GREG FUNCHESS

https://gfunchess.com
Richmond, TX

TECHNICAL STRENGTHS

Programming Languages	Clojure, Rust, JavaScript, SQL, Java, C, C++, Common Lisp, Scheme, Ocaml, Scala, Haskell, Python, Julia, Mathematica, MATLAB, LaTeX, HTML + CSS
Notable Libraries	Pedestal, Ring, Lacinia, Aleph, Axum, Actix, Tokio, Tracing, OpenTelemetry, PyTorch, Tensorflow, Flux.jl, DifferentialEquations.jl, Pandas, Polars, Matplotlib, JDBC, SQLx, Serde
Protocols & APIs	REST, GraphQL, WebSockets, WebRTC, RFCOMM (Bluetooth)
Databases	PostgreSQL, AWS Aurora, SQLite, AWS Neptune (Gremlin Graph DB)

EXPERIENCE

Clojure Team Lead — June 2022 - Present
ADT — *Remote*

- **Leadership:** Technical lead of the Clojure team at ADT. Received "exceptional" performance review, only 2% of employees get this rating.
- **Cost Savings:** Lead migration from AWS Neptune (**Graph DB**) to AWS Aurora (**SQL DB**) to significantly reduce costs, simplify code, and have more predictable performance.
- **Optimization:** Designed, architected, and implemented a service to handle new "un-throttled" device event feed from Google. Filters out irrelevant events so as to not overload downstream systems with the increased load. Processing events in **under 1 millisecond** on average.
- **Innovation:** Granted a **hardware patent** for a new kind of glass break sensor (US Patent 12,050,199).
- **Mentoring:** Started mentoring initiative within team. Redirected questions to our rotating "on-call" to help members learn more about various systems. Began pair programming to help junior developers gain experience. One colleague specifically listed "mentoring" as a main positive for working at ADT. Also started internal Rust training sessions for interested developers. Made internal **WASM** (WebAssembly) coding challenges.
- **Observability:** Added **OpenTelemetry** spans to Clojure apps to gain better visibility.
- **Operations:** Collaboration with SRE team to migrate apps to **Kubernetes** and implement new event filtering service as a Kubernetes StatefulSet.

Senior Software Engineer — October 2020 - June 2022
ADT — *Remote*

- **API Design:** Primary contributor on greenfield project for the **GraphQL** API consumed by the Mobile team to get and control Google devices. Minimized breaking changes in the design.
- **Concurrent Systems:** Implemented transient subscriptions (routed to the container's IP address) in the in-house event routing system in order to ensure Mobile gets device updates via WebSockets. Wrote a **TLA+ proof** for the system to verify if mobile has a WebSocket connection then there will be a transient subscription in the routing system. Main reason to write the proof was concerns about a mobile device rapidly disconnecting and reconnecting, possibly losing the transient subscription. The proof ensures this is not a problem and in the 3 or 4 years working here since then, no complaints about this system.
- **Robust Systems:** Added fail early logic and DB health monitoring so if configs or permissions were missing, the apps will exit early, failing the health check, and old versions will still remain active. Implemented a load testing tool that uses **Google Cloud Functions** to generate massive load without needing to remember to deallocate cloud resources after the load test finishes.

- **Rapid Debugging:** Used **nREPL** to connect and fix systems in lower environments and occasionally the production environment. One such bizarre finding lead to the implementation of DB and SQS health monitoring subsystems.

Freelance Developer & Consultant March 2020 - October 2020
Self Employed *Houston, TX*

- **Freelance:** Developed a virtual online classroom whiteboard with drawing, file sharing, and **video chat** support using WebRTC, WebSockets, ClojureScript, and NodeJS.
- **Consultant:** Improved the efficiency of a Python **crypto trading bot** that uses the Binance API. Locally patched the python-binance library to use an API endpoint that wasn't properly supported at the time.

Lead Full Stack Instructor June 2019 - October 2020
Byte Academy *Houston, TX*

- **Backend:** Taught students basics of programming with Python. This lead into an intro of web programming with Flask. Improved curriculum to include **Django** instead. Also did minor PHP work on the school's WordPress website.
- **Frontend:** After basics and backend, taught students HTML, CSS, JavaScript, and **React** for frontend development. This helped the students develop aesthetically pleasing portfolio websites.
- **Bi-directional:** Made a Discord WebSocket bot using Clojure to automate the enrollment of students into their appropriate cohort channels.

Research & Development Engineer November 2016 - June 2019
Independent Driving Systems *Houston, TX*

- **Mobile:** Developed an Android app using PhoneGap (now called Cordova) for communication with systems installed in cars via a custom protocol over **RFCOMM (bluetooth socket)**. This allowed the company to switch from using $300 custom LCD screens with a complicated wired install process to instead use $30 Android phones that are ubiquitous and can connect to the system wirelessly. This also allowed for the development of a **remote calibration system** using WebSockets and NodeJS.
- **3D Modeling and Manufacturing:** Designed a 3D model and manufacturing process for a special wire connector for a popular minivan to enable system to be "plug and play." This particular minivan was very finicky, so splicing wires was not an option, therefore this connector was essential for the business to be able to access this large segment of the market.
- **Microcontrollers:** Modified the gear selector **PIC microcontroller** code written in C to allow for installer configuration of torque on the actuator and to support the L gear in trucks.
- **Organization:** Improved overall shop process of fulfilling orders. This lead to **improved morale**. One of the long-time machinists said in all his time there he'd never seen a product order ready to ship the same day it was ordered.

Part-time Web Developer January 2014 - June 2016
Independent Driving Systems *Houston, TX*

- **Custom Website:** Developed a Django website hosted on Heroku. Made an admin portal so non-technical people could update the website. Admin portal supported input of English and Spanish content to allow for the two modes of the website. Used PIL library and Boto to allow for automatic thumbnails of images and uploading them to AWS S3.

PATENT

Glass break detection using ultrasonic signal(s)
Patent Number: 12050199
Inventors: Gregory Lee Funchess, Adam Gilbert Horn, Bibek Khatakho, Jason Mikel Harris, Ryan Nathaniel Burnside, Stephen Charles Kalapati

CONFERENCES & PUBLICATIONS

GDC Houston September 2019
Talk *Houston, TX*

- Gave a talk on the basics of neural networks with Python using Tensorflow at the Google Developer Conference in Houston, TX.

Quarterly of Applied Mathematics 2016
Paper

- Taoufik Meklachi, Graeme W. Milton, Daniel Onofrei, Andrew E. Thaler and **Gregory Funchess**. "Sensitivity of anomalous localized resonance phenomena with respect to dissipation." Quart. Appl. Math. 74 (2016), 201-234, https://doi.org/10.1090/qam/1408.

Texas PDE Conference 2013
Talk *El Paso, TX*

- Gave a short talk going over mathematical invisibility research.

EDUCATION

University of Houston *June 2016*
B.S. in Mathematics
Minor in Philosophy
Conducted math research for 3 years in **mathematical invisibility** under the mentorship of Dr. Onofrei

OTHER ACHIEVEMENTS

Passed Actuary P exam.

Scored a perfect score on the ETS Math Major Field Test.

Scored a 19 on the 2012 Putnam exam, the highest score at the University of Houston that year.