FRANCESCA N. VENDITTI

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U.S. Citizen

EDUCATION

Massachusetts Institute of Technology (MIT) | Cambridge, MA | Class of 2026
Candidate for *Bachelor of Science in Computer Science & Engineering* & Minor in Biology

Selected Coursework: Software Construction, Low-Level Programming in C & Assembly, Algorithms & Data Structures, Probabilistic Systems and Analysis, Linear Algebra, Fundamentals of Programming, Discrete Math for Computer Science, Computer Science Programming in Python, Computational Thinking and Data Science, Calculus I & II, Physics I & II

Activities: MIT Society of Women Engineers, MIT Assistive Technology Club, MIT IEEE/ACM, MITxHarvard Women in AI, MIT Pre-Medical Society

SKILLS & ACCOLADES

Computer-Based Skills: Python, JavaScript/TypeScript, C, Assembly, Git/Github, Node.js, zsh/bash, HTML, CSS, LaTeX, MATLAB, Final Cut Pro, Adobe Premiere Pro/Photoshop, Microsoft Suite, software construction, some machine learning (ML) familiarity
Languages: English (native), Spanish (Maryland Seal of Biliteracy, proficient), Mandarin Chinese (beginner, independent study)
Leadership: MIT Society of Women Engineers Board Member (September 2022-current) – organize and pilot new programs and initiatives as part of the SWEet Team to inspire younger women to pursue STEM careers
Awards/Accomplishments: National Merit Scholarship Program Finalist, AP Scholar with Distinction, school-wide Sandra Lee Heyman Award for Higher Mathematics, President's Gold Award for Educational Excellence, Governor's Merit Scholastic Award, Potomac Valley Swimming Scholar-Athlete Award (4 yrs), International Baccalaureate Diploma (Richard Montgomery HS), 3x published author in the International Youth Neuroscience Association Journal

EXPERIENCE

Solutions Engineering Intern, Deloitte (June-August 2024) | Rosslyn, VA
- Collaborate with cross-functional teams and lead technical consulting projects as part of the Discovery II internship program
- Develop contemporary solutions and software tailored to client needs for Application Modernization and Innovation in Core Business Operations, and specifically collaborate on a FEMA/Cloud DHS AI project

ML & Software Undergraduate Researcher, Koch Institute for Integrative Cancer Research (January 2023-2024) | White Lab | Cambridge, MA
- Analyzed -omics datasets through Partial Least Squares Regression (PLSR) and binned structural data by ligand type
- Performed Self-Organizing Maps (SOMs) analysis; performed systems-level analyses of protein phosphorylation in cancer metabolism
- Designed and ran clustering analysis, used unsupervised machine learning to predict structural features that determine the functional role of pTyr by cross-referencing experimental and computational datasets; co-author of pending research publication
- Integrated KEGG and Cytoscape platforms to visualize metabolic pathways

ML Intern, National Institutes of Health Summer Internship Program (June-August 2023) | Functional and Molecular Imaging Lab | Bethesda, MD
- Led a project analyzing axonal plasticity of neurons and integration of implanted brain tissue in different ages of mice using immunohistochemistry, anterograde, and retrograde tracing methods, in addition to image segmentation and other machine learning techniques
- Contributed research findings to an impending scholarly publication and presented to the NIH scientific community, receiving valuable feedback
- Attended seminars and career talks designed to develop communication, critical thinking, and career skills, as well as formal lectures and symposia dealing with the newest advances in health research
- Participated in clinical shadowing of patients with a variety of diseases, including rare genetic metabolic disorders and epilepsy

Volunteer Consultant, National Center for Advancing Translational Sciences (NCATS) (June-August 2022) | Ad hoc/Remote
- Guided the navigation of video editing software and identified key themes and messages to assist with the creation of a documentary series

Technical Intern, Angels for Alyssa MMA Research Foundation (June-November 2020) | Remote
- Created, managed, and produced a series of scientific documentaries to provide contemporary guidance to patients with methylmalonic acidemia (MMA) and their families regarding care and expectations – link: https://angelsforalyssa.com/mma-documentary-series
- Managed the patient-family website and interviewed experts in the field to compile comprehensive knowledge of MMA and relevant treatments by taking on roles including Director, Main Editor, Screenwriter, and Audio Engineer

EXAMPLE PROJECTS

Overview: memory scramble, flashcards, & star battle games (concurrency, async, web APIs, mutable shared abstract data types, etc.), meme generation (language implementation), cityscape generation (immutable abstract data types), SAT solver, audio & image processing programs, ML programs

Star Battle Game | TypeScript, Express, DOM Manipulation, Abstract Data Types, Software Construction, Git, Team Collaboration, Node.js
- Spearheaded and collaborated as part of a team on a client/server Star Battle puzzle GUI, adhering to a 10×10 2-star puzzle format with a unique solution, leveraging concepts from Software Construction such as parsing, abstract data types for representation, the DOM, and using Express for server requests while facilitating team collaboration and problem-solving through Git

Memory Scramble Game | TypeScript, Asynchronous Programming, User Interface Design, Concurrent Programming
- Developed a networked multiplayer Memory game handling concurrent players with an asynchronous game board and implemented commands for a responsive, interactive user experience

Meme Generation Tool | TypeScript, Domain-Specific Languages (DSLs), Parsing, Image Processing, Expression Representation, Software Design
- Created a comprehensive domain-specific language (DSL) for generating captioned image memes, encompassing parsing, expression representation, size computation, and image generation functionalities. Ensured robustness and flexibility by allowing expressions to include filenames, quoted strings for captions, and complex compositions of images and captions through operator precedence and grouping

AI Chatbot | Python, TensorFlow, Natural Language Processing (NLP), JSON Data Handling, Numpy
- Constructed a Python-based chatbot using TensorFlow for intent classification and response generation, trained on a custom JSON dataset, and used NLTK for natural language preprocessing, deployed locally