WILLIAM (BILL) XIA

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EDUCATION

Tufts University, School of Engineering, Medford MA — August 2021 – Present
Major: Computer Science
Minors: Mathematics, English
GPA: 3.78 / 4
Clubs: Tufts Computer Science Exchange • Parnassus (Tufts Creative Writing Club) • Tufts Mountain Club

RESEARCH EXPERIENCE

Senior Honors Thesis: LLM-Generated Neuro-Symbolic World Models — September 2024 – Present
Advised by Professor Vasanth Sarathy and Professor Matthias Scheutz, Tufts University

- Implemented an LLM agent capable forming and testing hypotheses regarding object affordances in an embodied environment.
- Implemented a modular MiniGrid environment for developing problem-solving-based puzzles and testing the LLM agent.
- Writing a thesis paper compiling my methods and results, which must be a minimum of 30 pages long.
    - This manuscript will be published by Tufts University in May 2025.

National Institutes of Health, Bethesda MD - Summer Research Intern — June 2023 – August 2024
Dr. Dina Demner-Fushman's Natural Language Processing Lab, National Library of Medicine

- Designed and built a suite of large language model-based tools to perform text simplification on biomedical abstracts.
- Annotated a natural language dataset consisting of over 4,000 sentence pairs.
- Mentored a new intern who joined the lab during my second summer at NIH.
- Presented my work at the NIH Summer Intern Poster Day, and presented the dataset at the Text Retrieval Conference, 2024.
- Wrote a scientific paper as the first author and am co-authoring an additional manuscript.

Tufts University, Medford MA - Research Assistant — May – December 2022
Professor Robert Jacob's Human-Computer Interaction Lab

- Collaborated on a project to differentiate mental workload states in participants performing cognitive tasks like playing chess.
    - Performed EEG data collection during clinical trials.
- Used Python and MATLAB to perform principal component analysis (PCA) on chess game data and brainwave data to identify key features in the data to be assessed by machine learning models.
- Completed Good Clinical Practice (GCP) training in preparation for conducting clinical trials.
- Co-authored two scientific papers.

Tufts University, Medford MA - Research Volunteer — June 2022
Professor Justin Hollander's Urban Attitudes Lab

- Performed data analysis on WebGazer.js eye tracking data using Python's MatPlotLib and Pandas Libraries.
- Communicated with a lab at Brown University to troubleshoot problems with WebGazer.js.

Brown University, Providence RI - High School Student Researcher — July – August 2018
Professor Chun Guen Lee's Pathobiology Lab

- Read relevant literature and experimental protocols.
- Learned lab safety skills, how to take detailed research notes, and how to document experimental results.
- Accurately followed lab protocols while conducting experiments.

MANUSCRIPTS / PUBLICATIONS

- Brian Ondov, **William Xia**, Dina Demner-Fushman. "Lessons from the inaugural plain language adaption of biomedical abstracts track at TREC 2024". Pending (March 2025) submission to *Journal of Biomedical Informatics*.
- **William Xia**, Ishita Unde, Brian Ondov, Dina Demner-Fushman. "JEBS: A Fine-grained Biomedical Lexical Simplification Task". Submitted on February 15, 2025 to the *Association of Computational Linguistics Rolling Review 2025* (under review).
- Matthew Russel, **William Xia**, Sam Youkeles, and Robert J.K. Jacob. "Neural Correlates of Move Quality During Chess Games: A Low-Cost EEG Study". Submitted on January 20, 2025 to *Neuroadaptive Technologies Conference* (under review).
- Matthew Russell, Samuel Youkeles, **William Xia**, Kenny Zheng, Aman Shah, Robert J.K. Jacob. "Decoding chess puzzle play and standard cognitive tasks for BCI: A low-cost EEG study". Submitted on October 28, 2024 to *Frontiers in Neuroscience* (under review).

PRESENTATIONS

- Brian Ondov (Co-presenter), **William Xia** (Co-presenter), Ishita Unde, Hoa Dang, Dina Demner-Fushman. "PLABA @ TREC 2024". Text Retrieval Conference (TREC) 2024. November 20, 2024.
- **William Xia** (Presenter), Brian Ondov, Dina Demner-Fushman. "Identifying and Simplifying Non-consumer Terminology in Biomedical Abstracts". National Library of Medicine Summer Internship Program Poster Day. August 2, 2024.
- **William Xia** (Presenter), Brian Ondov, Dina Demner-Fushman. "Identifying and Simplifying Non-consumer Terminology in Biomedical Abstracts". National Institutes of Health Summer Internship Program Poster Day. August 1, 2024.
- **William Xia** (Co-presenter), Amelia Hawks (Co-presenter), Sarah Rose Odutola (Co-presenter). "Rewilding of Laboratory Mice Enhances Granulopoiesis". National Institutes of Health Summer Intern Journal Club: *The Last of Us: The Threat of Emerging Fungal Pathogens*. July 11, 2024.
- **William Xia** (Presenter), Brian Ondov, Dina Demner-Fushman. "Identifying and Defining Non-consumer Medical Terminology". National Institutes of Health Summer Internship Program Poster Day. August 9, 2023.
- **William Xia** (Presenter), Brian Ondov, Dina Demner-Fushman. "Identifying and Defining Non-consumer Medical Terminology". National Library of Medicine Summer Internship Program Poster Day. August 8, 2023.
- **William Xia** (Co-presenter), Ike Keku (Co-presenter), Jerry He (Co-presenter). "Improving Language Understanding by Generative Pre-Training". National Institutes of Health Summer Intern Journal Club: *Exploding Gradients: The Rise of Large Language Models in AI*. July 19 2023.

