

# MATTHIEU GAY-BELLILE

SOFTWARE ENGINEER

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in matthieugb

## Skills

### PROGRAMMING LANGUAGES

C#

C

C++

JavaScript (ES9, TypeScript, JSX)

Python

Java

Objective-C

Verilog

HTML / CSS / SCSS

GLSL

### FRAMEWORKS, PLATFORMS, AND TOOLS

.NET Core / ASP.NET Core

Docker / Kubernetes

gRPC

Consul / Vault

Terraform

Entity Framework Core

GraphQL

Node.js / Express

React

Git

Alexa Skills Kit

Spark / Databricks

### AWS

SQS / SNS

S3

API Gateway

Lambda

Elastic Beanstalk

VPC

RDS / Aurora

Batch

CloudFormation

### DATABASES

PostgreSQL

DynamoDB

MongoDB

Elasticsearch

MSSQL

Redis

## Education

Georgia Institute of Technology

B.S. Computer Science 2019

Degree concentrations: Systems & Architecture / Artificial Intelligence

GPA: 3.57, Major GPA: 3.78

Aug. 2015 to May 2019

## Employment

Kabbage

Software Engineer

Atlanta, GA

May 2019 to Current

- Developed and helped design .NET Core 3.0 gRPC streaming microservices running in Kubernetes to gather, persist, and provide runtime access to raw customer data for loan underwriting purposes
- Worked on a unified GraphQL gateway for querying customer data across multiple databases
- Maintained and debugged a large, complex, and business-critical legacy .NET system

Vlipsy

Software Engineer

Atlanta, GA

May 2018 to Apr. 2019

- Developed integrations for Facebook Messenger, Slack, Gmail, and Viber
- Designed and developed new API for use by all clients, built on Amazon API Gateway and AWS Lambda
- Leveraged EC2 resources in a hybrid serverless architecture to optimize price/performance of compute-heavy tasks

Georgia Institute of Technology

Wreck Techs – Residential Technology Advisor

Atlanta, GA

Aug. 2017 to Apr. 2019

- Performed maintenance work on the Georgia Tech network including replacing cabling and network jacks, and surveying the wireless network
- Assisted Georgia Tech students with network access, malware removal, software installation, and operating system repair

Duke Energy

Cybersecurity "Red Team" – Penetration Testing Intern

Charlotte, NC

May 2017 to Aug. 2017

- Discovered and reported a critical flaw in corporate physical access control systems
- Designed and developed an internal web application to request penetration tests from the Red Team, built on Redis Pub/Sub for a pluggable, extendable, event-driven architecture

Duke Energy

IDEA Lab – Software Development Intern

Charlotte, NC

May 2016 to Aug. 2016

- Designed and developed a web application for internal "Innovation Challenge" initiative, built on a MEAN (MongoDB, Express, Angular (2.0), Node.js) stack with Bootstrap 4 UI and a REST API backend
- Developed a framework to integrate energy usage reporting services with the Amazon Echo smart speaker, using Lambda and Alexa Skills Kit

## Projects

xARMv6 Operating System

Jan. 2018 to May 2018

*Operating systems course final project*

- Ported MIT's UNIX-like xv6 teaching operating system (which runs on intel x86) to the ARM-based Raspberry Pi 2
- Fully functional and interactive, with virtual memory management, preemptive multitasking, and an in-memory filesystem
- MMU interface, timer control, UART I/O, low-level interrupt handlers, context switching all rewritten from the ground up
- ~12,000 lines of C, ~300 lines of ARM assembly

Tiger Compiler

Aug. 2017 to Dec. 2017

*Compilers course semester project*

- A compiler for the Tiger programming language (specification: <https://mgb.sh/tiger.pdf>), with a MIPS backend
- Includes lexer, parser, semantic analysis, IR generation, instruction selection, register allocation, MIPS code generation
- Written from scratch with no 3rd party components (e.g. Flex, Bison, LLVM) in compliance with project requirements
- ~3,000 lines of C++14, not counting generated lexer code

Pawgistics Web App

Aug. 2017 to May 2018

*Degree capstone web app project*

- Built for Canine Assistants, a non-profit organization that trains service dogs for people with physical disabilities, seizure conditions or other special needs
- Tracks volunteers, staff instructors, and dogs to facilitate coordination and maintain chain of custody of dogs, as well as better record-keeping
- Modern, API-backed, client-side single-page web app built with Node.js, Express, and React + Redux
- Build pipeline with full hot-reloading support for minimal development friction, or performance-tuned production build with bundling, minification, and compression

FluidSim iOS App

Jan. 2014 to Aug. 2015

*iOS fluid simulation personal project*

- Found a smoothed-particle hydrodynamics fluid simulation algorithm written in C#, ported it to C++, and tuned it for smooth 60fps operation despite mobile performance constraints
- Added variable gravity based on device accelerometer, and touch interactions with the fluid
- Wrote post-processing routines in OpenGL ES to draw discrete simulation particles as a smooth, continuous fluid
- Enabled customization of fluid appearance, color, and physics through in-app menus and flexible shaders
- Designed custom UI using iOS Storyboards and Objective-C