning of this important system. This effort was reported in the DUNE Interim Design Report (IDR) and will result in a full Technical Design Report (TDR) in July 2019.

– I am also currently co-leading the DUNE Far Detector Calibration Task Force (CTF) to develop a calibration strategy for DUNE to recommend the needed calibration hardware and perform relevant studies. Based on the recommendations of the calibration task force, a calibration consortium is formed to design and build calibration systems for DUNE. This effort was reported in the DUNE IDR and will result in a full TDR in July 2019. Very recently, I was appointed the laser calibration system working group leader which forms the primary calibration system for DUNE.

SBND (2015-present)

– The Short-Baseline Near Detector (SBND) experiment will serve as the near detector in the Short-Baseline Neutrino (SBN) program at Fermilab and will operate along with two other detectors, MicroBooNE and ICARUS. I am currently leading the Detector Controls and Monitoring effort for SBND as the Level-3 Data Acquisitions manager. I am also co-leading the same effort for the entire SBN Program.

MicroBooNE (2012-present)

– Held several leadership roles in MicroBooNE, an 170+ member international collaboration. I successfully co-designed, installed and commissioned the Detector Controls and Monitoring system. This system is operating successfully to date and is one of the most successfully designed systems in MicroBooNE. In my role as the Cosmogenics Task Force leader, I successfully lead a team of students/postdocs to understand the impact of Cosmogenic backgrounds on the MicroBooNE flagship oscillation analyses. My group generated first estimates of background rates and recommended that MicroBooNE install a concrete overburden to suppress the background. These studies were not only beneficial to MicroBooNE but the entire surface-based SBN Program.

– As the co-convener of the MicroBooNE Cross-section group, I laid the foundation and oversaw the progress of multiple neutrino cross-section measurements and co-lead the overall cross-section effort for MicroBooNE. Additionally, I am currently leading the electron attenuation and diffusion measurements using cosmic rays. My group produced a first-of-its-kind electron attenuation measurement for surface liquid argon detectors. I am widely recognized as an expert in detector physics and calibration for LArTPCs. I received the Fermilab Intensity Frontier award in 2015 for my research on MicroBooNE. My team is currently co-leading the MicroBooNE flagship analysis with single photon events to explain the MiniBooNE low-energy excess.

CMS (2007-2012)

– My Ph.D thesis was on the Compact Muon Solenoid (CMS) experiment located at CERN in Geneva, Switzerland. I searched for a new physics signature in the form of four-fermion contact interactions, arising due to the substructure of quarks and leptons, in events with two isolated muons in the final state. The thesis was performed using 5.3 inverse femto-barns of proton collision data collected in 2011 at a center-of-mass energy of 7 TeV. While no evidence for contact interactions was found, my thesis results set the most stringent exclusion limits at the time.

Postdoc, Graduate & Undergraduate Advising

- Postdoc, Wei Tang, 2017-present
(2018 Fermilab NPC Fellow)
- Ph.D., Andrew Mogan, 2016-present
(2018 DOE SCGSR Fellow; 2019 Fermilab NPC Fellow)
- Ph.D., Gray Yarbrough, 2016-present
(2017 Fermilab NPC Fellow; 2018 DOE SCGSR Fellow)
- Undergraduate, Tara Skiba, 2017-2018

Thesis Committees

- Ph.D Thesis Committee, Himel Acharya, UTK, 2021
- Ph.D Thesis Committee, Jimmy Caylor, UTK, 2021
- Ph.D Thesis Committee, Joshua Barrows, UTK, 2021
- Ph.D Thesis External Examiner, Siva Prasad Kasetti, U. of Hyderabad, India, 2018
- M.S. Thesis Committee, Biswas Sharma, UTK, 2018
- M.S. Thesis Committee, Blaine Heffron, UTK, 2016

Teaching

- PHYS231, Electricity and Magnetism (Engineers), Spring 2019 (double teaching)
- PHYS231, Electricity and Magnetism (Engineers), Spring 2018
- PHYS222, Elements of Physics II (Pre-Med), Fall 2017
- PHYS222, Elements of Physics II (Pre-Med), Spring 2017

