Cheng-Yeh Chen

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EDUCATION

Ph.D. Student | ECE
Georgia Tech | '23–present
Advisor: Raghupathy Sivakumar

M.S. | Communication Engineering
National Taiwan Univ. | '19–'21
Advisor: Hung-Yun Hsieh

B.S. | Electrical Engineering
National Taiwan Univ. | '15–'19

RESEARCH INTERESTS

Brain-machine alignment
(🧠 🔄 🤖)
Transformer interpretability
(🧠 ➡️ 🤖)
Neural decoding
(🧠 ⬅️ 🤖)

SKILLS

Transformer probing
fMRI / EEG / MEG preprocessing
PyTorch | Huggingface | nilearn
Python | C/C++ | MATLAB | Bash

TEACHING

Probability & Statistics
TA | NTU | '20
Computer Programming (C++)
TA | NTU | '19–'20

INDUSTRY

NTU Computer & Information Networking Center | '21–'22
Research Associate
Built real-time 25 Gbps network traffic analysis platform ($200K govt grant)

Trend Micro | Summer '19
Software Engineering Intern
Built spear-phishing detector over 10M+ email graph

SERVICE

Reviewer: IEEE ICC, TVT, Access

SELECTED PUBLICATIONS

Brain-machine alignment (🧠 🔄 🤖)

- **The Mind's Transformer: Computational Neuroanatomy of LLM-Brain Alignment**
  [ICLR 2026, Top 7% Review Scores]
  – Conducted the first systematic and anatomical intra-block LLM-brain alignment analysis

Transformer interpretability (🧠 ➡️ 🤖)

- **Aligning and Steering Vision Foundation Models via the Human Visual Cortex**
  – Utilizing the brain's functional topography as a zero-shot basis for mechanistic interpretability and training-free cortical steering of ViTs

Neural decoding (🧠 ⬅️ 🤖)

- **Before the Last Layer: Enriching Brain Decoding through Hierarchical Brain-Model Alignment**
  – Challenging the last-layer default in fMRI-to-image reconstruction; plug-and-play layer ensemble yields 5–15% gains across SOTA methods

SELECTED COMPETITION

NeurIPS 2025 LibriBrain — *MEG Speech Detection · Team Lead, Team Ch3ng*

- **5th globally** (53 teams) in Speech Detection Standard (F1: 0.9071; 1st: 0.9166); decoded speech segments from 306-channel MEG on 50+ hour dataset

RESEARCH EXPERIENCE

Georgia Tech GNAN Lab — *Aug 2023 – Present*
Graduate Research Assistant · Advisor: Prof. Raghupathy Sivakumar

AI Interpretability & Computational Neuroscience

- Dissected transformer internals and mapped them onto brain activity—first for LLMs against fMRI (MindTransformer, ICLR 2026), then leveraging cortical topography to steer Vision Transformers via training-free interventions (Cortical Steering)
- Resolved fundamental limitations in brain-AI alignment methodology by modulating temporal entanglement in fMRI (MindTrail), and challenged the last-layer default in brain decoding through hierarchical brain-model alignment

Brain-Computer Interfaces (EEG)

- Investigated cross-condition signal amplification dynamics in evoked brain signals (PerCom Wksp 2024), leading to a nonlinear ICA framework that disentangles universal neural sources for EEG-to-text/speech decoding (Trident)
- Pioneered transfer learning for rapid BCI calibration via optimal transport (MobiCom Wksp 2023), extended to microscopic domain adaptation that mitigates temporal drift across sessions (Catch My Drift)

NTU TONIC Lab — *Sep 2019 – Jun 2021*
Graduate Research Assistant · Advisor: Prof. Hung-Yun Hsieh

Wireless Virtual Reality

- Built an end-to-end pipeline of viewport-adaptive resource allocation for 360° video (IEEE TWC 2023), efficient tiling for lightweight VR (ICC Wksp 2023), and optimal multiview transcoding for volumetric content (IEEE ICC 2024)

4G/5G Protocol & Algorithm

- Discovered low-volume DDoS attack against 5G URLLC (EuCNC 2020), revealed queue correlation effects in multi-connectivity with packet duplication (IEEE WCL 2022), developed uplink optimization for clustered networks (IEEE TCOM 2024) and data-centric resource allocation for machine-type communications (IEEE TVT 2024)