Sam Williams

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Skills

Programming Languages
- JavaScript, C, C++, C#, Python, SQL, Java, Rust, x86 ASM, PHP

Concepts
- GUI, UX, Agile Methodologies, Model-View-Controller, Software Reverse Engineering, Computer Graphics, Data Structures, APIs, SDKs, CI/CD, Full-stack, Front-end, Back-end, Game Design, 2D/3D Modelling, Audio/Digital Signal Processing, Unit Testing, Web Scraping, Cloud Computing, Real-time Processing, Statistics, Database Management Systems, Networking, Usability Engineering, User Experience, Music

Technologies
- Visual Studio, GitHub, Web Technologies (HTML/JS/CSS/DOM), Linux, .NET/Windows, React.js/Next.js, Node.js, MySQL, MongoDB, Unity3D, Three.js, WebGL, D3, REST APIs, Notebooks, DAWs, AWS Lambda, DynamoDB, S3

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 the following courses:
  - **Graphical User Interfaces** (as described above)
  - **Intro to Computer Systems –** 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** (WordPress + HTML/JS/CSS).
- **Created 3D assets** for virtual reality-based social and educational experiences (Blender, 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 (Three.js, CI/CD w/ GitHub).
- **Collaborated with UX designers** to translate user interface mockup to GUI (Figma, JavaScript).

Projects

- **Open-sourced Web Applications**
  - **AirShare** – Cross-platform/device real-time file sharing web application implemented with Next.js and WebRTC.
  - **Mepository –** Web-based virtual journal for recording and grouping entries based on days, weeks and months.
  - **Audio Plugin Sandbox –** Quickly prototype audio plugins in a web-application sandbox environment.
  - **X86 ASM Sandbox/Debugger –** Debug assembly programs with breakpoints and stack and memory visualizations.
  - **Fourier Transform Calculator and Analysis –** Real-time audio visualizations with DFT and FFT calculations website.
- **VST Production –** Audio plugin development, e.g., pitch and timbre shifting, filtering and compression.
- **Unity Applications –** Developed games, research projects, and assignments for Desktop, Web, and XR/VR.

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** (Presented at HCII 2024)
- **An Approach to Pitch Based Implementation of Non-verbal Vocal Interaction** (Presented at IEEE VR 2024)
- **Immersive Technology in the Public School Classroom: When a Class Meets** (Presented at iLRN 2021)