Conference Committees

- Working Group Convener, "Noble Element Detectors" session at CPAD 2018, Dec. 9-11, 2018
- South Eastern Section of APS (SESAPS), Local Organizing Committee and Scientific Program Committee, Nov. 8-10, 2018
- International Neutrino Masterclass Development Workshop, Organizer/Host, University of Tennessee, Knoxville, TN, Oct. 13-14, 2018.
- DUNE Calibration Workshop, Co-organizer, Fermilab, March 14-16, 2018
- APS DPF, Outreach, Education and Diversity in Physics, Working Group Co-Convener, 2017 (Co-organized Inaugural DPF plenaries and parallel sessions on Outreach & Diversity)
- APS DPF, Neutrino Cross Sections, Session Chair, 2017
- APS DPF, LArTPC R&D, Session Chair, 2017
- APS DPF, Equity, Diversity and Inclusivity in Physics, Session Co-Chair, 2017
- APS DPF, Innovations in Science Communication, Session Co-Chair, 2017
- ICHEP, Long Baseline Neutrino Oscillation Physics, Session Chair, 2016

Physics Community Service

- Member, American Physical Society (APS) Committee on Minorities, 2019-present

- Department of Energy Science Graduate Student Research (DOE SCGSR), Reviewer, 2019
- DOE Intensity Frontier Lab Comparative Review, Panelist & Reviewer, 2018
- Chair, Elected, Fermilab Users' Executive Committee (UEC), 2017-2018
- Served on 3 MicroBooNE Physics Analysis Editorial Boards, 2017-2018
- Co-organizer, Fermilab Equity, Diversity and Inclusivity "101" Seminar Series, Summer 2018
- Advocacy for High-Energy Physics Funding, UEC Washington D.C. Trip, March 2018
- Committee Member & Co-Convener, New Vision for Fermilab Education and Public Outreach (VEPO) Committee, 2017-2018
- MicroBooNE Talks Committee, member, 2017-present
- Fermilab Users' Meeting, Directorate Panel Member, 2017
- Fermilab Users' Executive Committee, Science Outreach Sub-Committee Chair, 2016-2017
- Fermilab Users' Executive Committee (UEC), member, 2016-2018
- Advocacy for High-Energy Physics Funding, UEC Washington D.C. Trip, March 2017

University/Department Service

- Co-organizer, Department Colloquium series, Fall 2019
- Department Commencement Ceremony Spring 2019 Committee, 2019
- Department Diversity Task Force, 2018-present
- Department Faculty Search Committee, 2018-2019
- Department Graduate Student Recruitment and Admissions Committee, 2017, 2018
- Department Qualifying Exam Committee, 2017-2018
- Organizer, Graduate Student Participation Seminar Series, Fall 2017
- Organizer, Astro-Particle Physics Seminar Series, Spring 2017

Funded Proposals & Fellowships

- DOE Early Career Award HEP Grant, 2019-2024
- DOE Intensity Frontier HEP Base Grant, 2018-2021
- DOE Intensity Frontier HEP Supplemental Grant, 2018-2021
- NSF funded QuarkNet Program, 2017-present
- Fermilab Neutrino Physics Center Fellowship for graduate advisee, A. Mogan, Spring 2019
- Fermilab Neutrino Physics Center Fellowship for postdoc, W. Tang, Summer 2018
- DOE Office of Science Graduate Student Research (SCGSR) Fellowship to graduate advisee, G. Yarbrough, 01/2018–01/2019
- DOE Office of Science Graduate Student Research (SCGSR) Fellowship to graduate advisee, A. Mogan, 01/2018–01/2019
- Fermilab Neutrino Physics Center Fellowship for graduate advisee, G. Yarbrough, Summer 2017

Conference Presentations

- CPAD 2018, **Invited Plenary Talk**, *Neutrino Physics Overview*, Providence, RI, Dec. 9, 2018.
- APS SESAPS 2018, **Invited Talk**, *MicroBooNE: Status & Results*, Knoxville, TN, Nov. 9, 2018
- NuFact 2018, **Invited Plenary Talk**, *Status of DUNE*, Blackburg, VA, Aug. 15, 2018.

