Joey Chan

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EDUCATION

Johns Hopkins University — Baltimore, MD
Master in Computer Science — **Expected May 2025**
Bachelors of Science in Computer Science — **May 2023**

RESEARCH EXPERIENCE

National Library of Medicine — Bethesda, MD
Advised by: Dr. Zhiyong Lu

Project Matching Online Patients to Clinical Trials with TrialGPT — *May 2024 - Present*

- Analyzed 100 patient vignettes to evaluate the accuracy of the chatbot based on TrialGPT.
- Modified TrialGPT's pipeline to improve its handling of case reports using the PMC-Patients dataset, enabling more accurate interpretation of complex medical scenarios.
- Collected and incorporated 75 patient posts from Reddit (AskDocs, Cancer, Rare Diseases communities) and 25 case reports from 2024 PubMed publications, analyzed over 500 case reports to focus on patients with ongoing symptoms.
- Annotated 1,000 patient-to-clinical trial pairs, ensuring patient eligibility for the top ten returned clinical trials, and analyzed their potential benefit for the patient's condition.
- Conducted comparative analysis of top 10 ranked trials between TrialGPT and ClinicalTrials.gov, assessing performance differences.

Project MedCalc — *July 2024 - Present*

- Verified a dataset of over 1,000 PMC patients using a medical calculator to compare results with GPT-4's truncation output.
- Evaluated GPT-4's accuracy in truncation through prompt engineering techniques.
- Proofread and reviewed the research paper for clarity and accuracy.

Project Verscore — *October 2024 - Present*

- Annotated over 100 claims to determine the relationship between each abstract and its supporting claim.
- Analyzed the relationship between the original claim and its supporting claim.

The Koch Cancer Research Building — Baltimore, MD
Advised by: Dr. Betty Tyler

The Johns Hopkins Hunterian Laboratory — *August 2022 - May 2023*

- Implanted and removed tumors from mice and rats to examine the effectiveness of the drug Cisplatin.
- Built a website for the laboratory using ReactJS and Tailwind CSS.

Project From 2D IVIS to Tumor Volume (In-Progress) — *August 2023 - Present*

- Contacted over 30 authors of research papers to gather data on glioblastoma experiments using MRI and IVIS (In Vivo Imaging System).
- Applied Pearson correlation to identify IVIS features most strongly correlated with tumor volume.
- Developed a pipeline combining XGBoost and Linear Regression to estimate tumor volume based on IVIS features across various cell lines.

Project Drug Repurposing using RAG (In-Progress) — *August 2024 - Present*

- Designed a RAG framework to support rapid access to scientific literature on potential drug candidates for repurposing.
- Integrated a hybrid retrieval approach combining both lexical and semantic retrieval techniques for improved accuracy and relevance in search results.

Johns Hopkins University Applied Physics Lab Laurel, MD
Advised by: Dr. Will Gray-Roncal
Project Gamification of Connectomics *November 2021 - August 2022*

- Developed a lab scene to gamify proofreading that extracted neurons from Neuvue.
- Used Unity to create the basic functionality of a selection menu.
- Developed scripts for characters that were going to be in the game and worked on presentation posters and slides to describe the game to researchers.

Project AGENT *July 2022 - May 2023*

- Worked on a semi-automated error detection algorithm to verify endpoints of 15 neurons with lost orphans (disconnected cell parts of the brain) to full capacity by using a reverse extension approach.
- Finetuned algorithm parameters, including neuronal branch depth, to enhance detection accuracy.
- Compiled and visualized data on correct and incorrect endpoints identified by the algorithm, supporting further improvements in error detection precision.

