Dr. Gavin S. Davies

Contact Information

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Background

- Experimental High Energy physicist studying neutrino oscillations

Professional Experience

Associate Professor of Physics & Astronomy July 2025 - Present
University of Mississippi, *Dept. of Physics & Astronomy, Oxford, MS USA*
University of Mississippi Center for Multi-Messenger Astrophysics Affiliate

Assistant Professor of Physics & Astronomy Aug. 2019 - July 2025
University of Mississippi, *Dept. of Physics & Astronomy, Oxford, MS USA*
University of Mississippi Center for Multi-Messenger Astrophysics Affiliate

Postdoctoral Research Fellow Oct. 2014 - Aug. 2019
Indiana University, *Dept. of Physics, Bloomington, IN USA*
Supervisor: Prof. Mark Messier

Postdoctoral Researcher Jul. 2010 - Oct. 2014
Iowa State University, *Dept. of Physics, Ames, IA USA*
Supervisor: Prof. Mayly Sanchez

Education

Doctor of Philosophy (Ph.D.) in Physics Oct. 2006 - July 2010
Lancaster University, *Dept. of Physics, Lancaster, UK*
Dissertation: 'Understanding and calibrating the DS-ECal of ND280 in the T2K project'
Ph.D. Advisor: Dr. Laura Kormos

M.Phys (Hons.) Physics / USA Oct. 2002 - July 2006
Lancaster University, *Dept. of Physics, Lancaster, UK*
Dissertation: 'A Study of Charge Transfer Inefficiency in a Simulated CCD Damaged by Particle Radiation'
USA Study Abroad Program, Michigan State University*, MI USA* Aug. 2004 - May 2005

Leadership Experience

EMPHATIC Software & Analysis Coordinator Oct. 2022 - Present

NOvA Institutional Board Chairperson Mar. 2021 - Mar. 2023
Elected position

NOvA Computing Coordinator Jan. 2020 - Present

Fermilab Users Executive Committee Chairperson Sep. 2018 - Sep. 2019
Elected position

NOvA Exotic Neutrino Oscillation Analysis Convener Oct. 2017 - Sep. 2022

NOvA Production Convener, Software Releases and Framework Manager Feb. 2011 - July 2014

Committees, Service, and Awards

US HEP Coordinating Panel for Software & Computing Mar. 2025 - Present
Panel member

International Conference of High Energy Physics [ICHEP24] July 2024
Computing co-chair, Prague

APS Formation Task Force for the Coordinating Panel for Software and Computing
Dec. 2023 - July 2024

APS DPF Particle Physics Planning: Topical Group convener Apr. 2020 - July 2023
End-User Analysis

Department of Energy Office of Science User Facilities Roundtable Oct. 2020 - June 2021
Committee member

Flavor Physics and CP Violation (FPCP) international conference May 2021 - May 2022
Organizing Committee

NOvA Executive Committee May 2018 - Present
Elected position

Advocacy for High-Energy Physics Funding 2017 - Present
UEC Washington D.C. Trip

Fermilab Users Executive Committee (UEC) Sep. 2017 - Sep. 2019
Elected position

Breakthrough Prize in Fundamental Physics 2016

Extracurricular

APS *Member* 2014 - Present

Grants

Teaching/Student Supervision

Teaching

- PHYS 211, 212 Physics for Scientists and Engineers I/II
- PHYS 709 Advanced Mechanics (graduate-level)
- PHYS 510 Department Colloquium

Postdoctoral Researchers

- Jeffrey Kleykamp, University of Mississippi 2021 - Present
  NOvA/DUNE

Ph.D. Students

- Noah Knutson, University of Mississippi 2024 - Present
  EMPHATIC
- Xiaoyan Huang, University of Mississippi 2023 - Present
  DUNE
- Bishnu Acharya, University of Mississippi 2021 - Present
  NOvA
- Andrew Dye, University of Mississippi 2021 - May 2025
  NOvA

- Luiz Ricardo Prais, University of Mississippi — 2021 - Nov. 2024
  Ph.D. NOvA

M.Sc. Students

- Ehsan Farooq, University of Mississippi — 2024 - July 2025
  M.Sc. Physics (DUNE)
- Devesh Bhattarai, University of Mississippi — 2020 - Aug. 2023
  M.Sc. Physics (NOvA/DUNE)
  Now pursuing Ph.D. at Mississippi State University

Undergraduate Students

- Suyog Badal, University of Mississippi — S25
  NOvA, undergraduate research
- Kaylyn Beard, University of Mississippi — S23/F24
  NOvA, undergraduate research

