Curriculum Vitae of Yu-Chi Chang

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Research Interest

- **Quantum Field Theory and Scattering Amplitude**
- **String Theory and Quantum Gravity**
- **Mathematical Physics**

Education

National Taiwan University *Sep 2023 - Aug 2025*
MS Degree (Department of Physics) *Overall GPA:4.14/4.3*

National Taiwan University *Sep 2019 - Jun 2023*
BS Degree (Department of Physics) *Overall GPA:4.10/4.3*
BS Degree (Department of mathematics)

Publication

[1] Yu-Chi Chang, Hsing-Yen Chen, Yu-tin Huang, "All zeros of (super)String Theory," arXiv:2506.15299 [hep-th]

Research Experience

Surfaceology for QCD *Since Mar 2024*
Supervisor: Professor Yu-Tin Huang (Department of Physics, National Taiwan University, Taiwan)

- Tried to construct surfaceology for QCD in two ways. First, used the curve–integral representation to rewrite the amplitude and then extracted the tropical function to obtain the field–theory limit. Second, followed the Feynman rules to construct the curve integral in the field–theory limit directly.
- Tried to find a new way to write surfaceology in superspace, formulating the superstring amplitude in a simple and novel form to reveal more properties and structure.

All zeros of (super)String [1] *Jan 2025 - Jun 2025*
Supervisor: Professor Yu-Tin Huang (Department of Physics, National Taiwan University, Taiwan)

- Developed a scaffolding technique that builds Yang–Mills and higher-level string amplitudes from tachyon amplitudes in the open bosonic string, and used it in the curve-integral representation to identify hidden zeros in the open bosonic string.
- Extended it to the superstring, constructing the SYM amplitude from supertachyon and gluino amplitudes, identifying SYM zeros and revealing new superstring zeros.
- Formulated curve-integral representations for fermionic amplitudes and extracted their field-theory limit.

Gravitational analog of electromagnetic duality *Nov 2023 - Feb 2024*
Supervisor: Professor Mao-Pei Tsui (Department of Mathematics, National Taiwan University, Taiwan)
Supervisor: Professor Yu-Tin Huang (Department of Physics, National Taiwan University, Taiwan)

- Explore possible new solutions generated by duality map and extend the case with a cosmological constant.
- Using scattering amplitudes give some hints and disprove the claims about creating new solutions.

Real-space renormalization group for Quasi-hermitian Transverse Ising Model *Dec 2022 - Feb 2023*

Supervisor: Professor Chang-Tse Hsieh (Department of Physics, National Taiwan University, Taiwan)

- Utilize the Real-space renormalization group technique to the Quasi-hermitian Transverse Ising Model to study its critical phenomena.

Awards

Dean's Award *Jul 2023*

Academic Excellence Award *Oct 2019*

20th Asian Physics Olympiad Bronze Medal *May 2019*

Extracurriculars

Advanced Reading Group on Hodge Theory and Complex Geometry *May 2021 - Jan 2022*

Supervisor: Professor Jungkai Chen (Department of Mathematics, National Taiwan University, Taiwan)

- Regular presentations in the group fostered my ability to present ideas and articulate concepts about Hodge theory and K3 surfaces.
- Focus on the Hodge decomposition and the Lefschetz decomposition, together with Kodaira theorems, as the tools for the K3 case.
- Applied these to K3 surfaces: focused on the Hodge structure and used the period map together with Torelli-type theorems to study their classification.

Mountain Service Club, National Taiwan University *Mar 2021-Aug 2024*

- Spent 10–20 days during each winter and summer break immersing in local Indigenous communities; visited and participated in daily village life to build deeper connections.
- Designed and delivered diverse, engaging lessons for Indigenous children.

Physics Student Association, National Taiwan University *Sep 2021-Jul 2022*

- Organized laboratory visits to introduce Physics Department students to the research and activities within the labs and a study abroad talk where alumni shared their experiences studying overseas.

Working/Teaching Experience

Teaching Assistant

Course: Calculus I, II, III,and IV and General Physics I and II

Common Courses Tutoring services (NTU Academic Counseling Service) *Sep 2023-Jun 2025*

Course: General Physics and Calculus

- Delivered one-on-one academic support, clarifying complex topics in Calculus and Physics for undergraduate students

Research Assistant *May 2021-Jan 2022*

Supervisor: Jungkai Chen

Research Assistant *Oct 2024- Present*

Supervisor: Yu-Tin Huang

Skills

Programming skills

Python, LaTeX

Language

TOEFL: 100 (R:25, L:27, S:22, W:26) *Oct 29th, 2025*