Kaiwen Shi

Mobile: +1 6159558225 | +86 18248722021
Email: kaiwen.shi@vanderbilt.edu | **LinkedIn**: https://www.linkedin.com/in/kaiwenshi121381

EDUCATION

Vanderbilt University **Nashville, TN**
B.A. Mathematics and B.S. Computer Science, Minor in Architecture ***Conferral Date**: Dec 2024*
***GPA**: 4.0 / 4.0, Summa Cum Laude*
Relevant Coursework: Data Structure, Algorithm, Probability and Statistics, Linear Algebra, Mathematical Analysis, Convex Optimization, Game Theory, Bilevel Optimization, Optimal Transport, General Biology/Chemistry, Intermediate Software Design
Honors: Highest Honors on Math Honors Thesis, Dean's List, Minhong Yu Scholarship
Honors Thesis: Time-Parameterized Optimal Transport, under guidance of Dr. Akram Aldroubi
Languages: Mandarin (Native), English (Proficient), German (Intermediate), Japanese (Elementary)
Coding Languages: C++/Python (Intermediate), Racket/Prolog/Julia (Intermediate), R/SQL/JAVA(Elementary)

PROFESSIONAL EXPERIENCE

Machine Intelligence and Neural Technologies Lab **Nashville, TN**
Undergraduate Research Assistant *Apr 2024 – Present*

- Assisted in Linearized Sliced Spherical Optimal Transport (LSSOT) Research by replicating the results of SUGAR, CorticalFlow++, and similar methodologies, while implementing an autoencoder framework penalized by LSSOT metric
- Led a collaborative project on Continual Learning and Personalization in partnership with InfoTech Lab, Toyota Motor North America, creating essentially a digital twin fit to the user's preferences that can continually adapt and evolve
- Coauthored LSSOT paper ICLR 2025, contributing to advancements in optimal transport techniques
- Composing currently a paper on Active Continual Learning, currently pushing for publication

Vanderbilt Mathematics Department/Computer Science Department **Nashville, TN**
Linear Algebra/Algorithm Grader/TA *Sep 2022 – Dec 2022; Aug 2024 – Dec 2024*

- Assisted in students' understanding of vector space, linear transformation, matrix operations, and matrix diagonalization in Linear Algebra, as well as asymptotic bounds, various algorithms, and NP/P problems in Algorithm
- Graded all homework assignments of 100+ students on time and received high remarks from both the instructor and the students
- Received Letter of Gratitude and was invited to be the Grader for Real Analysis, an advanced class for honor students

Shanghai Tubo Tech Technology Co., Ltd. (Start-up) **Shanghai, China**
AI Solutions Engineer Intern *Jun 2023 – Aug 2023*

- Built a deep learning Neural Network and a Machine Learning model (XGBoost) to calculate colorants' concentrations based on the given Lab values, with an average error <1%, and constructed a foundational algorithm pipeline based on the two models
- Created a chatbot application and fine-tuned the first Large Language Model specialized in resin and colorants in Chinese
- Developed an algorithm to predict reflectance curves with point error < 1%, reducing one-time sampling cost by ~89%
- Produced product menu and user guide, tested the entire software pipeline, and contributed to the product pricing policy

Language and Educational Analytics Research Lab **Nashville, TN**
Research Assistant *Mar 2023 - Aug 2023*

- Annotated PII (Personal Identifiable Information) for 1000+ student-composed responses weekly to train a Large Language Model that can aid in erasing digital footprint by automatically concealing personal information in online texts
- Utilized Lang Chain and OpenAI API to evaluate the learner feedback automatically generated by iTell (an online adult education platform LEAR Lab built), which increased the overall accuracy of the suggestions given to the learner

BioChem Lab **Nashville, TN**
Student Researcher *Aug 2022 – Dec 2022*

- Gained hands-on experience with protein purification, enzyme kinetics, PCR, and recombinant DNA methods, including ligation, transformation, and restriction mapping, which are key to drug discovery.
- Developed skills in experimental design, hypothesis testing, and data analysis, essential for applying ML in drug discovery research.

Protein Engineering and Biochemistry Laboratory (PEBL) **Baltimore, MD**
Student Researcher *Jul 2019 – Aug 2019*

- Investigated the structure of an SNase using PyMOL, devised a hypothesis on the change of the structure and function of the protein with the mutation K134R, and crafted a suitable primer for PCR at PEBL at Johns Hopkins University
- Extracted the desired protein with bacterial transformation (*E. coli*), DNA purification and sequencing (UV-Vis spectroscopy, SDS-PAGE and mass spectrometry), and assessed its mutated properties with various techniques, including but not limited to negative page gel analysis, circular dichroism at different pH levels, and Trp fluorescence (final work contributed to PDB)

PROJECTS

- ***C++ projects***: Sudoku Solver, Guitar String Simulator, Calculator, Calendar Maker, Maze Solver
- ***Julia Projects***: LCP solver, QP solver, Bilevel-Op solver, LMCP solver, IP solver (Branch and Bound)
- ***ML projects***: ULS Challenge, Autoencoder with LSSOT Regulation, Continual Learning with Personalized LLM (Toyota)
- ***MERN Stack w/ Jest Testing***: AnchorLease (a sublease app for Vanderbilt students, see https://anchorlease.space(deprecated))