

# JINCHEN HE

Argonne National Laboratory, 9700 S Cass Ave, Lemont ◇ Illinois, United States 60439

(+1) 240-413-9989 ◇ jinchen@umd.edu ◇ INSPIRE HEP ◇ Personal Page

## EDUCATION

---

**University of Maryland, College Park**

Doctoral of Philosophy (Ph.D.) in Physics

*September 2022 - Present*

**University of California, Berkeley**

Exchange student in Physics

*January 2020 - June 2020*

**University of Chinese Academy of Sciences**

Bachelor of Science (B.S.) in Physics

*September 2017 - June 2021*

## APPOINTMENTS

---

**Argonne National Laboratory**

Research Assistant

*August 2024 - Present*

**University of Maryland**

Graduate Assistant

*September 2022 - Present*

**Shanghai Jiao Tong University**

Research Assistant

*July 2021 - July 2022*

## HONORS AND AWARDS

---

Theory session Award for New Perspectives at Fermilab

*2025*

APS GHP Student Travel Grant

*2025*

Ralph Myers & Friends of Physics Award, Outstanding Teaching Assistant

*2023*

PITT PACC travel award for Pheno 2023

*2023*

Dean's Fellowship at University of Maryland

*2022*

Second Award of 2021 in Lattice Parton Collaboration

*2021*

Academic Scholarship at University of Chinese Academy of Sciences

*2017 - 2019*

Merit Student at University of Chinese Academy of Sciences

*2017*

Excellent Student Cadre at University of Chinese Academy of Sciences

*2017*

## GRANTS AND PROPOSALS

---

**Learning Field Transformations to Accelerate Hybrid Monte Carlo**

*June 2025 - Dec 2025*

*Principal Investigator (PI)*

*ALCF*

- We propose to accelerate hybrid Monte Carlo simulations of lattice gauge fields via a neural network-constructed field transformation. We first apply this approach to the 2D U(1) gauge theory, and then plan to extend it to the SU(3) non-abelian case.
- 8,000 Nvidia A100 GPU hours of Sophia@ALCF.

**3D Imaging of the Pion on a Fine Lattice**

*June 2024 - June 2026*

*Principal Investigator (PI)*

*USQCD*

- We propose to calculate the transverse-momentum-dependent distribution (TMD) of the pion valence quark using staggered HISQ gauge configurations with clover fermions on the hypercubic (HYP) gauge background at the pion mass  $m_\pi = 300$  MeV with fine spacing  $a = 0.06$  fm.
- 130,000 Nvidia A100 GPU hours of LQ2@FNAL.

## PROFESSIONAL SERVICE

---

### Moderator of “AI for HEP” community on alphaXiv

April 2025 - Now

- Manage the “AI for HEP” community on alphaXiv, including coordinating online discussions and curating topics at the intersection of high-energy physics and AI.
- Co-host online “AI for HEP” seminars for the community every two to three weeks, invite researchers to present their work, and facilitating interactive Q&A sessions.

## MENTORING

---

### Justin Dean

February 2024 - Now

Undergraduate Student, Virginia Tech

- Guided Justin on a project studying the effects of Gribov copies in lattice calculations of gluon correlators.

### Qi Cai

February 2022 - July 2022

Undergraduate Student, Shanghai Jiao Tong University

- Provided guidance to Qi on foundational lattice gauge theory, covering core concepts of lattice QCD as well as the computation and analysis of two-point correlation functions.

## PUBLICATIONS

---

### Lead-author publications

- D. Bollweg, X. Gao, **J. He**, S. Mukherjee and Y. Zhao (Apr. 2025). “*Transverse-momentum-dependent pion structures from lattice QCD: Collins-Soper kernel, soft factor, TMDWF, and TMDPDF*”, Phys. Rev. D 112, (2025) 3 arXiv:2504.04625 [hep-lat]
- X. Gao, **J. He**, R. Zhang and Y. Zhao (Aug. 2024). “*Systematic Uncertainties from Gribov Copies in Lattice Calculation of Parton Distributions in the Coulomb gauge*”, Chin.Phys.Lett. 41 (2024) 12 arXiv:2408.05910 [hep-lat]
- **J. C. He** *et al.* (Lattice Parton Collaboration) (Nov. 2022). “*Unpolarized Transverse-Momentum-Dependent Parton Distributions of the Nucleon from Lattice QCD*”, Phys.Rev.D 109 (2024) 11 arXiv:2211.02340 [hep-lat]
- **J. He**, D. A. Brantley, C. C. Chang, *et al.* (CalLat Collaboration) (Apr. 2021). “*Detailed analysis of excited state systematics in a lattice QCD calculation of  $g_A$* ”, Phys.Rev.C 105 (2022) 6 arXiv:2104.05226 [hep-lat]
- **J. He**, X. Y. Jin, J. C. Osborn and Y. Zhao (Aug. 2025). “*Neural Field Transformations for Hybrid Monte Carlo: Architectural Design and Scaling*”, NeurIPS 2025 Workshop on Machine Learning for Physical Sciences arXiv:2511.02018 [hep-lat]
- **[In preparation]** “*Nucleon PDFs from Boosted Correlations in the Coulomb Gauge*”
- **[In preparation]** “*Physical limit of the soft function using the Coulomb gauge method*”