ACADEMIC CONTRIBUTIONS

- **Cortes Ballen, A.I.; Amosu, M.; Ravinder, S.; Chan, J.; Derin, E.; Slika, H.; Tyler, B. Metabolic Reprogramming in Glioblastoma Multiforme: A Review of Pathways and Therapeutic Targets.** *Cells* 2024, *13*, 1574. https://doi.org/10.3390/cells13181574
- **Joyce, J., Chalavadi, R., Chan, J., Tanna, S., Xenes, D., Kitchell, L., Kuo, N., Rose, V. A., Bishop, C., Rivlin, P. K., Villafañe-Delgado, M., & Wester, B. (2023). A novel semi-automated proofreading and mesh error detection pipeline for neuron extension.** ***bioRxiv (Cold Spring Harbor Laboratory)***. https://doi.org/10.1101/2023.10.20.563359
- **Xenes, Daniel, et al. "NeuVue: A Framework and Workflows for High-Throughput Electron Microscopy Connectomics Proofreading."** ***bioRxiv*** **(2022). (Acknowledged for contribution)** Contributions: Proofread many neurons and completed various tasks such as extending many neurons that included various dendrites that required extending at many endpoints of the dendrite.

HONORS & AWARDS

Digital Education & Learning Technology Acceleration (DELTA) Grants Baltimore, MD
Project Hunterian Laboratory Learning Modules Development *July 2024*

- Received a 75k grant to develop comprehensive learning modules detailing laboratory protocols and experimental procedures. These modules will be featured on a newly created page on the Hunterian Laboratories website, aimed at helping students familiarize themselves with essential lab practices.

Albstein Research Scholarship Baltimore, MD
Project From 2D IVIS Scans to 3D Model *January 2024*

- Received a 5k grant to develop advanced algorithms for translating 2D In Vivo Imaging System (IVIS) scans into 3D models of brain tumors, facilitating longitudinal analysis to assess drug efficacy in clinical studies.

Interactive Case Challenge Virtual
Emerging Tech Challenge First Place *November 2022*

- Developed a chatbot that used sentiment analysis algorithm that was mostly based on a machine learning algorithm combined with Google's Speech to Text API.

Johns Hopkins University Baltimore, MD
HopHacks Fall 2022 Top Ten *September 2022*
- Created an algorithm using Google API to transcribe short conversations into text and applied a machine learning model trained on 50,000+ Reddit posts to predict emotions based on diction
- Collaborated with a team to develop a web platform that tracks daily conversations, supporting vocabulary improvement and identifying potential mental health concerns.

Johns Hopkins University Applied Physics Lab Laurel, MD
Net-Hacks 2022 Hackathon First Place (Internal) *July 2022*
- Developed a website to serve as a database for monkeypox variants and key mutations, aimed at accelerating vaccine development and disease prevention.
- Created a database of these mutated strains as well as their antigen strains, with mutations to critical DNA sequences flagged.

LEADERSHIP ACTIVITIES

HopDrop Baltimore, MD
Team Lead, Johns Hopkins University *January 2023 - January 2024*
- Crafted a comprehensive collection of user-centric designs through the utilization of Figma, effectively addressing the challenge of facilitating on-campus delivery with a team of four.
- Used Android Studio to develop an application tailored for Android devices and later used react native to develop an platform for ios devices.

UWP Baltimore, MD
Team Lead, Johns Hopkins School of Medicine *April 2023 - December 2023*
- Crafted a sophisticated interactive ultrasound-based learning platform from the ground up, seamlessly integrating real-time data retrieval from Airtable. The result was a dynamic Jeopardy-style game board infused with captivating live game mechanics reminiscent of the immersive engagement seen in Kahoot.

Quest2Learn Baltimore, MD
AR Development Intern, Johns Hopkins University *October 2022 - January 2023*
- Assisted in developing lab scenes in Unity including animations for lab materials and selecting materials for assets.
- Developed a registration page using JavaScript for professors involved in Quest2Learn to add students on the platform.

SKILLS

- **Programming Languages:** Python, Java, C++, C, JavaScript
- **Frameworks and Libraries:** PyTorch, scikit-learn, Flask, Expo, Jupyter Notebook, GitHub, Netlify
- **Tools:** Unity, Blender, 3D Slicer
- **Cloud Platforms:** AWS, Microsoft Azure