ADAM LISTER
CURRICULUM VITAE

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RESEARCH INTERESTS

I am primarily interested in searches for physics Beyond the Standard Model, with a specific focus on **sterile neutrino searches**. There have been a number of hints that these particles might exist, but the picture is far from clear with experimental results apparently conflicting. Resolving this open question is critical if we are to interpret data from future long-baseline experiments such as DUNE and Hyper-Kamiokande under a three-flavour model. My interest in answering this question has additionally led me to spending a significant amount of time on **detector physics and calibration**, which are critical to understanding the data from our detectors.

ACADEMIC POSITIONS

2024–present | **Scientist I, University of Wisconsin - Madison.**
Primarily focused on NOvA and DUNE experiments. I am currently helping to guide one graduate student and several undergraduate students through various service tasks and analyses.

2019–2024 | **Postdoctoral Research Associate, University of Wisconsin - Madison.**
Primarily focused on NOvA and DUNE experiments. I helped to supervise one student, who graduated and went on to a postdoctoral position at Fermilab

EDUCATION

2015–2019 | **PhD Experimental Particle Physics, Lancaster University.**
Constraint of Systematic Uncertainties in an Electron Neutrino Search Using Muon Neutrinos at MicroBooNE
Advisers: Dr Andrew Blake & Dr Jaroslaw Nowak

2013–2014 | **MSc Particles, Strings and Cosmology, Durham University.**
Neutrino Oscillations in Long Baseline Experiments
Adviser: Prof. Silvia Pascoli

2010–2013 | **BSc Astrophysics (1st class), Aberystwyth University.**

LEADERSHIP POSITIONS

2025-present | NOvA Executive Committee Member
Elected by peers as early career member of executive committee

2024–present | NOvA NuX Convener
Responsible for nonstandard oscillation analyses. I am guiding students and research associates through searches for sterile neutrinos, nonstandard interactions, and neutrino decay. The group has produced two publications in PRL in the last year, with an additional publication expected in 2025.

2023–present | NOvA Analysis Review Committee
Internal reviewer for Seasonal variation of cosmic-ray muons analysis.

2022–2024 | NOvA Detector Systematics Convener
Responsible for NOvA's simulation, calibration, and detector uncertainties. I guided students and research associates to deliver an improved detector simulation and calibration process. I initiated the work to begin incorporating data from NOvA's test beam into our detector-related uncertainties. Two publications are in preparation from my time convening this group.

2022–2023 | DUNE Plot Style Committee
Delivered recommendations for a presentation style that accounted for vision disabilities and will be used for DUNE publications.

2020–2022 | NOvA Production Convener
Responsible for production of NOvA's simulation and data. Managed a team of 4-6 graduate students to produce NOvA's largest simulation campaign to date. I implemented our keepup monitoring, maintained our submission scripts through a number of computing transitions, and was one of the initial developers for NOvA's "Freight-Train" processing, which allowed us to process significantly more cosmic data than would have otherwise been possible.

AWARDS

2019 | Lancaster University Department Prize, PhD student 2019

2018 | Fermilab Neutrino Physics Center Fellowship, $10,000

2017 | Poster Prize, 50th Annual Fermilab Users Meeting

PRESENTATIONS

April 2025 | Looking for Sterile Neutrinos with the NOvA Experiment
Colloquium, University of Mississippi

Jun 2024 | Improving NOvA's Sterile Neutrino Search with the Booster Neutrino Beam
Poster, Neutrino 2024

Dec 2023 | Neutrino Oscillations at NOvA
Invited Talk, NuPhys 2023

Sep 2023 | Searching For Sterile Neutrinos With The NOvA Experiment
Seminar, Cornell University

Dec 2022	Effects of Ionisation Electron Diffusion on Calibrations in LArTPCs *Contributed Talk, CPAD 2022 Workshop*
Jun 2022	Probing Neutrino Oscillations at The NOvA Experiment *Invited Talk, 55th Annual Fermilab Users Meeting*
Jun 2020	Event Selection and Systematics for the NOvA Sterile Neutrino Search *Poster, Neutrino 2020*
Dec 2018	MicroBooNE and the Path to Resolving the MiniBooNE Low-Energy Excess *Seminar, University of Wisconsin — Madison*
Mar 2018	Measuring Electron Diffusion in MicroBooNE *Contributed Talk, IOP HEPP and APP Meeting*
Jun 2017	Towards a Longitudinal Electron Diffusion Measurement in MicroBooNE *Poster, 50th Annual Fermilab Users Meeting*
Jul 2016	Measurements of ν_μ CC Interactions by the MicroBooNE Experiment *Poster, Neutrino 2016*

PUBLIC OUTREACH & WORKSHOPS

2024–present	NOvA Social Media Manager
2023–present	MINOS Underground Tour Guide
2022,2024	Marched with Fermilab LGBTQ+ group (Spectrum) at Pride parades
2018	Saturday Morning Physics On-Site Coordinator
2018	MicroBooNE Tour Guide
2018	“Particle Physics in the USA”, Lancaster University Masterclass
2017	LAr and High Voltage Station, Fermilab Open House
2015-2016	Special Relativity Workshop, Lancaster University Masterclass

PUBLICATIONS

Author on 62 peer-reviewed articles, with many from the MicroBooNE, DUNE, and NOvA collaborations. Publications listed here are those for which I am a primary author or had a substantial contribution. See ORCiD for a full list of publications. Convention for large collaborations is to list authors alphabetically. For publications where I was the primary author, I am including the Field-Weighted Citation Impact (FWCI) score, and the total number of citations.