- Aspen 2018 Winter Conference, **Invited Plenary Talk**, *MicroBooNE: Status & Results*, Aspen, CO, March 29, 2018.
- NuEclipse, **Invited Talk**, *LArTPC Reconstruction Challenges*, Knoxville, TN, Aug. 22, 2017.
- AAPT Summer Meeting, **Invited Talk**, *Probing the Secrets of the Universe with Neutrinos*, Cincinnati, OH, July 24, 2017.
- DUNE/SBN Joint Workshop, **Invited Talk**, *Detector Physics in MicroBooNE – Lessons Learned*, Fermilab, May 15, 2017.
- Nuclear Structures 2016 Conference, **Invited Talk**, *Neutrino-Nucleus Interactions with LArTPCs*, Oak Ridge National Lab, Knoxville, TN, July 30, 2016.
- NuHorizons, **Invited Plenary Talk**, *Neutrino Cross Sections: Current Status and Impact on Oscillation Measurements*, Ahmedabad, India, March 19, 2016.
- NuPhys 2015, **Invited Plenary Talk**, *Neutrino Cross Section Future*, London, U.K., Dec 16, 2015.
- CIPANP 2015, **Invited Talk**, *Accelerator-based Short-Baseline Neutrino Oscillation Experiments*, Vail, CO, May 19, 2015.
- Nulnt14, **Invited Talk**, *Prospects of making low-energy neutrino cross-section measurements at MicroBooNE*, London, U.K., May 19, 2014.
- Fermilab All Experimenters' Meeting, *Status of the MicroBooNE experiment*, Fermilab, IL, Nov. 11, 2013.
- DOE CMS Visit, **Invited Talk**, *Contact interactions in the Di-Muon Channel at CMS*, Fermilab, IL, June 8, 2012.
- PHENO2012, Parallel Talk, *Results of Contact Interactions Search in Di-muon Final states at CMS using 2011 data*, Pittsburgh, PA, May 7, 2012.
- APS April Meeting, Parallel Talk, *Search for Contact Interactions in the Di-muon channel in p-p collisions at CMS*, Atlanta, Georgia, March 31, 2012.

Seminars & Colloquia

- *Unlocking the Mysteries of Neutrinos with the Deep Underground Neutrino Experiment*
Physics Colloquium, Columbia University, New York, NY, March 25, 2019
- *Neutrino Oscillation Physics with Liquid Argon Detectors*
HEP Seminar, Rutgers University, NJ, February 14, 2019
- *Neutrinos: Small Particles, Big Science!*
Physics Colloquium, University of Oregon, Eugene, OR, February 7, 2019
- *From MicroBooNE to DUNE*
Experimental Seminar Series, SLAC, CA, Nov. 2, 2018
- *From MicroBooNE to DUNE: Towards the biggest, most intense neutrino experiment ever!*
Physics Division Seminar, Los Alamos National Lab, Los Alamos, NM, May 21, 2018
- *The DUNE Experiment*
HEP Seminar, Argonne National Laboratory, IL, May 7, 2018
- *From MicroBooNE to DUNE: Towards the biggest, most intense neutrino experiment ever!*
Physics Colloquium, Drexel University, PA, November 30, 2017
- *Neutrino Physics with Liquid Argon Detectors*
UTK Department of Physics Graduate Student Seminar, November 22, 2017
- *MicroBooNE and the path to DUNE*

- HEP Seminar, Rutgers University, NJ, November 6, 2017
- *MicroBooNE: Status and First Results*
HEP Seminar, University of Tennessee, Knoxville, TN, Oct. 12, 2016
- *Neutrinos*
UTK Department of Physics Graduate Student Seminar, August 24, 2016
- *MicroBooNE: Marking a Nu Era in Precision Neutrino Physics*,
HEP Seminar, Brookhaven National Laboratories, July 15, 2016
- *Chasing the Secrets of the Ghostly Neutrino*,
Brookhaven Women in Science (BWIS) Colloquium talk, BNL, NY, July 14, 2016
- *Hunting for Nu Physics with Liquid Argon Detectors*,
Physics Colloquium, University of Mississippi, Oxford, March 7, 2016
- *Neutrino Physics with Liquid Argon Detectors*,
Physics Colloquium, University of Tennessee, Knoxville, March 3, 2016
- *Neutrino Physics with Liquid Argon Detectors*,
Physics Colloquium and guest speaker for 6th Annual Graduate Research Day,
Department of Physics, Wayne State University, April 17, 2015.
- *The MicroBooNE LArTPC: Status and Physics Goals*,
Physics Colloquium, Northern Illinois University, March 28, 2014
- *The MicroBooNE Experiment at Fermilab*,
HEP Seminar, University of Kansas, March 13, 2014
- *The Status of the MicroBooNE Experiment*,
HEP Seminar, Kansas State University, March 12, 2014

