Jing-Chen Zhang (张京晨)

Incoming Postdoctoral Researcher, North Carolina State University
Ph.D., Chemical Physics Program, University of Maryland, College Park

jczhang@terpmail.umd.edu

(Updated: September 4, 2026)

Academic Positions

Visiting Postdoctoral Researcher — Reno, NV
University of Nevada, Reno — *Dec 2026 – Present*
Advisor: Prof. Timur V. Tscherbul. Research on quantum-information aspects of chemical reactions.

Postdoctoral Researcher — Raleigh, NC
North Carolina State University — *Aug 2026 – Present*
Advisor: Prof. Yuan Liu. Research on molecular qudits and quantum information processing with molecules.

Research Assistant — College Park, MD
Yu Liu Group, University of Maryland — *May 2026 – Aug 2026*
Continued research with the Yu Liu group following the Ph.D. defense, prior to starting postdoctoral appointments.

Education

University of Maryland, College Park — College Park, MD
Ph.D., Chemical Physics Program — *Aug 2020 – May 2026*
Advisor: Prof. Yu Liu and Prof. Paul Julienne

Thesis: *"Preparation of Ground-State Ultracold Lithium Dimers and Coherent Control of Their Reactions: A Theoretical Study"*

University of Pittsburgh — Pittsburgh, PA
M.S. in Physics — *Sep 2017 – Aug 2020*

Jilin University — Changchun, China
B.S. in Physics, with Highest Honor — *2013 – 2017*
Tang Aoqing Honors Program in Physics ("Everest Plan," Ministry of Education of P.R. China)

Program Rank: 1/15, College Rank: 1/235, Overall GPA: 91/100

Stony Brook University — Stony Brook, NY
Visiting Student, International Academic Program — *Sep 2015 – Jun 2016*
Undergraduate research with Prof. Jin Wang on landscape and flux theory in nonequilibrium statistical mechanics and regulated phosphorylation–dephosphorylation dynamics.

Honors & Awards

- **APS DAMOP Travel Award**, American Physical Society 2026
- **Alexander Family Fellowship**, University of Maryland 2020
- **Dean's Fellowship**, University of Maryland 2020
- **Ralph Myers and Friends of Physics Award, Honorable Mention**, University of Maryland 2020
- **Dean's Scholarship (highest honor in the college)**, College of Physics, Jilin University 2016–2017
- **Yan Ji'ci Scholarship for Elites of Physics**, Chinese Academy of Sciences 2014–2015
- **Dong Rong Scholarship** (15 out of 235), Jilin University 2014–2015
- **National Scholarship** (top 0.2%), Jilin University 2013–2014
- **Excellent Student of Jilin University** 2013–2014

Publications

1. **J.-C. Zhang**, P. Julienne, and Y. Liu, "Characterization of Feshbach resonances in ^{6}Li–^{7}Li using improved interaction potentials," *Phys. Rev. A* **113**, 062802 (2026). https://doi.org/10.1103/p3bm-rpcb

2. **J.-C. Zhang**, A. Devolder, T. V. Tscherbul, P. Brumer, and Y. Liu, "Identical-Particle Symmetry-Enabled Complete Coherent Control of Ultracold Atomic and Molecular Collisions," *arXiv preprint* arXiv:2607.01620, 2026. https://arxiv.org/abs/2607.01620

3. **J.-C. Zhang**, Y. Liu, and P. S. Julienne, "Magneto-association and STIRAP Pathways to rovibrational ground states of Lithium Dimers," in preparation (2026).

4. J. Xu, **J. Zhang**, Z. Hao, X. Gong, Z. Meng, Y. Zhao, S. Wang, H. Sun, H. Tian, and D. Su, "Manipulating the Electronic Structure of Bismuth Oxide by Selenium Incorporation for Efficient and Reversible Zinc-Ion Storage," *Acta Materialia*, 2025, p.121701. https://doi.org/10.1016/j.actamat.2025.121701

5. X. Liu, Y. Yan, Q. Zhang, H. Cai, M. Wang, X. Gong, **J. Zhang**, Z. Meng, H. Sun, Z. Du, and X. Hao, "Palladium-Induced Localized High-Spin Environment Enhances Redox Kinetics for High-Performance Aqueous Energy Storage," *Advanced Functional Materials*, 2025, 2503345. https://doi.org/10.1002/adfm.202503345

6. Z. Meng, R. Zhang, H. Sun, **J. Zhang**, X. Gong, and Z. Du, "New Perspectives Addressing Application Challenges in Concentration Cells," *Phys. Chem. Chem. Phys.*, 27(28):14718–14728, 2025. http://dx.doi.org/10.1039/D5CP01934F

7. S. Hao, R. Singh, **J. Zhang**, and T. P. Purdy, "Cavity-less Quantum Optomechanics with Nanostring Mechanical Resonators," in *Frontiers in Optics / Laser Science*, paper FW5C.4. https://doi.org/10.1364/FIO.2020.FW5C.4

Current & Past Research Projects

Molecular qudits for quantum information processing *Postdoctoral research with Yuan Liu, North Carolina State University*
Developing molecules as multi-level qudits for quantum information processing and quantum simulation.

Quantum-information aspects of chemical reactions *Ongoing collaboration with Timur V. Tscherbul*
Investigating quantum-information theoretic aspects of chemical reaction dynamics.

