Benjamin Chou

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PROFESSIONAL SUMMARY

3rd-year ECE PhD Candidate at Purdue University specializing in AI/ML research for audio, music, and multimodal systems. Researching generative model steering, Stem separation, Transformers for error detection, and deepfake detection. Track record of high-impact research, including publications at AAAI, WACV and papers currently under review at top-tier venues with exceptional feedback. I am proficient in Audio DSP, Python, PyTorch, Tensorflow, and HPC clusters. I also have organizational and communication skills (experience organizing 3 AI4Music workshops).

EDUCATION

Ph.D. in Electrical & Computer Engineering | *Purdue University*, West Lafayette, IN 2023 - Present
- GPA: 3.8/4.0

B.Sc. in Electrical Engineering | *National Cheng Kung University*, Tainan, Taiwan 2020 - 2023
- GPA: 4.0/4.3

EXPERIENCE

Applied Research Scientist Intern | *Reality Defender*, Manhattan, New York (remote) May '25 – Sep '25
- Developed an in-context learning framework with large audio language models, achieving SOTA deepfake detection on in-the-wild speech (+54.9% avg Macro F1 improvement). **Natural Language Processing**, **RAG**, **ICL**, **Audio LLMs**, and **model routing**.

Graduate Research Assistant | *Under Dr. Yung-Hsiang Lu, Purdue University*, West Lafayette, IN Jan '24 – Present
- Developed an AI tutoring model with 6× higher F1 than prior work, accepted to AAAI. **PyTorch**, **NLP**, and **Audio Transformers**.
- Leveraged **HPC clusters** and **Linux** environments to engineer generative pipelines for music mistakes, producing two datasets.
- Organized 'AI for Music' workshops at AAAI 2025, IEEE ICME 2025, and NeurIPS 2025, showcasing **leadership** and **communication**.

Startup Founder | *LocaLens*, West Lafayette, IN Mar '23 – Jan '24
- Made an app for menu translation, currency conversion, and allergen alerts using **Flutter** and **Android Studio**.
- Built an MVP in 4 months with weekly sprints, emphasizing **leadership** and **collaboration**.
- Integrated Google ML Toolkit for cross-platform AI with **computer vision** and **real-time** deployment.

Research Assistant | *Under Dr. Hsun-Ping Hsieh, National Cheng Kung University*, Taiwan Mar '23 – Aug 2023
- Raised cancer-screening invitation accuracy to 83% using **scikit-learn** and tree-based classification. **machine learning**, **statistics**.
- Elevated flash-chip yield by 17% with ensembling and Gaussian processes. **numpy**, **pandas**.

PROJECTS

Improving Developer Code Understanding with GitHub Issues and Retrieval-Augmented Generation | *ChatGPT API, REST, Git*
- Built a RAG-based doc tool with GitHub issues; raised README clarity by 116% and code clarity by 16%.

Multi-Agent Self-Play for Beating Atari Games | *OpenAI Gym, PettingZoo, PyTorch, RL, Multi-agent systems*
- Used DQN/PPO self-play to improve Atari win rates by 11–32%.

Spectral Image Inpainting with Deep Learning | *MATLAB, C++, CUDA*
- Recovered 98% corrupted hyperspectral data at 0.02 RMSE using convex optimization and deep learning.

HONORS & AWARDS

- Outstanding Student Scholarship, awarded to top 2 students in NCKU-Purdue program (2020–2023)
- AAAI Student Scholarship (2025), Selected for NeurIPS Volunteer (2025)

PUBLICATIONS

- P. Jajal, N. J. Eliopoulos, **B. Chou**, G. K. Thiravathukal, J. C. Davis, Y. Lu, "AdaPerceiver: Transformers with Adaptive Width, Depth, and Tokens", *Under Submission* [Link]
- **B. Chou**, Y. Zhu, S. Koppisetti, "ICLAD: In-Context Learning with Comparison-Guidance for Audio Deepfake Detection", *Under Submission*
- **B. Chou**, P. Jajal, N. J. Eliopoulos, J. C. Davis, G. K. Thiravathukal, K. Y.-J. Yun, Y.-H. Lu, "LadderSym: A Multimodal Interleaved Transformer for Music Practice Error Detection", *Under Submission* [Link]
- P. Jajal, N. J. Eliopoulos, **B. Chou**, G. K. Thiravathukal, J. C. Davis, Y. Lu, "Inference-Time Alignment of Diffusion Models with Evolutionary Algorithms", *Under Submission* [Link]
- **B. Chou**, P. Jajal, N. J. Eliopoulos, T. Nadolsky, C.-Y. Yang, N. Ravi, J. C. Davis, K. Y.-J. Yun, Y. Lu, "Detecting Performance Errors with Transformers", *Accepted to AAAI 2025* [Link]
- P. Jajal, N. J. Eliopoulos, **B. Chou**, G. K. Thiravathukal, J. C. Davis, Y.-H. Lu, "Token Turing Machines are Efficient Vision Models", *WACV 2025* [Link]

PATENT PENDING

- System and Method for Detecting Musical Performance Errors, Patent Application 2025.
- ICLAD: In-Context Learning with Comparison-Guidance for Audio Deepfake Detection, Provisional Patent Application 2025.