Lanqing Yuan

袁 澜 清

Washington University in St. Louis, Department of Physics
✳ *Born: 17 July 1998, Shanghai, China*
✉ *yuan.l@wustl.edu*
🌐 *inspirehep.net/authors/2011768*
⌗ *FaroutYLq*
Last updated: June 10, 2025

Accurate search for physics beyond the Standard Model

Appointments

2025-now   **Postdoctoral Research Associate**, *Washington University in St. Louis*
Development of novel lab searches for light dark matter and axion
Supervisor: Karthik Ramanathan

Education

2020-2025   **Doctor of Philosophy in Physics**, *The University of Chicago*
Dissertation Title: *First Search for Light Dark Matter in the Neutrino Fog with XENONnT*
Advisor: Luca Grandi

2020-2022   **Master of Science in Physics**, *The University of Chicago*
en route to the Ph.D.

2016-2020   **Bachelor of Science in Physics**, *ShanghaiTech University*
Dissertation Title: *Z-drop Correction for Cryogenic Fluorescent and X-ray Tomography*
Advisor: Huaidong Jiang & Carolyn Larabell

Selected Research Experience

The XENONnT Dark Matter Experiment

2023-2025   **Search for Magnetic Inelastic Dark Matter**
Proposal of analysis for dark matter scattering events with exotic event topology.

- Built simulation and analysis framework for signal and background modeling.

2023-2024   **Search for Light Dark Matter in the Neutrino Fog**
First search ever for dark matter with the existence of solar ^8B coherent elastic neutrino-nucleus scattering as one of the major backgrounds.

- Led the whole analysis from signal model to statistical inference.

- Served as the corresponding author for this PRL paper.

2020-2024   **Detector Response Modeling**
Leading analyst for efficiency and bias in reconstruction and data selection.

- Made major contribution to 4 physics results in the first 2 science runs of XENONnT.

2022-2024   **Convener for Computing and Analysis Tools Group**
Leader of a team of around 20 people in computing pipeline and analysis software.

- Led the development and maintenance of HTC/HPC processing pipeline with ~2PB IO.

Noble Gas (Liquid) Detector R&D for Low-energy Particle Physics

2025-now   **Microphysics Model for Nobel Gas Detectors**
Theoretical work on modeling light and charge yield for nuclear recoils in noble gas detectors.

2020-2023	**Development of Nanocomposite Coatings for Future Large-Scale TPCs**
	Construction, operation, calibration and analysis for a time-projection-chamber(TPC).

- Built data-acquisition system, data processor and cyberinfrastructure.
- Completed more than 500 hours of operational and analysis shift.

2020-2022	**Characterization of Photomultiplier Tubes (PMTs) in Xenon TPCs**
	Experimental and algorithmic study of single photon response of PMTs.

- Constructed LED laser based in-situ photo sensor calibration pipeline in a local TPC.
- Modeled single photon responses in PMTs in XENONnT.

2019-2020	**Scintillation yield from electronic and nuclear recoils in superfluid ^{4}He**
	GEANT4 Monte-Carlo simulation for DD neutron calibration.

Selected Honor and Awards

2024	**XENON Medal**, *XENON Collaboration*
	Collaboration award for "extraodinary contributions to the development and maintenance of the XENONnT software and data pipeline".
2023	**AI+Science Research Funding**, *The University of Chicago*, $10,000
	Funding for building cyperinfrastructures for rare event search.
2020	**Robert R. McCormick Fellowship**, *The University of Chicago*
	Fellowship for highly rated admitted Ph.D. students.
2020	**Outstanding Graduate of Shanghai**, *Education Commission of Shanghai*
	Highest honor for college graduates awarded by the government of Shanghai.
2020	**Outstanding Graduate of ShanghaiTech University**, *ShanghaiTech University*
	Honor for top 10 percent distinguished college graduates.

Talks

Conferences

2024	**The XENONnT Data Handling with Rucio**, *7th Rucio Community Workshop*, San Diego, CA
2024	**XENONnT: First Measurement of Solar ^{8}B CEνNS**, *TeV Particle Astrophysics 2024eaf*, Chicago, IL
2024	**Search for Dark Matter with the XENONnT Experiment**, *Lake Louise Winter Institute 2024*, Lake Louise, Canada

Seminars

2025	**Towards an Ultimate Search for Light Dark Matter with XENONnT**, *Fundamental Physics Seminar at the Chinese University of Hong Kong, Shenzhen*, Shenzhen, China
2025	**Towards an Ultimate Search for Light Dark Matter with XENONnT**, *Physics Seminar at Westlake University*, Hangzhou, China
2025	**Towards an Ultimate Search for Light Dark Matter with XENONnT**, *Seminar at ShanghaiTech University*, Shanghai, China
2025	**First Kiss on the Fog – How we learned to stop worrying and love the neutrino**, *Seminar at University of Oxford*, Oxford, UK
2025	**Towards an Ultimate Search for Light Dark Matter with XENONnT**, *Space Sciences/Astrophysics Seminar at Washington University at St. Louis*, St. Louis, MO
2024	**Search for Light Dark Matter with XENONnT**, *KIPAC Tea Talk at SLAC*, Stanford, CA

2024   **Four Years of XENONnT**, *Seminar at The University of Arizona*, Online

2024   **Four Years of XENONnT**, *CENPA special seminar at University of Washington, Seattle*, Seattle, WA

2024   **WIMP Search and Beyond with the XENONnT Experiment**, *EPD seminar at Institute of High Energy Physics*, Beijing, China

2024   **WIMP Search and Beyond with the XENONnT Experiment**, *Seminar at Tsung-Dao Lee Institute*, Shanghai, China

2023   **WIMP Search and Beyond with the XENONnT Experiment**, *Seminar at Stanford University*, Stanford, CA

Mentoring

2022–2023   **Ariana Qin**, *Undergraduate student*, The University of Chicago
Application of statistical techniques from causal inference in XENONnT analysis.