Public Lectures

- *Physics & Society*, Fermilab Saturday Morning Physics Lecture, Fermilab, Apr. 2019
- *Neutrinos: Why Do They Matter?*, The QuarkNet CMS Masterclass workshop, UTK, Apr. 2018
- *Catching the Invisible*, Vol. 10 PechaKucha Night Public Talk Series, Fermilab, Feb. 15, 2018
- *Particle Physics For Everyone: The Things You Don't See Matter the Most – A Dive into the World of Sub-Atomic Particles*, Physics For Everyone Public Lecture Series, UTK, Knoxville, TN, Oct. 28, 2017
- *Neutrinos: Weird and Wonderful (part I & II)*, Oak Ridge Institute for Continued Learning (ORICL), Oak Ridge, TN, July 7 and August 11, 2017
- *The Ghostly Neutrinos*, UTK Saturday Morning Physics Lecture, Knoxville, TN, Feb. 18, 2017
- *Neutrinos: Weird and Wonderful*, Fermilab Saturday Morning Physics, Fermilab, Batavia, IL, Feb. 6, April 16, and Oct. 22, 2016

Outreach & Education

- *International Neutrino Masterclass Development Workshop*, UTK, July 2019
- *International MINERvA Masterclass event*, Host and Organizer, UTK, Apr. 2019
- *International Neutrino Masterclass Development Workshop*, UTK, October 2018
- *Panelist, Fermilab FSPA Career Panel*, Fermilab, June 2018
- *International CMS Masterclass event*, Host and Organizer, UTK, Apr. 2018
- *Cosmic ray detector workshop II for high school teachers and students*, Host and Organizer,

UTK, Feb. 2018

- *Designing Inaugural International Neutrino Master Class with MicroBooNE for High School Teachers/Students, Lead Physicist*, 2016-present (collaboration between MicroBooNE, QuarkNet and the Univ. of Notre Dame)
- Fermilab Saturday Morning Physics Program, **Co-Director**, 2016-present (*5th in Director-line; Founded by former Fermilab Director & Nobel Laureate Leon Lederman*)
- *Launched QuarkNet Program at UTK*, Primary Mentor & UTK QuarkNet **Center Leader**, 2017
- *Cosmic ray detector workshop I for high school teachers and students*, Host and Organizer, UTK, Dec. 2017
- *Electromagnetism and Particle Physics*, West High School, UTK Science Academy Lecture, Knoxville, TN, September 2017
- *The Elusive Neutrino*, UTK Facebook Live Chat Event, August 2017
- *Women in Physics*, UTK Facebook Live Chat Event, April 2016
- *Neutrinos*, Science Cafe Lecture, South Doyle Middle School, Knoxville, TN, Feb. 16, 2017
- *The Neutrino Secrets*, West High School, Knoxville, TN, December 12, 2016
- *Careers in physics*, West high school, Knoxville, TN, November 2016
- *Ghostly Neutrinos*, UTK Facebook Live Chat Event, November 2, 2016
- *Panelist*, STEM Career Expo for High School Students, Fermilab, April 20, 2016
- *Meet a Scientist Q&A Series* for High School and College Tour Groups, Fermilab, 2012-2017
- *Panelist*, 2015 Annual Careers Conference for High schoolers, Univ. of Chicago, IL, May 9, 2015
- *Panelist*, STEM Career Expo for High School Students, Fermilab, April 22, 2015
- *Workshop Leader for Middle School Girls*, Expand Your Horizons (EYH15), University of Illinois, Chicago, IL, March 28, 2015
- *Workshop Mentor* for High School Girls, Introduce a Girl to Engineering Day (IGED2015), Argonne National Lab, IL, Feb. 26, 2015

