# Chi-Sheng (Michael) Chen (陳麒升)

**AI in Medicine/Finance | EEG/BCI | Multi-Modal Learning | Quantum Machine Learning**

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Nationality: Taiwan | Country of normal residence (last 5 years): Taiwan and USA |

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Chi-Sheng (Michael) Chen is a biomedical AI researcher with both academic and industry experience, specializing in EEG/time-series AI and Quantum Machine Learning. With 15+ peer-reviewed publications (JAD IF=6.5, Physical Review A/B/R, ICASSP, QCE), and serving as reviewer for leading journals including IEEE TPAMI and npj Quantum Information, hands-on experience in RLHF development at OpenAI, and entrepreneurial work building AI-driven quantitative trading and DeFi risk management systems, he bridges cutting-edge research with real-world deployment. His work addresses the challenge of building generalizable AI for non-stationary finance/biosignals, with trading systems online and EEG prediction models clinically deployed at real world Hospital.

## Research & Industry Experience

**Harvard Medical School & Beth Israel Deaconess Medical Center** — MA, USA

*Surgical Informatics Research Assistant, Advisor: Prof. Dr. Gabriel Brat* — *Nov 2024 – Now*

- Developing real-time EMS triage pipeline using multimodal AI for trauma prediction.
- Collaborating with surgeons on AI-assisted decision support systems.

**OpenAI Inc.** — MA, USA

*AI Trainer (Contractor)* — *Mar 2025 – Oct 2025*

- Performed high-complexity AI data labeling and evaluation tasks, including instruction following, multimodal reasoning, and safety alignment.
- Contributed to Reinforcement Learning from Human Feedback (RLHF) pipelines by providing high-quality comparative judgments, preference rankings, and model-behavior assessments.

**Bonanza Quant Corporation** — Delaware, USA

*Backend Engineer* — *Dec 2024 – Feb 2026*

- Build AI/algorithm-based quant trading/analysis/back test system for a private fund.

**Neuro Industry, Inc.** — CA, USA

*Researcher, Co-Founder & CTO* — *Mar 2024 – Jan 2025*

- Built GCP-based MLOps pipeline, enabling training on 10K+ EEG samples.
- 2 research papers on quantum machine learning on EEG signal processing.
- 1 research paper on EEG-to-image using diffusion model.

**MediaTek Inc.** — Hsinchu, Taiwan

*Digital IC R&D Engineer* — *Dec 2021 – Oct 2023*

- Responsible for microprocessor IP development for flagship 5G smartphones' display and AMBA SoC implement.
- Hardware virtualization architecture RTL design and IP verification with UVM and SystemVerilog.

**Department of Surgery, National Taiwan University Hospital** — Taipei, Taiwan

*Research Assistant, Advisor: Dr. Shuo-Lun Lai* — *Jul 2021 – Sep 2021*

- Deep learning applications on surgery automation with YOLO-based model.
- Developed a prototype for a surgical smoke evacuation system.

**Department of Psychiatry, Taipei Veterans General Hospital** — Taipei, Taiwan

*Research Assistant, Advisor: Prof. Dr. Cheng-Ta Li* — *Sep 2019 – Jun 2021*

- Collaborated with researchers and clinicians to identify patterns and trends in brainwave activity related to major depressive disorder.
- Utilized machine learning algorithms to develop predictive models based on real-world brainwave data.

**Max Planck Institute for Chemical Physics of Solids (MPI CPfS)** — Dresden, Germany

*Research Internship, Advisor: Dr. Alexander Komarek & Dr. Li Zhao* — *Jul 2018 – Sep 2018*

- Searching new possible unconventional superconductors among Co-based quaternary chalcogenides with diamond like structure $CuInCo_2A_4$ / $AgInCo_2A_4$ (A = Te, Se, S).

## Education

**National Taiwan University (NTU)** Taipei, Taiwan

*Master of Science in Biomedical Electronics and Bioinformatics* ***GPA: 3.74/4.30*** *Sep 2019 – Jun 2021*
*Advisor: Prof. Dr. Cheng-Ta Li, MD & Prof. Chung-Ping Chen*

- Machine learning application on non-stationary time series data.
- The research EEG model for TMS pattern personalized prediction is currently being applied to real outpatient patients in the Precision Depression Intervention Center (PreDIC), Taipei Veterans General Hospital.

**National Chiao Tung University (NCTU)** Hsinchu, Taiwan

*Bachelor of Engineering in Electrophysics* *Sep 2015 – Jun 2019*
*Bachelor of Science in Interdisciplinary Science Degree Program*

- Researching the oxide processing techniques.
- Researching the biomedical signal processing on traditional Chinese medicine data.

## Skills

**Programming:** C/C++, JavaScript, Python, Rust, MATLAB, R, MySQL, Verilog, SystemVerilog, Perl, Solidity

**Frameworks:** PyTorch, HuggingFace, Scikit-learn, MNE, MLflow

**Tools:** Git, Docker, GCP, AWS, HSPICE, Genus, SG-Lint, Verdi, UVM

**Languages:** Chinese (Native), English (Fluent; IELTS Overall 6.5, R 7.0, L 6.5, W 6.0, S 6.0, test date: Dec 2025; IELTS retake scheduled for Mar 2026)

## Selected Publications (270+ cites)

[Peer-Reviewed - First/Co-first Author]

**Chen, C.-S., et al. "Exploring the potential of qeegnet for cross-task and cross-dataset electroencephalography encoding with quantum machine learning"** Journal of Signal Processing Systems (2025)

**Chen, C.-S., et al. "Unraveling quantum environments: Transformer-assisted learning in Lindblad dynamics"** Physical Review A (2025), IF=2.9, https://doi.org/10.1103/gsxk-45mk .