Primary Author

- NOvA collaboration, *Dual-Baseline Search for Active-to-Sterile Neutrino Oscillations in NOvA*, *Phys. Rev. Lett.* **134** (2025) 081804 [2409.04553],

  This letter reports NOvA’s first dual-baseline sterile neutrino search. We achieved world-leading exclusion limits in interesting areas of phase space, where IceCube has a 95% allowed region. **I was responsible for NC interaction selection and application of Feldman-Cousins statistical technique, was a primary developer of one of analysis frameworks, and was one of two lead authors**. I additionally mentored a PhD student who graduated based on this analysis.

- A. Lister and M. Stancari, *Investigations on a fuzzy process: effect of diffusion on calibration and particle identification in Liquid Argon Time Projection Chambers*, *JINST* **17** (2022) P07016 [2201.09773],

  FWCI: 2.86, Citations: 4
  This publication was the first to recognise that diffusion of ionisation electrons impacts calorimetry and that current calibration techniques are insufficient for next-generation liquid argon neutrino experiments to meet their physics goals. **I proposed the idea, carried out all analysis work, and co-authored the publication.**

- MicroBooNE collaboration, *Measurement of the longitudinal diffusion of ionization electrons in the MicroBooNE detector*, *JINST* **16** (2021) P09025 [2104.06551],

  FWCI: 7.11, Citations: 14
  This publication reports a measured longitudinal diffusion parameter lower than previous experiments suggested. This measurement has since been confirmed by other experiments. This work reduced MicroBooNE's uncertainty on the diffusion parameter by a factor of 4. This is an important result in understanding LArTPC microphysics, and is critical to the future of DUNE, where electrons have a longer drift time and so experience more diffusion. **I was the lead analyser, and one of two authors of the publication.**

Substantial Contribution

- NOvA collaboration, *Search for CP-Violating Neutrino Nonstandard Interactions with the NOvA Experiment*, *Phys. Rev. Lett.* **133** (2024) 201802 [2403.07266],

  This Letter reports a search for nonstandard interactions of neutrinos with matter in NOvA, and it examines their effects on the determination of the standard oscillation parameters. As NOvA NuX convener, I managed the development of this publication, liaising with the analysers and reviewers.

- NOvA collaboration, *Improved measurement of neutrino oscillation parameters by the NOvA experiment*, *Phys. Rev. D* **106** (2022) 032004 [2108.08219],

  This publication reports three-flavour oscillation results from NOvA. I was production convener from 2020-2022 and liased with groups to produce and validate relevant samples on short timescales.

- MicroBooNE collaboration, *Search for an Excess of Electron Neutrino Interactions in MicroBooNE Using Multiple Final-State Topologies*, *Phys. Rev. Lett.* **128** (2022) 241801 [2110.14054],

  This letter reports that MicroBooNE sees no anomalous excess of electron neutrinos across three different analyses. I worked on an early iteration of this analysis, and did a significant amount of development work for the experiment. I proposed and led development of the MicroBooNE Continuous Integration system, which was critical to ensuring good understanding of our data/simulation. In recognition of my contributions, MicroBooNE petitioned for my inclusion on author list, despite having left the collaboration.

- MicroBooNE collaboration, *Search for an anomalous excess of charged-current νe interactions without pions in the final state with the MicroBooNE experiment*, *Phys. Rev. D* **105** (2022) 112004 [2110.14065],

  This publication reports one of three searches for an excess of electron neutrinos at low energy. I developed the constraint of flux and cross-section systematic uncertainties using muon neutrino charged-current interactions for an early iteraction of this analysis. I also performed critical work identifying simulation deficits, mitigating these deficiencies,

eventually leading to the improved simulation used for this publication. I was petitioned for inclusion in this publication due to contributions.

- MicroBooNE collaboration, *Measurement of differential cross sections for ν_μ -Ar charged-current interactions with protons and no pions in the final state with the MicroBooNE detector*, *Phys. Rev. D* **102** (2020) 112013 [2010.02390],

  This publication reports the first ever differential cross-section measurement for this topology on argon. I led a study to understand the particle identification capabilities of the MicroBooNE detector, and implemented a calibration for increasing data/simulation agreement. I additionally developed a technique to fit reconstructed showers as tracks in order to leverage particle identification work and mitigate deficiencies in the simulation, reducing the leading systematic uncertainty by a factor of two, enabling this analysis. I also developed the TPC noise model that was used for this analysis and other analyses from the same era.

- DUNE collaboration, *Deep Underground Neutrino Experiment (DUNE), Far Detector Technical Design Report, Volume IV: Far Detector Single-phase Technology*, *JINST* **15** (2020) T08010 [2002.03010],

  This article is the Technical Design Report for DUNE's Single-phase Far Detector Design. I analysed ProtoDUNE data to assess how low-tension sense wires impact physics measurements, which was used to set tolerances for DUNE construction. I additionally provided text and plots associated with wire tensions.