Jinguo Liu (刘金国)

Postdoc fellow in Harvard university

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"朝正确的方向攀爬，而不是去摘下垂的果实。"

Education

Nanjing Institute of Technology — *Nanjing*

B.S. in Software Engineering — *2008–2012*

When I was a college student, I read a book "Quantum Computation and Quantum Information" by Michael A. Nielsen. I was deeply impressed by the beautiful computation framework in the book, and decided to learn more about quantum computing in Prof. Yang Yu's group in Nanjing University.

Nanjing University — *Nanjing*

Ph.D. Theoretical Physics — *2012–2017*

Adviced under Prof. Qianghua Wang, doing numeric simulation of condensed matters. I mastered tensor networks algorithms and renormalizationing group theories, and became a geek in simulating quantum many body systems. Most of my works are about designing numeric algorithms to solve important problems in physics, like multi-channel Kondo problem and fractional topological excitation. In the last year as a doctor candidate, I won the first prize in ZTE fantastic algorithm challenge, which is a good proof of my solid algorithmic background of matrix computation and combinatorial optimization.

Skills

Programming	Julia, Python, Fortran
Language	Chinese, English
Algorithms	Tensor Networks, Differentiable Programming
Knowledge	Quantum computing, Condensed matter physics, Combinatorial optimization

Experience

Institute of Physics (IOP), Chinese Academy of Sciences — *Beijing*

Postdoc — *2017–2019*

Then I became a postdoc of a young and charming guy Lei-Wang. Besides providing valuable suggestions in my research, Lei also creates a lot of opportunities for me, like encouraging me to give lectures and talks in international conferences and summer schools. My postdoc career is in Institute of Physics (IOP), Chinese Academy of Sciences. That time my research interest is automatic differentiation and quantum algorithms, this is a field that can incubate several killer Apps. I also developed the quantum simulation framework Yao.jl with a built in automatic differention engine together with a genuine Julia lover Xiu-Zhe Luo. I mentored a student for Julia on the GSoC project of differentiable tensor networks. It is a valuable experimence for me to lead a project. The open source repository `OMEinsum` is listed bellow.

QuEra computing — *Waterloo*

Consultant — *2020.01-2020.07*

Harvard university — *Boston*

Postdoc fellow — *2020.08-*

Honors & Awards

2017	**First prize (out of 8000 teams, 100,000 RMB award),** ZTE Fantastic Algorithm Challenge	*Xi An, China*
2007	**First prize,** Physics Olympiad	*JiangSu Province, China*
2016	**Academic Excellence Scholarship,** Nanjing University	*NanJing*

Selected Presentations

March Meeting — *Boston*

Presenter — *2019*

Gave a talk "Differentiale Quantum Circuits and Generative Modeling"

Juliacon *Baltimore*

PRESENTER *2019*

Gave a talk "Differential Programming Tensor Networks"

Deep Learning and Quantum Programming: A Spring School *Dongguan*

LECTURER *2019*

Gave lectures on quantum computing.

Selected Publications

Computing properties of independent sets by generic programming tensor networks *Unpublished*

FIRST AUTHOR *2022*

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Tropical tensor network for ground states of spin glasses *Phys. Rev. Lett. 126, 090506*

FIRST AUTHOR *2021*

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Yao.jl: Extensible, Efficient Framework for Quantum Algorithm Design *Quantum*

SECOND AUTHOR *2020*

- One of the main authors of the most popular quantum circuit simulator in Julia language.