**Chen, C.-S., et al. "Exploring the Potential of Electroencephalography Signal–Based Image Generation Using Diffusion Models: Integrative Framework Combining Mixed Methods and Multimodal Analysis"** JMIR MI (2025), IF=3.8, https://doi.org/10.2196/72027 .

**Chen, C.S., et al. "Improving fine-grained food classification using deep residual learning and selective state space models"** PloS one (2025), IF=2.9, https://doi.org/10.1371/journal.pone.0322695 .

Li, C.T., **Chen, C.S., et al. "Prediction of antidepressant responses to non-invasive brain stimulation using frontal electroencephalogram signals: Cross-dataset comparisons and validation"** Journal of Affective Disorders (2023), IF=6.533, https://doi.org/10.1016/j.jad.2023.08.059 .

Lai, S.L., **Chen, C.S., et al. "Intraoperative Detection of Surgical Gauze Using Deep Convolutional Neural Network"** Ann Biomed Eng 51, 352–362 (2023), IF=4.219, https://doi.org/10.1007/s10439-022-03033-9 .

**Chen, C.S., et al. "Quantum Reinforcement Learning-Guided Diffusion Model for Image Synthesis via Hybrid Quantum-Classical Generative Model Architectures"** arXiv:2509.14163, 2026 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP).

**Chen, C.S., et al. "Quantum and Classical Machine Learning in Decentralized Finance: Comparative Evidence from Multi-Asset Backtesting of Automated Market Makers"** arXiv:2510.15903, 2026 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP).

**Chen, C.S., et al. "Quantum Contrastive Learning Framework"** arXiv:2408.13919. 2025 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), doi: 10.1109/ICASSP49660.2025.10889504 .

**Chen, C.S., et al. "QEEGNet: Quantum Machine Learning for Enhanced Electroencephalography Encoding"**arXiv:2407.19214. IEEE International Workshop on Signal Processing Systems (SiPS) 2024, doi: 10.1109/SiPS62058.2024.00035 .

**Chen, C.S., et al. "Q-DPTS: Quantum Differentially Private Time Series Forecasting via Variational Quantum Circuits"**IEEE GLOBECOM Workshop 2025, arXiv:2508.05036.

**Chen, C.S., et al. "Quantum Reinforcement Learning Trading Agent for Sector Rotation in the Taiwan Stock Market"** IEEE QCE QCRL Workshop 2025, arXiv:2506.20930.

[Peer-Reviewed - Contributing Author]

Lai, S.L., Chao, Y.C., **Chen, C.S., et al. "Detection and tracking of a gauze sponge in minimally invasive surgery using a YOLO and R-CNN based model"** Medical & Biological Engineering & Computing (2025), IF=2.6, https://doi.org/10.1007/s11517-025-03471-2 .

Takegami D., et al.**"Direct imaging of valence orbitals using hard x-ray photoelectron spectroscopy"** Phys. Rev. Res. 4, 033108 (2022), IF=4.3, https://doi.org/10.1103/PhysRevResearch.4.033108 .

Falke J., et al.**"Electronic structure of the metallic oxide $ReO_3$"** Phys. Rev. B 103, 115125 (2021), IF=3.908, https://doi.org/10.1103/PhysRevB.103.115125 .

[Preprints / Under Review]

**Chen, C.S., et al. "A Unified SPD Token Transformer Framework for EEG Classification: Systematic Comparison of Geometric Embeddings"** arXiv preprint (2026), arxiv:2601.21521.

**Chen, C.S., et al. "FreqLens: Interpretable Frequency Attribution for Time Series Forecasting"** arXiv preprint (2026), 2602.08768.

**Chen, C.S., et al. "Quantum Adaptive Self-Attention for Quantum Transformer Models"** arXiv preprint (2025), arXiv:2504.05336.

**Chen, C.S., et al. "Large Cognition Model: Towards Pretrained EEG Foundation Model"** arXiv preprint (2025), arXiv:2502.17464.

**Chen, C.S., et al. "Mind's Eye: Image Recognition by EEG via Multimodal Similarity-Keeping Contrastive Learning"** arXiv preprint (2024), arXiv:2406.16910.

## Professional Service

**Journal Reviewer** (2025–present): **IEEE Trans. Pattern Analysis and Machine Intelligence (TPAMI)**, **IEEE Trans. Consumer Electronics**, **IEEE Trans. Audio, Speech, and Language Processing**, **npj Quantum Information**, EPJ Quantum Technology, Quantitative Finance and Economics, AI, Computer Science and Robotics Technology, Biomedical Physics & Engineering Express, Engineering Research Express

**Conference Reviewer** (2025–present): **ICML**, **KDD**, **ICASSP**

## Awards & Achievements

**2023 Certificate of the 20th National Innovation Award, clinical research category.**
**2019 International Blockchain Olympiad (IBCOL):** World Finalist competition with 100+ teams.

**2017 Microsoft International Imagine Cup :** 2nd place in Taiwan.

**2016 International Genetically Engineered Machine Competition (iGEM):** World Gold medal, Best Applied Design, Best Part Collection, Best Presentation competition with 300+ university teams.