Selected Talks

Dec. 2024 'Exploring Exotic Neutrino Oscillations with the NOvA Experiment' *(invited plenary talk)*
Miami 2024, University of Miami, Fort Lauderdale, FL

Nov. 2024 'Long-baseline neutrino experiments: Today and tomorrow' *(invited parallel talk)*
SESAPS 2024, UNC Charlotte, North Carolina

Oct. 2024 'EMPHATIC' *(invited plenary talk)*
NBI 2024, Neutrino Beams and Instrumentation, Tokai, Japan

Oct. 2024 'Hadron production measurements at EMPHATIC' *(invited parallel talk)*
J-PARC symposium, Mito, Japan

Dec. 2023 'Long-baseline neutrino experiments: hoy y mañana' *(invited plenary talk)*
8th ComHEP: Colombian Meeting on High Energy Physics, Ibagué, Colombia

July 2022 'Measurement of Standard and Non-standard Oscillations at NOvA' *(invited plenary talk)*
XLI International Conference on High Energy Physics [ICHEP 2022], Bologna, Italy

Nov. 2021 'Latest oscillation results from NOvA' *(invited parallel talk)*
SESAPS 2021, Tallahassee, Florida

Nov. 2019 'Latest three-flavor neutrino oscillation results from NOvA' *(invited parallel talk)*
SESAPS 2019, Wrightsville Beach, North Carolina

Nov. 2019 'The Fermilab Users Executive Committee Model' *(invited parallel talk)*
Society for Science at User Research Facilities (SSURF) annual meeting, College Park

Oct. 2019 'NOvA Software Infrastructure' *(invited parallel talk)*
Inaugural Dark-matter and Neutrino Computation Explored (DANCE) workshop, Houston, TX

Aug. 2019 'Latest three-flavor neutrino oscillation results from NOvA' *(invited parallel talk)*
Lepton Photon 2019, Toronto, Canada

Mar. 2019 'NOvA and T2K: Status and Outlook' *(invited plenary talk)*
Aspen Winter Conference, Aspen, Colorado

Aug. 2018 'Neutrinos, antineutrinos, and deep learning on NOvA' *(invited seminar)*
G.S. Davies, Seminar talk at Wichita State University, Wichita, KS

Sep. 2017 'Results and Prospects from NOvA' *(invited plenary talk)*
19th International Workshop on Neutrinos from Accelerators (NuFACT 2017), Uppsala, Sweden

Aug. 2016 'Searches for Sterile Neutrinos with NOvA' *(invited parallel talk)*
38th International Conference on High Energy Physics (ICHEP 2016), Chicago, Illinois, USA

Aug. 2016 'First Results from Searches for Active to Sterile Neutrino Oscillations with NOvA' *(seminar)*
Fermilab JETP (Wine & Cheese) Seminar

Select Publications

Recent Refereed Publications (2024-2025)

- M. A. Acero et al. (NOvA Collaboration), "Measurement of $d^2\sigma/d|q|dE_{avail}$ in charged current neutrino-nucleus interactions at $\langle E_\nu \rangle = 1.86$ GeV using the NOvA Near Detector", Phys. Rev. D. 111, 052009 (2025)
- M. A. Acero et al. (NOvA Collaboration), "Dual-Baseline Search for Active-to-Sterile Neutrino Oscillations in NOvA", Phys. Rev. Lett. 134, 081804 (2025)
- M. A. Acero et al. (NOvA Collaboration), "Monte Carlo method for constructing confidence intervals with unconstrained and constrained nuisance parameters in the NOvA experiment", JINST 20 02, T02001 (2025)
- M. A. Acero et al. (NOvA Collaboration), "Search for CP-violating Neutrino Non-Standard Interactions with the NOvA Experiment", Phys. Rev. Lett. 133 20, 201802 (2024)
- A. Abed Abud et al. (DUNE Collaboration), "First Measurement of the Total Inelastic Cross-Section of Positively-Charged Kaons on Argon at Energies Between 5.0 and 7.5 GeV", Phys. Rev. D 110 9, 092011 (2024)
- M. A. Acero et al. (NOvA Collaboration), "Expanding neutrino oscillation parameter measurements in NOvA using a Bayesian approach", Phys. Rev. D 110, 012005 (2024)
- A. Abed Abud et al. (DUNE Collaboration), "The DUNE Far Detector Vertical Drift Technology. Technical Design Report", JINST 19 08, T08004 (2024)

Key Publications (2020-2023)