Coherent control of identical ultracold molecules *Adrien Devolder, Timur V. Tscherbul, Paul Brumer, and Yu Liu*
Investigating the role of quantum statistics in protecting quantum interference during cold collisions.

Refinement of lithium dimer potentials *Nike Dattani (U Waterloo), Paul Julienne, and Yu Liu*
Performing global optimization to obtain lithium dimer MLR potentials spectroscopically accurate, both at short range and at the threshold.

Pathway to Ground-State Lithium Dimers *Co-advised by Paul Julienne and Yu Liu*
Theoretical investigation of pathways to form ultracold lithium dimers through coherent assembly of laser-cooled atoms.

Passive Error Correction with Open Rabi Model *Joint work with Simon Lieu, Mathias Van Regemortel, and Mohammad Hafezi*
Developing novel quantum error correction schemes using engineered dissipation in open quantum systems.

Floquet Engineering of Multispin Interactions *Joint work with Andrey Grankin, Hossein Dehghani, and Mohammad Hafezi*
Generating quantum chiral spin liquid phases via Floquet engineering of ultracold atoms in optical lattices.

Variational Studies of Stellar Functions *Joint work with En-Jui Kuo, David Roberts, Christopher White, and Mohammad Hafezi*
Studying the non-Gaussian ground states of quantum many-body systems using stellar functions as ansätze.

Theory of Topological Materials and Edge States in Dirac Materials *Visiting student, Institute for Advanced Study, Tsinghua University; supervised by Prof. Zhong Wang*
Studied theories of topological materials and calculated edge states in Dirac materials, including Weyl semimetals, during a research visit from July to September 2016.

Flux and Landscape Theory in Nonequilibrium Statistical Mechanics *Undergraduate researcher, Stony Brook University; supervised by Prof. Jin Wang (2015–2016)*
Studied landscape and flux theory; developed a mathematical model of
a regulated phosphorylation–dephosphorylation process; analyzed chemical and physical factors governing biochemical dynamics; and completed a project report.

Mentoring

Aiden Heggs (UMD(2024-2025)), UMD → US Navy

Haoran Hu (online undergraduate researcher 2024-2025), Southeast University (China) → UC Riverside

Chenhao Ni (online undergraduate researcher 2023-2024), Wuhan University (China) → Max Planck Institute of Quantum Optics

Teaching

University of Pittsburgh: Teaching of general physics for undergraduate students (PHY 110, 111, 174, 175) and undergraduate physics labs (PHY 212, 219)

University of Maryland: Teaching of general physics for undergraduate students (PHY 260, 260H, **Ralph Myers and Friends of Physics Award for teaching, Honorable Mention**)

Professional Activities

Founder and co-organizer, UMD Quantum Matter Journal Club 2021–2023
`https://www.youtube.com/@physicsandcoffee6171`
University of Maryland, College Park

Organizer, UMD-JLU-Brandeis Mini Quantum Workshop — May 2022
University of Maryland, College Park

Co-organizer, Condensed Matter Theory Student Seminar — May 2019 – Sep 2019
University of Pittsburgh

Founder & Chair, Undergraduate Academic Seminars in Physics — Aug 2016 – Jul 2017
Jilin University, China

Conferences and Talks

- **Coherent Formation of Ground-State Lithium Dimers via Magnetoassociation and STIRAP** (Oral), DAMOP 2026, 57th Annual Meeting of the APS Division of Atomic, Molecular and Optical Physics, Providence, RI Jun 3, 2026
- **Preparation of Ground-State Ultracold Lithium Dimers and Coherent Control of Their Reactions: A Theoretical Study** (Invited, Virtual Seminar), Quantum Seminar, North Carolina State University, Raleigh, NC May 1, 2026
- **Symmetry-Protected Quantum Control of Ultracold Chemical Reactions** (Invited), Friday Quantum Seminar, Joint Center for Quantum Information and Computer Science (QuICS), University of Maryland, College Park, MD Mar 6, 2026
- **Pathway to Ground State Lithium Dimers**, Gordon Research Conference: Quantum Control of Light and Matter, Salve Regina University, Newport, RI Aug 4–8, 2025
- **Pathway to Ground State Lithium Dimers**, ITAMP Workshop: Fundamental Three-Body Processes in Physics and Chemistry, Harvard–Smithsonian Center for Astrophysics, Cambridge, MA Jun 2–4, 2025
- **Generating Quantum Spin Liquid from Floquet Engineering of Multi-Spin Interactions in Optical Lattices**, APS March Meeting, Las Vegas, NV Mar 9, 2023
- **Synthesis of Effective Hamiltonian with Symmetries Using Floquet Approach**, RQS Workshop, Duke University, Durham, NC Aug 16, 2022
- **Summit of Everest Plan of MOE**, Harbin Institute of Technology, Harbin, China Sep 2016
- **Tang Aoqing Weekly Talk Series**, Jilin University, Changchun, China May 2016; Oct 2016

Technical Skills

Programming Languages: Python, MATLAB, Mathematica, Fortran, C++
Computational Tools: QuTiP, NumPy, SciPy, TensorFlow, PyTorch
Languages: English (Fluent), Mandarin (Native)