Zhuo Chen

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EDUCATION

Massachusetts Institute of Technology (Not started yet) *Sep. 2021—May* 2026(Expected)
Cambridge, MA GPA: N/A
Major: Physics (Doctor of Philosophy)

University of Illinois at Urbana-Champaign (Graduating soon) *Aug. 2017—May 2021*(Expected)
Urbana, IL GPA: 4.00/4.00
Major: Physics (Bachelor of Science)
Minor: Mathematics, Computer Science.

PUBLICATIONS († Co-first authors)

- Di Luo†, **Zhuo Chen**†, Kaiwen Hu, Zhizhen Zhao, Vera Mikyoung Hur, Bryan K. Clark. "Gauge Invariant Autoregressive Neural Network for Quantum Lattice Models." (Jan. 18, 2021). https://arxiv.org/abs/2101.07243
- Di Luo†, **Zhuo Chen**†, Juan Carrasquilla, & Bryan K. Clark. "Quantum Dynamics by Solving Probabilistic Differential Equations via Autoregressive Networks." (Dec. 11, 2020). Machine Learning and Physical Sciences Workshop at NeurIPS Conference 2020. https://ml4physicalsciences.github.io/2020/files/NeurIPS_ML4PS_2020_95.pdf
- Di Luo†, **Zhuo Chen**†, Juan Carrasquilla, & Bryan K. Clark. "Autoregressive Neural Network for Simulating Open Quantum Systems via a Probabilistic Formulation." (Sep. 11, 2020). https://arxiv.org/abs/2009.05580
- **Zhuo Chen**, E. A. Huerta, Joseph Adamo, Roland Haas, Eamonn O'Shea, Prayush Kumar, & Chris Moore. "Observation of Eccentric Binary Black Hole Mergers with Second and Third Generation Gravitational Wave Detector Networks." (Aug. 7, 2020. Recently accepted by PRD, expecting publication soon.) https://arxiv.org/abs/2008.03313
- **Zhuo Chen**. (2016). Chinese Utility Model Patent, Brushless DC Motor, CN205385396U, filed on Feb 17, 2016 and issued on July 13, 2016.
- **Zhuo Chen**. (2016). Chinese Utility Model Patent, Brushless DC Motor, CN205407548U, filed on Feb 17, 2016 and issued on July 27, 2016.

HONORS & AWARDS

- Deans' list for all semesters at University of Illinois. *May. 2020*
- A. C. Anderson Undergraduate Research Award. *Apr. 2020*
- Honorable mention (team) in Mathematical Contest in Modeling. *Apr. 2020*
- Phi Beta Kappa Society member. *Dec. 2019*
- Sixth place (team) in International Theoretical Physics Olympiad for Undergraduate Student. *Jan. 2019*
- Top gold in British Physics Olympiad (China). *Dec. 2015*
- Certificate of Elementary Red Cross first aider. *Apr. 2015*
- Second Prize in China National Linguistics Olympiad Individual Contest. *Apr. 2015*
- Certificate of Distinction in American Mathematics Competition (12). *Feb. 2015*

RESEARCH EXPERIENCE

Clark Research Group *University of Illinois*
Mentor: Professor Bryan K. Clark *Jan. 2020–Present*

- **Quantum computation simulation**
  - Designed an algorithm of diffusion Monte Carlo (DMC) simulation of quantum computing process via positive operator-valued measure (POVM) formulation.
- **Many-body open quantum system simulation**
  - Simulated open quantum systems using autoregressive neural networks via POVM formulation.
  - Submitted a co-first-author paper to PRL (under review) and published a co-first-author paper to NeurIPS Machine Learning and the Physical Science workshop.
  - Attended NeurIPS workshop on Dec. 11, 2020 and will attend 2021 APS March Meeting to present our results.
- **Simulation of quantum lattice gauge theories**
  - Developed gauge-invariant neural networks with efficient sampling.
  - Simulated various quantum models with gauge symmetries, including quantum link model, toric code model, X-cube fracton model, and non-abelian anyon model.
  - Gathering results and submitting a co-first author paper to PRX.
- **Simulation of quantum dynamics of density matrices and operators**
  - Proposed a unifying algorithm to simulate many-body density matrix dynamics and operator dynamics in both closed and open systems.

National Center for Supercomputing Applications (NCSA) Gravity Group *University of Illinois*
Mentor: Professor Eliu Antonio Huerta Escudero *Sep. 2018–Aug 2020*

- **Analysis of gravitational wave detection**
  - Numerically analyzed the sensitivity of different combinations of second and third generation gravitational wave detectors for binary black hole mergers.
  - Presented results on 2019 NCSA gravity group symposium.
  - Submitted a first-author paper to PRD (addressing comments).
- **Gravitational wave simulation**
  - Collaborated with other students to simulate gravitational waves using the Einstein Toolkit and Blue Waters supercomputer.

EXTRACURRICULAR ACTIVITIES

DIY Projects *Jul. 2017–Present*

- Designed and made a portable electric refrigerator, an air humidifier with continuously variable speed control, five modular power banks, and an uninterrupted power supply for a wireless router.
- Identified and fixed a wide-spread flawed design of power adapters that may shock people after unplugged.
- Built several desktop computers, explored different operating systems, hosted a personal cloud server using virtualization technology, and converted a broken laptop into a home media server

Illinois Guidance for Physics Students (GPS) *Aug. 2019–Present*

- Mentored freshmen physics students and provided advice on their physics career.

Overseas China Education Foundation (OCEF) at UIUC *Sep. 2019–Present*

- Assisted fund-raising events to improve the education environment for children in China's rural areas and designed several social activities.

Artificial Limbs 3D Printing Project *Feb. 2016*

- Designed, printed, and assembled an artificial limb using PRO/engineering 3D modeling software and programed the limb to sense muscle signals using an electromyography sensor.

- Donated the limb to a child with disability in Tibet.

TEACHING EXPERIENCE

Physics Tutor *University of Illinois*

One to One Tutor *Sep. 2017—Dec. 2018*

- Tutored undergraduate students on introductory and mid-level topics of physics and developed teaching skills.

Physics, Math, Chemistry and English Teacher *Luohe, China*

Teacher *Jun. 2018—Aug. 2018*

- Taught a class of seven middle school students on physics, math, chemistry, and English and two high school students on physics and chemistry for two months.

SKILLS

- Programing: Python, C++, Java, PyTorch, CUDA, Mathematica, and LaTeX.
- Operating system and software: Windows, Linux, macOS, Office 365, and Origin.
- Techniques: soldering, computer building and troubleshooting, virtualization, and RAID.