2021–2022   **Charles Cooper**, *Undergraduate student*, The University of Chicago
Identification of multi-scatter events by segmentation techniques from machine learning.

Teaching

2024   **Lecturer for XENONnT Computing Tutorial Series**, *Online*
Biweekly tutorial sessions on HTC/HPC computing in XENONnT context.

2023   **Co-organizer and Lecturer for XENONnT Newcomer Workshop**, *Paris*, France
Software and analysis workshop with more than 50 participants.

2021   **Teaching Assistant**, *The University of Chicago*, Chicago, IL
PHYS 122: General Physics II.

2020   **Teaching Assistant**, *The University of Chicago*, Chicago, IL
PHYS 121: General Physics I.

2020   **Teaching Assistant**, *ShanghaiTech University*, Shanghai, China
Mathematical Mehods for Physics II: Partial Differential Equations.

Internships and Summer Schools

2025   **Visiting Researcher**, *Tsinghua University*, Beijing, China
Microphysics modeling in noble gas particle detectors.

2022&2023   **Visiting Researcher**, *Laboratori Nazionali del Gran Sasso*, Assergi, Italy
One-month operation and calibration shift for XENONnT.

2023   **51st SLAC Summer Institute**, *SLAC*, Stanford, CA
"Machine Learning Across the Frontiers".

2022   **CoDaS-HEP 2022 Summer School**, *Princeton University*, Princeton, NJ
"Computational and Data Science Training for High Energy Physics".

2020–2021   **Visiting Researcher**, *Tsinghua University*, Beijing, China
XENONnT analysis shift and single photon response modeling.

2019-2020   **Undergraduate Researcher**, *University of California, Berkeley*, Berkeley, CA
Simulation for scintillation yield measurement from electronic and nuclear recoils in ^4He.

2019   **Affiliate**, *Advanced Light Source*, Berkeley, CA
Correction of Beer-Lambert attenuation for Confocal Cryogenic Fluorescent Microscopy.

2017-2018   **Undergraduate Researcher**, *ShanghaiTech University*, Shanghai, China
Sample preparation and characterization under Scanning Electron Microscope.

Outreach Activities

2022-2024   **Physics Demonstrator**, *South Side Science Festival*, Chicago, IL
Experienced demonstrator for optics and electromagnetic induction for K-12 children mostly from Chicago south communities.

2019   **Science and Math Teacher**, *Yuming Charter School*, Oakland, CA
40 hours of voluntary teaching and infrastructure building in a K-8 summer program.

References

Luca Grandi, *Professor of Physics*, The University of Chicago
Ph.D. Advisor, Email: `lgrandi@uchicago.edu`

Elena Aprile, *Centennial Professor of Physics*, Columbia University
XENON Spokesperson, Email: `age@astro.columbia.edu`

Kaixuan Ni, *Professor of Physics*, University of California, San Diego
XENON Collaborator, Email: `nikx@physics.ucsd.edu`

Selected Publications

○ E. Aprile et al. First Search for Light Dark Matter in the Neutrino Fog with XENONnT.
Phys. Rev. Lett. 134, 111802, 2025 *(Editors' Suggestion)*
Corresponding Author:

- Led the whole analysis from signal models to statistical inference.
- (and same contribution as Phys. Rev. Lett., 133(19):191002, 2024)

○ E. Aprile et al. First Indication of Solar ^{8}B Neutrinos via Coherent Elastic Neutrino-Nucleus Scattering with XENONnT.
Phys. Rev. Lett., 133(19):191002, 2024 *(Featured in Physics & Editors' Suggestion & Collection of the Year 2024)*
Major Contributor:

- Built HTC-based statistical inference computation pipeline for better accuracy and shorter overhead.
- Led the data processing and analysis software maintenance for all of the datasets involved in this search.

○ E. Aprile et al. First Dark Matter Search with Nuclear Recoils from the XENONnT Experiment.
Phys. Rev. Lett., 131(4):041003, 2023 *(Featured in Physics & Editors' Suggestion)*
Major Contributor:

- Modeled detection efficiency and reconstruction bias for nuclear recoil.
- Studied robustness of electronic recoil background model.
- (and same contribution as Phys. Rev. Lett., 129(16):161805, 2022)

○ E. Aprile et al. Search for New Physics in Electronic Recoil Data from XENONnT.
Phys. Rev. Lett., 129(16):161805, 2022 *(Featured in Physics & Editors' Suggestion)*
Major Contributor:

- Optimized accuracy of waveform simulation, the central tool of detector response modeling, and the dependent data selections.
- Modeled detection efficiency for electronic recoil near energy threshold with both data-driven and MC-driven methods, to exclude the risk of mismodeling induced low energy excess.

All Publications

Please refer to my `inspirehep` page.