- M. A. Acero et al. (NOvA Collaboration), "Measurement of the ν_e-Nucleus Charged-Current Double-Differential Cross Section at $\langle E_\nu \rangle$= 2.4 GeV using NOvA", Phys. Rev. Lett. 130 (2023) 5, 051802 (2023)
- A. Abed Abud et al. (DUNE Collaboration), "Impact of cross-section uncertainties on supernova neutrino spectral parameter fitting in the Deep Underground Neutrino Experiment", Phys. Rev. D 107, 112012 (2023)
- M. A. Acero et al. (NOvA Collaboration), "Improved measurement of neutrino oscillation parameters by the NOvA experiment", Phys. Rev. D 106, 032004 (2022)
- A. Abed Abud et al. (DUNE Collaboration), "Design, construction and operation of the ProtoDUNE-SP Liquid Argon TPC", JINST 17 01, P01005 (2022)
- M. A. Acero et al. (NOvA Collaboration), "Search for Active-Sterile Antineutrino Mixing Using Neutral-Current Interactions with the NOvA Experiment", Phys. Rev. Lett. 127, 201801 (2021)
- B. Abi et al. (DUNE Collaboration), "Supernova neutrino burst detection with the Deep Underground Neutrino Experiment", Eur. Phys. J. C 81 5, 423 (2021)
- B. Abi et al. (DUNE Collaboration), "First results on ProtoDUNE-SP liquid argon time pro-

jection chamber performance from a beam test at the CERN Neutrino Platform", JINST 15 12, P12004 (2020)
- B. Abi et al. (DUNE Collaboration), "Long-baseline neutrino oscillation physics potential of the DUNE experiment", Eur. Phys. J. C 80 10, 978 (2020)
- B. Abi et al. (DUNE Collaboration), "Deep Underground Neutrino Experiment (DUNE), Far Detector Technical Design Report, Volume IV: Far Detector Single-phase Technology", JINST 15 08, T08010 (2020)

Major Results (2016-2019)
- M. A. Acero et al. (NOvA Collaboration), "First Measurement of Neutrino Oscillation Parameters using Neutrinos and Antineutrinos by NOvA", Phys. Rev. Lett. 123 151803 (2019)
- M. A. Acero et al. (NOvA Collaboration), "New constraints on oscillation parameters from ν_e appearance and ν_μ disappearance in the NOvA experiment", Phys. Rev. D 98, 032012 (2018)
- P. Adamson et al. (NOvA Collaboration), "Search for active-sterile neutrino mixing using neutral-current interactions in NOvA", Phys. Rev. D. 96, 072006 (2017)
- P. Adamson et al. (NOvA Collaboration), "Constraints on Oscillation Parameters from ν_e Appearance and ν_μ Disappearance in NOvA", Phys. Rev. Lett. 118, 231801 (2017)
- P. Adamson et al. (NOvA Collaboration), "Measurement of the neutrino mixing angle θ_{23} in NOvA", Phys. Rev. Lett. 118, 151802 (2017)
- P. Adamson et al. (NOvA Collaboration), "First Measurement of Electron Neutrino Appearance in NOvA", Phys. Rev. Lett. 116, 151806 (2016)
- P. Adamson et al. (NOvA Collaboration), "First Measurement of muon-neutrino disappearance in NOvA", Phys. Rev. D 93, 051104(R) (2016)

T2K Collaboration
- D. Allan et al. (T2K Collaboration), "The Electromagnetic Calorimeter for the T2K Near Detector", JINST 8 P10019 (2013)
- K. Abe at al. (T2K Collaboration), "First Muon-Neutrino Disappearance Study with an Off-Axis Beam", Phys. Rev. D. 85, 031103 (2012)
- K. Abe et al. (T2K Collaboration), "Indication of Electron Neutrino Appearance from an Accelerator-produced Off-axis Muon Neutrino Beam", Phys. Rev. Lett. 107, 041801 (2011)

Selected Non-refereed Publications
- Abed Abud et al. (DUNE Collaboration), "DUNE Offline Computing Conceptual Design Report", arXiv:2210.15665 (2022)
- V. Daniel Elvira et al., "The Future of High Energy Physics Software and Computing", Snowmass 2021, arXiv:2210.05822 (2022)
- G.S. Davies, P. Onyisi, and A. Roberts, "CompF5: End User Analysis Topical Group Report", Snowmass 2021, arXiv:2209.14984 (2022)
- A. Abed Abud et al. (DUNE Collaboration), "Snowmass Neutrino Frontier: DUNE Physics Summary", Snowmass 2021, arXiv:2203.06100 (2022)
- B. Abi et al. (DUNE Collaboration), "Deep Underground Neutrino Experiment (DUNE), Far Detector Technical Design Report, Volume II: DUNE Physics", arXiv:2002.03005 (2020)