### Key-contributor publications

- J. W. Chen, X. Gao, **J. He**, *et al.* (May 2025). “*LaMET’s Asymptotic Extrapolation vs. Inverse Problem*”, arXiv:2505.14619 [hep-lat]
- H. Liu, **J. He**, L. Liu, *et al.* (Jul. 2022). “*Hidden-charm Hexaquarks from Lattice QCD*”, Sci.China Phys.Mech.Astron. 67 (2024) 1 arXiv:2207.00183 [hep-lat]
- J. Hua, M. H. Chu, **J. C. He**, *et al.* (Lattice Parton Collaboration) (Jan. 2022). “*Pion and Kaon Distribution Amplitudes from Lattice QCD*”, Phys.Rev.Lett. 129 (2022) 13 arXiv:2201.09173 [hep-lat]

### Contributor publications

- M. Zhu, M. Tian, X. Yang, T. Zhou, P. Zhu, E. Chertkov, S. Liu, Y. Du, L. Yuan and **J. He**, *et al.* “*Probing the Critical Point (CritPt) of AI Reasoning: a Frontier Physics Research Benchmark*”, arXiv:2509.26574 [cs.AI].
- X. Gao, **J. He**, Y. Su, R. Zhang and Y. Zhao (Aug. 2024). “*Comments on ‘Non-local Nucleon Matrix Elements in the Rest Frame’*”, arXiv:2408.04674 [hep-lat]
- M. H. Chu, **J. C. He**, J. Hua, *et al.* (Lattice Parton Collaboration) (Jun. 2023). “*Lattice calculation of the intrinsic soft function and the Collins-Soper kernel*”, JHEP 08 (2023) 172 arXiv:2306.06488 [hep-lat]
- M. H. Chu, **J. C. He**, J. Hua, *et al.* (Lattice Parton Collaboration) (Feb. 2023). “*Transverse-Momentum-Dependent Wave Functions of Pion from Lattice QCD*”, Phys.Rev.D 109 (2024) 9 arXiv:2302.09961 [hep-lat]

### Open-Source contributions

- **LaMETLat**: Python package for lattice calculations in Large Momentum Effective Theory. Publicly available at [github.com/Greyyy-HJC/LaMETLat](https://github.com/Greyyy-HJC/LaMETLat).

## SEMINARS AND CONFERENCE PRESENTATIONS

---

### Seminars

- “3D Imaging of the Pion on a Fine Lattice”, Special CFNS seminar, Stony Brook University, October 15, 2025.
- “Effective field theory for positronium in relativistic motion”, Nuclear Theory Seminar, University of Maryland, April 17, 2025.
- “NRQED: Lamb Shift and Relativistic Hydrogen Atom”, Theory Seminar, Argonne, January 12, 2024.
- “Unpolarized Nucleon TMDPDFs from LQCD”, EFT Seminar, Technische Universität München, November 24, 2023.

### Invited Talks

- “3D Imaging of the Pion on a Fine Lattice”, 15th Conference on the Intersections of Particle and Nuclear Physics, University of Wisconsin–Madison, June 12, 2025.
- “Imaging of the Pion on a Fine Lattice”, USQCD All-Hands Meeting, Online, April 19, 2024.
- “Unpolarized Nucleon TMDPDFs from LQCD”, TMDs: Towards a Synergy between Lattice QCD and Global Analyses, Stony Brook University, June 22, 2023.

### Contributed Talks

- “Nucleon Parton Distribution Functions from Boosted Correlators in CG”, The 36th Midwest Theory Get Together, Argonne, September 26, 2025.
- “Nucleon Parton Distribution Functions from Boosted Correlators in CG”, QGT Topical Collaboration Meeting, Argonne, September 19, 2025.
- “3D Imaging of the Pion on a Fine Lattice”, New Perspectives 2025, Fermilab, July 15, 2025.
- “Nucleon Parton Distribution Functions from Boosted Correlators in CG”, APS Topical Group on Hadronic Physics, Anaheim, March 16, 2025.
- “Effective Field Theory for Positronium in Relativistic Motion”, Midwest Theory Get Together, Argonne, October 18, 2024.
- “Systematic Uncertainties from Gribov Copies in CG-Fixed Correlators”, QGT Topical Collaboration Meeting, Temple University, September 13, 2024.
- “Systematic Uncertainties from Gribov Copies in Lattice Calculation of Quasi-distributions in the Coulomb gauge”, LaMET 2024, University of Maryland, August 14, 2024.
- “Nucleon TMDPDFs from Lattice QCD”, Phenomenology Symposium 2023, University of Pittsburgh, May 8, 2023.
- “Unpolarized Transverse-Momentum-Dependent PDF from Lattice QCD”, LaMET 2022, Argonne, December 2, 2022.

- “Pion and Kaon Distribution Amplitudes with LaMET”, LaMET 2021, Online, December 8, 2021.
- “Distribution amplitudes from lattice QCD with LaMET”, International Workshop on Heavy Quark Physics, Online, November 24, 2021.

**Poster Presentation**

- “Nucleon Parton Distribution Functions from Boosted Correlators in CG”, Physics Opportunities at an Electron-Ion Collider XI, Florida International University, February 25, 2025.

SKILLS

---

<b>Programming &amp; Software</b>	Python, C++, Linux, Git, Mathematica, LaTeX, QUDA
<b>Machine Learning &amp; Data Science</b>	PyTorch, NumPy, SciPy, Pandas, Matplotlib
<b>High-Performance Computing</b>	Experience with large-scale GPU/CPU clusters: OLCF (Andes/Frontier, NERSC), ALCF (Polaris/Sophia), FNAL (LQ2), LCRC (Swing/Improv)
<b>Languages</b>	Chinese (Native), English (Professional Working Proficiency)