Chun-Wei Liu

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Research Interests

Quantum Information, Quantum Computing, Computational Physics.

Education

National Cheng Kung University *Tainan, Taiwan*

B.S. in Civil Engineering *06/2020*

- Overall GPA: 3.55/4.3, Physics Major: 4.16/4.3

Research Experience

***Research Assistant* , Physics Dept. Matterwave Lab,** Prof. Pei Chen Kuan *Tainan, Taiwan*

Semi Quantum Walk *08/2019 - PRESENT*

- Discussed a generalized quantum walk with a parameterized shift operator that can improve high precision measurement of quantum states adapting optical methods.
- Proposed a numerical simulation model of quantum walks.

***Research Assistant*, Civil Engineering Dept. AI Material Lab,** Prof. Yun Che Wang *Tainan, Taiwan*

Machine learning in material design. *02/2019 - 06/2020*

- Applied various generative adversarial networks(GANs) to generate high fedility material samples.
- Proposed a method using VGG networks that can predict mechanical properties from microstructure images with 95% accuracy.
- Investigated an integrated model that optimizes the geometry generated by GANs.

Constructing auxetic materials unsing computational molecular dynamics.

- Prunned auxetic networks to generate material with negtive poisson's ratio based on "**Auxetic metamaterials from disordered networks**".
- Proposed a model that dealt with 96-core processors, incresed the computatioinal efficiency by 40 times.

Publications

1. **Chun Wei Liu,** Pei Chen Kuan, *"Symmetric quantum walk with phase transition feature"*(Under preperarion.)
2. Yun-Che Wang**, Chun Wei Liu** , Pei-Chen Cheng , Jyun-Ping Wang, Tsai-Wen Ko, *"Design of Chiral Metamaterials via Deep Neural Networks"*(Under preperarion.)

Honors & Awards

2018 **5th Place**, Asia Pacific Mechanics Contest for College Students

2020 **Chairman Special Award**, "Hybrid Neural Networks with VQE", IBMq Qiskit Hackthon Taiwan

Presentation

Asian Pacific Congresson Computational Mechanics (APCOM2019) *Taipei, Taiwan*

Presenter for *"Design of Viscoelastic Auxetic Materials Through Machine Deep Learning"* *12/2019*

- Application of VGG networks when labeling microtructure images.

Extracurricular Activity

Academic Department of NCKU CE Student Association *Tainan, Taiwan*

Director *06/2017 - 06/2018*

- Organized several construction site-visiting including, hydraulic systems, metro transtortation sysytems and mojor consulting corporations.
- Held workshops and talks for student fellows and prospective junior students.

American Language Program, School of Professional Studies, Columbia University *New York City, NY*

Student *07/2018 - 08/2018*

- Visited an advance academic facility and preparing my prospected academic studies in the U.S.

Skills

Programming Languages Python, C/C++, MATLAB
Deep Learning Libraries Tensorflow, PyTorch, Keras
Other Technologies Qiskits, Linux, Raspberry Pi, GCP, Git, LAMMPS, LaTeX