Sam Williams

samhw6@gmail.com | (703) 244-7802 | smwllyms.github.io | github.com/smwllyms

Education

M.S. Computer Science, Virginia Tech   January 2023 – December 2023
- **Thesis**: *Exploring the Usability of Non-verbal Vocal Interaction (NVVI) and a Pitch-based Implementation*

B.S. Computer Science, Virginia Tech   Fall 2019 – Fall 2022

Research & Publications, Virginia Tech   Spring 2020 – Spring 2024
- **Undergraduate** and **Graduate research** at DVE Lab (Human-Computer Interaction (HCI) & VR/XR), Virginia Tech
- A Relative Pitch Based Approach to Non-verbal Vocal Interaction as a Continuous and One-Dimensional Controller (HCII 2024)
- An Approach to Pitch Based Implementation of Non-verbal Vocal Interaction (IEEE VR 2024)
- Immersive Technology in the Public School Classroom: When a Class Meets (iLRN 2021)

Work Experience

Instructor of Record, Virginia Tech   January 2024 – May 2024
- **Taught** an introductory elective course on **Graphical User Interfaces, including:**
  - **GUI Programming** – concepts and technologies like MVC, event-based programming, modularity, React, MUI, etc.
  - **Computer Graphics** – frameworks and libraries like coordinate systems, transformations, SVG, WebGL, D3, etc.
  - **Full-stack Development** – MERN stack web application development (MongoDB, Express, React, Node, REST API)
- **Developed classwork material** and **delivered lectures** in a fast-paced environment to a class of 70 students
- **Supervised TAs** – organized weekly meetings, instructed office hours and grading procedures, utilized feedback

Graduate Teaching Assistant, Virginia Tech   January 2023 – December 2023
- **Assisted students in office hours and graded** in GUI (described above) and Computer Organization (The C programming language, low-level programming, memory management)

Web/Asset Developer, StemPlus   Part-time, May 2020 – December 2022
- **Maintained company website** as a **front-end developer** with WordPress and HTML/JS/CSS and customized plugins
- **Created 3D assets** for virtual reality-based social and educational experiences in Blender and Mozilla Hubs
- **Produced proprietary video content,** e.g., programming tutorial videos, e-learning content, production logos
- **Advised on market needs and gaps** to help expand business and direct company niches

Software Engineer, ARIES Program, Virginia Tech Libraries   May 2021 – August 2021
- **Developed a cross-platform web-application** for desktop and Virtual Reality devices (e.g., Meta Quest)
- **Collaborated with UX designers** to translate user interface mockup from Figma to JavaScript GUI with Three.js
- Utilized **continuous integration/continuous** deployment (CI/CD) with organizational GitHub workflow

Projects

- **AirShare** – Cross-platform/device real-time file sharing web application over WebRTC, built on Next.js, deployed on Vercel.
- **Audio Plugin Sandbox –** Quickly prototype audio plugins in a web-application sandbox environment
  - Code C/C++ based audio processing programs (signal processing) translated into JavaScript Web Audio API
  - Drag & Drop environment provides GUI interface for routing generators to plugins to final audio output
  - Plugin Preview allows for adding text labels and interaction points (e.g., sliders) to modulate parameters in real time
- **My Little LLM Friend –** Full-stack LLM search/chatbot with RAG for up-to-date data from Google Search
  - Implemented with React.js, Express.js, REST API, ollama (llama3), and Puppeteer for web scraping
- **Job Finder –** Full-stack application that scrapes job postings from Indeed, ZipRecruiter, and LinkedIn
  - Customizable keywords, minimum keyword matching; implemented with Angular.js, Express.js, WebSockets, Puppeteer
- **X86 ASM Sandbox/Debugger –** Debug assembly programs with breakpoints and stack and memory visualizations
  - X86 assembly can be typed or pasted into text block (with or without addresses), optionally from Ghidra
  - Terminal and GUI provides ability to add breakpoints, step in instructions, or run entire program.
  - Stack, registers, flags, and RAM are all visible, interactable and modifiable. An example program is provided
- **VST Production –** Audio plugin development, e.g., pitch and timbre shifting, filtering and compression
  - Implemented with C++ SDK in Visual Studio, observing Model-View-Controller (MVC) principles
- **StockWatch – Full-stack AWS application that fetches select stock prices periodically**
  - User accesses static web application hosted on S3, selects ticker price to fetch with REST API
  - Lambda 1 runs on timer, updates ticker prices in DynamoDB; Lambda 2 handles HTTP requests, fetches ticker values

Other Skills

Programming Languages	• JavaScript, C, C++, C#, Python, SQL, Java, Rust, x86 ASM, PHP, Web Technologies (HTML/JS/CSS/DOM)
Concepts & Technologies	• Software Reverse Engineering, Computer Graphics (OpenGL, Vulkan), Game Design, Unity3D, 2D/3D Modelling, Audio/Digital Signal Processing, Database Management Systems, Networking, Usability Engineering, User Experience (UX), Music, Visual Studio