Selected Journal Publications

- The MicroBooNE Collaboration, "First Measurement of Muon Neutrino Charged Current Neutral Pion Production on Argon with MicroBooNE LArTPC", *Phys. Rev. D* 99, 091102 (R) (2019).
- The MicroBooNE Collaboration, "Comparison of ν_{μ} -Ar multiplicity distributions observed by MicroBooNE to GENIE model predictions", May 2018, *Eur. Phys. J. C* 79, 248 (2019).
- The MicroBooNE Collaboration, "Michel Electron Reconstruction Using Cosmic Ray Data from the MicroBooNE LArTPC", *JINST* 12, P09014 (2017).
- The MicroBooNE Collaboration, "Measurement of Cosmic Ray Reconstruction Efficiencies in the MicroBooNE LArTPC Using Small External Cosmic Ray Counter", *JINST* 12, P12030 (2017).
- The MicroBooNE Collaboration, "Design and Construction of the MicroBooNE Detector", *JINST* 12, P02017 (2017).
- R. Acciarri et al., "Construction and Assembly of the Wire planes for the MicroBooNE Time Projection Chamber", *JINST* 12, T03003 (2017).
- L. F. Bagby et al., "Breakdown Voltage of Metal-oxide Resistors in Liquid Argon", *JINST* 9, T11004 (2014).
- J. Asaadi et al., "Testing of High Voltage Surge Protection Devices for use in Liquid Argon TPC Detectors", *JINST* 9, P09002 (2014).

- The CMS Collaboration, "Search for Contact Interactions using the Di-muon Mass Spectrum in pp Collisions at $\sqrt{s} = 7$ TeV", Phys. Rev. D 87, 032001 (2013).

Selected PrePrints

- The MicroBooNE Collaboration, "First Measurement of Inclusive Muon Neutrino Charged Current Differential Cross-sections on Argon at $E_\nu \sim 0.8$ GeV with the MicroBooNE Detector", May 2019, <http://arxiv.org/abs/1905.09694v1> (submitted to Phys. Rev. Letters)
- The DUNE Collaboration, "The DUNE Far Detector Interim Design Report, Volume 1: Physics, Technology and Strategies", July 2018, <http://arxiv.org/abs/1807.10334v1>.
- The DUNE Collaboration, "The DUNE Far Detector Interim Design Report, Volume 2: Single-Phase Module", July 2018, <http://arxiv.org/abs/1807.10327v1>.
- The DUNE Collaboration, "The DUNE Far Detector Interim Design Report, Volume 2: Dual-Phase Module", July 2018, <http://arxiv.org/abs/1807.10340v1>.
- The SBN Collaboration, "A Proposal for a Three Detector Short-Baseline Neutrino Oscillation Program in the Fermilab Booster Neutrino Beam", March 2015, <http://arXiv.org/abs/1503.01520v1>.

Selected MicroBooNE Public Results

<https://www-microboone.fnal.gov/publications/publicnotes/index.html>

- MICROBOONE-NOTE-1048-PUB: Detector calibration using through going and stopping muons in the MicroBooNE LArTPC (August 2018).
- MICROBOONE-NOTE-1041-PUB: The MicroBooNE Search for Single Photon Events (July 2018).
- MICROBOONE-NOTE-1045-PUB: First Muon-Neutrino Charged-Current Inclusive Differential Cross Section Measurement for MicroBooNE Run 1 Data (May 2018).
- MICROBOONE-NOTE-1026-PUB: A Measurement of the Attenuation of Drifting Electrons in the MicroBooNE LArTPC (August 2017).
- MICROBOONE-NOTE-1025-PUB: Proton Track Identification in MicroBooNE Simulation for Neutral Current Elastic Events (January 2017).
- MICROBOONE-NOTE-1010-PUB: Selection and kinematic properties of numu charged-current inclusive events in 5E19 POT of MicroBooNE data (July 2017).
- MICROBOONE-NOTE-1005-PUB: Cosmic Shielding Studies at MicroBooNE (May 2016).
- MICROBOONE-NOTE-1004-PUB: MC performance study for an early numu charged current inclusive analysis with MicroBooNE (November 2015).

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