

Sam Williams

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github.com/smwllmys

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, 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

- **Open-sourced Web Applications**
 - **AirShare** – Cross-platform/device real-time file sharing web application over WebRTC.
 - Full-stack application built in Next.js, with custom JavaScript WebRTC API, hosted on Vercel
 - **Mepository** – Web-based virtual journal for recording and grouping entries based on days, weeks and months.
 - Implemented in React and utilizes Local Storage API for saving and loading user data
 - **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
 - **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.

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), Data Structures, Game Design, Unity3D, 2D/3D Modelling, Audio/Digital Signal Processing, Unit Testing, Web Scraping, Cloud Computing (AWS Lambda, DynamoDB, S3), Rest API, Statistics, Database Management Systems, MongoDB, SQL, Networking, Usability Engineering, User Experience (UX), Music, Visual Studio