Ji (Joey) Chan

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Education

- **University of Illinois Urbana-Champaign (UIUC)**
  Ph.D. Candidate in Computer Science *Aug 2025 – Present*
  - Advisor(s): Prof. Yue Guo; Prof. Jiawei Han
  - Research Focus: Plain Language Summarization, Drug Discovery, AI4Science
- **Johns Hopkins University (JHU)**
  Master of Science in Computer Science *Aug 2023 – May 2025*
  Bachelor of Science in Computer Science *Aug 2021 – May 2023*

Research Experience

- **National Library of Medicine (NLM), National Institutes of Health (NIH)**
  Academic Intern *June 2024 – Present*
  Supervisor: Zhiyong Lu
  - Conducted research in creating multi-hop QA dataset, matching patients to clinical trials, and large language models.
  - Collaborated on interdisciplinary projects involving machine learning and natural language processing for healthcare.
- **The Johns Hopkins Hunterian Laboratory**
  Research Intern *Aug 2022 – Present*
  Supervisor: Betty Tyler, Henry Brem
  - Conducted preclinical research involving wet-lab techniques, including cell culture and passaging, tumor implantation, and animal handling in glioblastoma models.
  - Developed and maintained the laboratory website, and assisted with data collection and analysis for preclinical imaging studies.
- **The Johns Hopkins Applied Physics Laboratory**
  Circuit Intern *Nov 2021 – May 2023*
  Supervisor: Will G. Roncal
  - Contributed a Unity-based gamified environment for connectomics proofreading, including interactive neuron extraction from NeuVue datasets and presentation materials for research dissemination.
  - Designed and evaluated a semi-automated error detection pipeline for neuronal endpoint verification, tuning algorithm parameters and analyzing results to improve detection accuracy for the Machine Intelligence from Cortical Networks (MICrONS) dataset.

Ongoing Projects

Personalizing Plain Language Summarization *UIUC*
Illinois, Champaign, USA *Sep 2025 - April 2026*
Advised by: Yue Guo
Project Lead

- Developed a web-based study platform using Streamlit in which participants interact with a GPT-assisted chatbot to complete various phases.

- Collaborated with medical graduate students to design a rigorous question–answering pipeline for assessing participant understanding.
- Established end-to-end workflows across all study phases, including a Phase 3 pipeline that uses data from earlier phases to support techniques such as Mixture-of-Experts and in-context learning.
- Trained open-source models with LoRA-based fine-tuning to enable controllable reader-personalized summarization across study phases.

Making Molecules for Cancer Targeted Therapy with Virtual Cells and Agentic AI *UIUC*
Illinois, Champaign, USA *Sep 2025 - Present*
Advised by: Jiawei Han

- Assisted in the IC50 reward prediction model creation to guide reinforcement learning (RL) molecular design for cancer-targeted therapies.
- Collected molecular building block information using SMILES strings from PubChem and RDKit to support downstream modeling and virtual cell simulations.
- Curated non–FDA-approved molecules from the Broad Institute and evaluated available platforms for compound characterization.

EviBench *NIH, NLM*
Bethesda, MD, USA *July 2025 - Present*
Advised by: Zhiyong Lu

- Developed a web-based annotation platform enabling annotators to label multiple question–answer pairs per item, with structured interfaces to ensure consistency and data quality.
- Contributed to discussions on best practices for implementing automated evaluation of LLM-based question answering systems.
- Implemented data cleaning and validation pipelines to standardize answer formatting, resolve separation issues, and prepare annotations for downstream analysis.

Using Multi-Omics Data to Identify Prognostic Biomarkers in Glioblastoma *JHU*
Baltimore, MD, USA *April 2025 - Present*
Advised by: Betty Tyler
Project Lead

- Conducted a systematic review of multi-omics studies to identify prognostic biomarkers in glioblastoma, reviewing and synthesizing evidence from 300+ research articles.
- Extracted genomics, transcriptomics, and proteomics methodologies to evaluate associations with overall survival (OS) and progression-free survival (PFS), and assessed clinical relevance to identify potential prognostic biomarkers.

Using Knowledge Graphs and Large Language Models for Drug Repurposing *NIH, NLM*
Bethesda, MD, USA *May 2025 - March 2026*
Advised by: Zhiyong Lu

- Built an evaluation pipeline enabling biomedical experts to extract and compare structured evidence across heterogeneous preclinical studies using PrimeKG as a unifying biomedical knowledge graph.
- Developed a Streamlit-based annotation platform to assess drug–disease relationships across cancers including glioblastoma, melanoma, and liver cancer.
- Collaborated with neuroscientists to understand disease biology and interpret drug–disease relationships in a clinically meaningful way.

