

Chip Bell

478.318.2283

chipbell4@gmail.com

<https://chipbell4.github.io>

<https://github.com/chipbell4>

Skills

Amazon Web Services, C++, C#, CDK, CI/CD, Docker, Go, NodeJS, Python, React, Terraform, TypeScript

Experience

Minerva Digital

Principal Consultant / Dec 2023 - Present / Frederick MD

Designed and built a GraphQL realtime backend for a mobile game in AWS for an NSF grant. Built corresponding client libraries in TypeScript to facilitate developer integration. Utilized GitHub actions for end-to-end CI/CD. Designed and built a real-time analytics pipeline for the game to support real-time and ad hoc behavior analysis.

Amazon Web Services

Senior Software Development Engineer / Oct 2020 - Dec 2023 / Herndon, VA

Built a serverless data pipeline in Go for security analytics ingesting 30 billion events/second across all commercial AWS regions exporting to a data lake in S3, queryable with Athena

Tech and Design Lead for a GraphQL-based security-review UI used across all AWS and Amazon.

Built CI/CD pipeline using AWS CDK for the data pipeline that automated deployments, end-to-end tests, and rollbacks on failures, freeing hours of developer time per week.

Built a serverless rule engine in Python and Go for the data pipeline that alerted customers on matches and violations within seconds, resulting in hundreds of events detected weekly and reported to customers via SNS, SQS, and trouble tickets.

Designed and built a custom serverless streaming solution in Go for dynamic data pipeline filtering that vendors 4 GB/minute in real-time

Tech-lead for 8-person team, leading designs for new features, performing code reviews, and shepherding features live

Public Broadcasting Service

Senior Production Developer, Principal Engineer / Sep 2015 - Sep 2020 / Arlington, VA

Lead developer on multiple hybrid mobile apps, shipping over a dozen hybrid mobile apps with millions of downloads

Rebuilt and deployed a containerized content management system for games to ECS supporting 30k concurrent users across entire PBS KIDS site, along with an automated CI/CD system in Jenkins for HTML5 game deployment to CMS

Team lead and Project and Product Manager for internal game framework redesign, stewarding over a dozen game development shops globally to develop hundreds of games, deployed to dozens of apps, using the new version.

Lead developer for a serverless data pipeline ingesting games analytics data, handling thousands of requests per second. Also developed an analytics API client used in the majority of PBS KIDS' suite of 500 games

Specialized Information Environments

Programmer / Jun 2013 - Aug 2015 / Macon, GA

Developed an ACH transaction processing portal in Laravel that processed over \$30 million in transactions, with scheduled recurring payments, and automated security scanning.

Lead dev for time-keeping and report generator SPA in JavaScript with Laravel back-end, saving client nearly \$50k yearly

Mercer Engineering Research Center

Software Engineer / Sep 2011 - May 2013 / Warner Robins, GA

Extended 3D viewer for aircraft maintenance app to enable users to record inspections faster and more accurately.

Mercer University

Adjunct Professor / May - July, 2009 - 2011 / Macon, GA

Helped organize and teach computer science topics to camp students ranging from elementary to high school aged. Planned course curriculum in topics such as video game development, mobile development, graphics, and more. Organized catering, helped plan outdoor computer-science themed activities, and provided hands-on assistance to students.

Projects

Built a ray-tracer in C++ with support for reflection, refraction, constructive solid geometry, with a YAML-based scene format. Containerized with Docker and executable in parallel via AWS Batch and ECS

Built an algorithmic text-based adventure game, where the map, quests, and subgoals are all built on-the-fly using string generation methods for context-free grammars.

Designed and built [Roswell](#), a Game Boy-themed rail-shooter game where all music, sfx, and sprites are rendered from code alone, making the game 33KB in size.

Constructed a fireworks simulation in C and OpenGL. Simulation based on physical models incorporating drag, using fourth-order Runge-Kutta methods, and rendered in real-time.

Constructed an algorithmic composition system that used Genetic Algorithms and Markov Chains to learn music composition based on user input.

Implemented a WebGL simulation of the wave equation in 2 dimensions, incorporating elasticity and damping, using Delaunay triangulation for mesh building, and FEM methods.

Built a web-based simulation of the metro system in Washington, DC using data collected from the WMATA Metro API, analyzed in MongoDB, and rendered using Leaflet.

Built a real-time multi-client digital aquarium using WebSockets for syncing clients, and PIXI.js for rendering.

Built a programming contest judging site and problem repository for the Mercer Binary Bears competitive programming team using Laravel

Volunteer Work

Mercer University Binary Bears

Assistant Coach / August 2011 - Nov 2017 / Macon, GA

Assistant coach for Mercer's competitive programming team. Planned curriculum and course topics, wrote relevant problems for class, prepared interactive presentations covering material, and instructed students. Worked hands on, teaching programming skills to students. Authored judging software for practice, and traveled with the team to competitions. Authored competition problems. Worked with students from teams across the Southeast in competition to address technical concerns and problem clarifications during contents.

Education

Georgia Institute of Technology / *MS Computational Science and Engineering / 2016 / Atlanta, GA*

Mercer University / *BS Computer Science / 2011 / Macon, GA*

Bibliography and Speaking

BELL, C., 2011, Algorithmic composition using dynamic Markov chains and genetic algorithms. *Journal of Computing Sciences in Colleges Vol 27. Issue 2, 99-104*

Designing and Testing for Performance in Kids Games, Panel at MagLabs 2018, Panel at MagFest 2019

Accessible Games: Captions Aren't Enough!, Panel at MagFest 2020

Algorithmic Art with Python, Talk at Python Frederick February 2024

Web Audio API, Talk at Frederick Web Technology Group February 2024