PROJECTS

Senior Capstone Project: Recommender System for ASL Learning Platform September 2024 – Present
Role: Machine Learning Engineer, Programmer

- Collaborating with a team of two other members to create an AI-powered lesson generation system for ASLdeafined, an online American Sign Language education program.
- Integrated the AI lesson generation system into ASLdeafined's learning website.

Neural Network: Custom Model May 2024

Role: Programmer

- Programmed a neural network from scratch using Python and the NumPy library.
- Trained and evaluated the performance of the neural network using the *Iris* flower data set.
    - Optimized the neural network's performance by tuning hyperparameters with a validation set.

Language Model: Statistical Complex Term Identifier March – May 2024

Role: Programmer

- Developed a Categorical-Dirichlet statistical language model to identify complex biomedical terms in academic texts.
- Deepened my understanding of statistical machine learning and natural language processing.

Language Model: Sentiment Analyzer June 2023

Role: Programmer

- Programmed two sentiment analysis models from scratch using Python and the NumPy library.
    - One model used logistic regression to classify text; the other was a Naïve Bayes classifier.

Web Application: BitCalc December 2022

Role: Programmer

- Designed and built a programming calculator web app using HTML, JavaScript, and the React framework.
    - Functionalities included basic arithmetic, bitwise operations, and base changing.
- Maintained version control using GitHub.

Digital Game: Catacombs February – May 2022

Roles: Project Manager, Programmer

- Led a team of three classmates to create a video game using Unity and C#.
- Coordinated weekly team meetings and maintained a project timeline to keep the team organized.
- Designed and programmed the enemy AI system.

OTHER WORK EXPERIENCE

Tufts University, Medford MA - Programming Languages Teaching Assistant September 2023 – Present

- Led semiweekly recitation classes for up to fifteen students at a time.
- Assisted students in office hours by answering questions and helping with debugging.
- Regularly answered student questions on the course *Piazza* forum.
- Graded students' assignments at teaching assistant grading meetings.

Ruffalo Noel Levitz - Telefund Student Fundraiser January – May 2022

- Fundraise for Tuft's various colleges and programs through engaging phone calls with alumni and parents.
- Handled confidential and sensitive information in a professional, appropriate manner.

Cumberland Public Library, Cumberland RI - Teen Volunteer June 2019 – December 2020

- Reshelved books and designed posters for library public events.

Moses Brown RISE Summer Camp, Providence, RI - Counselor in Training June – August 2018

- Assisted full counselors with camp activities and supervised campers ages 3-13 years old.

AWARDS & HONORS

- Dean's List, Tufts University, Fall 2021 – Spring 2024
- Intramural Research Training Award, National Institutes of Health, 2023 – 2024

COMPLETED ONLINE COURSES & CERTIFICATES

- **Reinforcement Learning Course.** Taught by David Silver. Published by Google DeepMind on YouTube. Completed October 2024.
- **Natural Language Processing Specialization.** Taught by Łukasz Kaiser and Younes Bensouda Mourri. Published by DeepLearning.AI on Coursera. Completed June 2023.
- **Python Data Structures.** Taught by Charles Russell Severance. Published by University of Michigan. Completed and certified May 2022.
- **Programming for Everybody (Getting Started with Python).** Taught by Charles Russell Severance. Published by University of Michigan. Completed and certified May 2022.

SKILLS

Programming Languages: Python, Java, C++, JavaScript/HTML, C, C#, Linux/Unix, SQL, PHP, R, MATLAB
Spoken Languages: English, Mandarin

HOBBIES

Creative Writing / Storytelling

- Currently writing a fantasy novel titled, *A Merchant's Feud*.
- Served as Dungeon Master for various *Dungeons & Dragons* groups since 2019.

Violin

- 16 years of experience.
- Member of Tufts University's Klezmer Ensemble.

LINKS

LinkedIn: https://www.linkedin.com/in/william-xia-ab40b2218/
GitHub: https://github.com/onionLad