From 2D IVIS to Tumor Volume *JHU*
Baltimore, MD, USA *Dec 2024 - Present*
Advised by: Betty Tyler
Project Lead

- Contacted over 30 authors to obtain preclinical glioblastoma datasets, collecting In Vivo Imaging Data and temporally matched MRI data (within 24–48 hours) from six murine studies.
- Applied Pearson correlation analysis to identify IVIS-derived features most strongly associated with tumor volume.
- Applied ensemble machine-learning models (XGBoost, CatBoost, LightGBM) to estimate tumor volume across multiple glioblastoma cell lines using In Vivo Imaging System (IVIS) data.

Presentations

Oral Presentations

- **Recommending Clinical Trials for Online Patient Cases using Artificial Intelligence**
  AMIA 2025 Annual Symposium, Georgia, USA *Nov 2025*

Poster Presentations

- **Matching Online Patients to Clinical Trials using TrialGPT**
  Poster Day, National Library of Medicine, Bethesda, USA *Aug 2024*

Tutorials & Workshops

Identifying Ethical Considerations for AI Agents in Mental Health Support *Workshop, AMIA 2025 Annual Symposium*
Atlanta, Georgia, USA *Nov 2025*
Co-presenters: Ben Zevenbergen, Diane M Korngiebel, Trevor Cohen, Justin Tauscher, Alisa Busch, Joey Chan

- Applied the Moral Imagination method to instructional design and technology development for AI-based mental health support.
- Analyzed ethical challenges in mental health AI systems and facilitated stakeholder communication to anticipate downstream impacts earlier in the research and development process.

BioCreative IX: Large Language Models for Clinical and Biomedical NLP *Workshop, IJCAI*
Montreal, Quebec, Canada Aug 2025
Co-presenters: Zhiyong Lu, Martin Krallinger, Graciela Gonzalez Hernandez, Rezarta Islamaj, Joey Chan, Wesam AL-NABKI, Salvador Lima López

- Provided an overview of the process for creating the multi-hop question answering (QA) dataset *MedHopQA* for evaluating the performance of Large Language Models.
- Discussed challenges, future directions, and ethical considerations surrounding human–AI collaboration in biomedical research.

Contributions to Science

- Selected Publications:
  - **Chan, J.**, Jin, Q., Wan, N., Floudas, C. S., Xue, E., & Lu, Z. "Recommending Clinical Trials for Online Patient Cases Using Artificial Intelligence." *arXiv preprint arXiv:2504.20059*. *2025*
  - 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*, 13, 1574. *2024*
  - 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. "A Novel Semi-Automated Proofreading and Mesh Error Detection Pipeline for Neuron Extension." *bioRxiv*. *2023*
  - Islamaj, R., **Chan, J.**, Leaman, R., & Lu, Z. "Overview of the MedHopQA Track at BioCreative IX: Track Description, Participation, and Evaluation of Systems for Multi-Hop Medical Question Answering." *Proceedings of the BioCreative IX Challenge and Workshop (IJCAI)*. *2025*
  - Islamaj, R., Leaman, R., **Chan, J.**, & Lu, Z. "The Corpus of the MedHopQA Track at BioCreative IX." *Proceedings of the BioCreative IX Challenge and Workshop (IJCAI)*. *2025*

- Wan, N., Jin, Q., **Chan, J.**, Xiong, G., Applebaum, S., Gilson, A., McMurry, R., Taylor, R. A., Zhang, A., Chen, Q., & Lu, Z. "Humans Continue to Outperform Large Language Models in Complex Clinical Decision-Making: A Study with Medical Calculators." *arXiv preprint arXiv:2411.05897*. *2024*
- Wang, Z., Cao, L., Jin, Q., **Chan, J.**, Wan, N., Afzali, B., Cho, H.-J., Choi, C.-I., Emamverdi, M., Gill, M. K., et al. "A Foundation Model for Human–AI Collaboration in Medical Literature Mining." *arXiv preprint arXiv:2501.16255*. *2025*
- Xenes, D., et al. "NeuVue: A Framework and Workflows for High-Throughput Electron Microscopy Connectomics Proofreading." *bioRxiv*. *2022*
  (Acknowledged contribution: proofreading neuron reconstructions and dendritic extensions)

Fellowships, Honors, & Awards

- Amazon AI Research Fellowship, UIUC *2025*
- Digital Education & Learning Technology Acceleration (DELTA) Grant, JHU *2024*
- Albstein Research Scholarship, JHU *2024*
- Emerging Tech Challenge — First Place *2022*
- HopHacks Fall — Top Ten, JHU *2022*