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| Andrew Wildridge  PhD Candidate - Experimental High Energy Particle Physics   |  |  | | --- | --- | | **Address**Lafayette, IN 47909  **Phone**(812) 577-7644  **E-mail**awildrid@purdue.edu |  | |

Particle physics Ph.D candidate interested in the cross-section between particle physics, quantum computing, and machine learning. Excited and pursuing new quantum information-inspired observables in top quark physics at the Large Hadron Collider with the Compact Muon Solenoid Detector.

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| **Education** |

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| 2019-08 - Current | Ph.D.: Experimental High Energy Particle Physics  *Purdue University - West Lafayette, IN*   * 3.75 GPA * Thesis: Quantum Tomography of Top Quark Pairs Produced at the Large Hadron Collider at √s = 13 TeV |

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| 2014-08 - 2019-05 | Bachelor of Science: Honors Physics  *Purdue University - West Lafayette, IN*   * Dean's List: Fall '14, Fall '16, Fall '18, Spring '18, Spring '19 * Semester Honors: Fall '14, Fall '17, Spring '19 * 3.51 GPA * Thesis: Exploration of Quantum Annealing to Solve Primary Vertexing |

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| **Professional Appointments** |

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| 2022-04 - Current | **CTO**  *Quantum Research Sciences, LLC, Lafayette, IN* |

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| 2021-06 - Current | **Graduate Research Assistant**  *Purdue University, West Lafayette, IN* |

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| 2022-05 – 2024-05 | **Research Mentor**  *Lumiere Education, Cambridge, MA* |

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| 2019-08 - 2021-05 | **Graduate Teaching Assistant**  *Purdue University, West Lafayette, IN* |

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| **Awards & Fellowships** |

**Graduate Fellowships**

* Rolf Scharenberg Graduate Research Fellowship (2020)

**Graduate Awards (Purdue)**

* George W. Tautfest Award

**Graduate Awards (External)**

* 2025 Breakthrough Prize in Fundamental Physics - $3M (split among 4 LHC collaborations)
* Elevate Nexus '22 State Competition - $80000
* Rally Innovation Conference '23 IN-Prize pitch finalist (1 of 5 selected to compete for $1M)

**Undergraduate Awards (Purdue)**

* Ramdas Prize for an exceptional senior who has completed a unique project (2019) - $1000

**Undergraduate Awards (External)**

* Omni Technologies Inc. Scholarship - $2500

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| **Publications** |

The CMS Collaboration. Enhanced reconstruction of dileptonic top quark-antiquark events using supervised machine learning methods. CMS-NOTE-2025-010. https://cds.cern.ch/record/2944724

Afik, Y., et. al. Quantum information meets high-energy physics: input to the update of the European strategy for particle physics. Eur. Phys. J. Plus **140** (2025) 9, 855.

Campolongo, E. G. *et al.* “Building Machine Learning Challenges for Anomaly Detection in Science.” arXiv:2503.02112 (2025). doi:10.48550/arXiv.2503.02112.

Andrew J. Wildridge, et. al. Bumblebee: Foundation Model for Particle Physics Discovery. Contribution to NeurIPS 2024. arXiv:2412.07867, 2024.

The CMS Collaboration. Observation of quantum entanglement in top quark pair production in proton-proton collisions at = 13 TeV. *Rep. Prog. Phys.* ***87*** *117801*, 2024.

Andrew Wildridge. "Top quarks as a probe to quantum information", *Proceedings for the* *14th International Workshop on Top Quark Physics (videoconference), arXiv:*2202.11347,2022.

Souvik Das, Andrew J. Wildridge, and Andreas Jung. Track clustering with a quantum annealer for primary vertex reconstruction at hadron colliders. arXiv:1903.08879, 2019.

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| **Organizer, Session Chair or Panelist for professional conferences/events:** |

Organizer, *3rd Top Quark Physics at the Precision Frontier*, Oct. 2023.

Panelist, “Challenges in high-energy experiments measuring quantum observables”, Quantum Observables for Collider Physics, Galileo Galilei Institute, Florence. Nov. 8, 2023. https://agenda.infn.it/event/34555/overview

Panelist, “PANEL SESSION: Making it happen: steps needed for real experimental measurements”, *Foundational Tests of Quantum Mechanics at the LHC*, Merton College, Oxford. March 22 2023. https://indico.cern.ch/event/1246316/timetable/

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| **Talks** |

“Observation of entangled top quarks with the CMS Detector”, LPC Physics Forum, 2025.

“Bumblebee: Foundation Model for Particle Physics Discovery”, US LUA annual meeting, 2024.

“Entanglement of top quarks in the production threshold region at CMS”, Quantum tests in collider physics, 2024. (Invited talk.)

“Recent measurements of top-quark properties at CMS”, ICHEP 2024, 2024. (Invited talk.)

“[Entangled Top Quarks at the LHC measured with the CMS Detector at sqrt(s) = 13 TeV](https://cms-mgt-conferences.web.cern.ch/conferences/pres_display.aspx?cid=3595&pid=28050)”, APS April Meeting, 2024.

“Recent highlights of top-quark property measurements from CMS”, Lake Louise Winter Institute 2024, 2024. (Invited talk.)

"Quantum Annealing applications in Collider HEP-ex", *3rd Top Quark Physics at the Precision Frontier*, 2023.

"Challenges of entanglement measurement in ttbar final states",  *Standard Model at the LHC 2023,* 2023.(Invited talk.)

"Towards quantum measurements at CMS", *Foundational Tests of Quantum Mechanics at the LHC*, 2023. (Invited talk.)

 "Entanglement & More at the CMS", *quantumTANGO: Quantum Information with Top quarks and Higgs bosons*, 2022. (Invited talk.)

"Investigation of Entangled and Bound ttbar Pairs at the LHC with the CMS Detector", *APS April Meeting*, 2022.

"Reconstructing proton-proton collision positions at the Large Hadron Collider with a D-Wave quantum computer", *Meeting of the Division of Particles and Fields of the American Physical Society*, 2021.

"Reconstructing proton-proton collision positions at the Large Hadron Collider with a D-Wave quantum computer", *APS April Meeting*, 2021.

"Reconstructing proton-proton collision positions at the Large Hadron Collider with a D-Wave quantum computer", *New Perspectives 2019*, 2019.

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| **Posters** |

“Bumblebee: Foundation Model for Particle Physics Discovery”, Machine Learning and the Physical Sciences Workshop at the 38th conference on Neural Information Processing Systems, 2024.

“Observation of Entangled Top Quarks at the LHC measured with the CMS Detector as sqrt(s) = 13 TeV”, ICHEP 2024, 2024.

"Track clustering with a quantum annealer for primary vertex reconstruction at hadron colliders", *TOP23*, 2023.

"Quantum Annealing to Reconstruct Highest Human-made Energetic Particle Collisions",  *Center for Quantum Technologies Inaugural Industry Advisory Board Meeting*, 2023.

"Track clustering with a quantum annealer for primary vertex reconstruction at hadron colliders", *Elmore ECE Emerging Frontiers Center: Crossroads of Quantum and AI*, 2022.

 "Track clustering with a quantum annealer for primary vertex reconstruction at hadron colliders", *Quantum Computing Users Forum, Oak Ridge National Laboratory*, 2019.