

WORK EXPERIENCE

Data & Software Engineer

GeoSonics, Inc.

St. Petersburg, FL
November 2022 – Present

- ▶ Lead engineer for a high-performance seismograph analysis engine:
 - Performs backend compute for industry-leading web-based vibration analysis data visualizations.
 - Native- and statically-compiled with Nim, musl-libc, and gnuplot.
 - Implements a number of hand-tuned vibration and signals analysis algorithms to a legally defensible standard.
 - Renders professional reports using Gnuplot for SVG data visualization and HTML/CSS for layout.
 - Investigated and reverse-engineered obfuscated C code to verify and reimplement legacy computations.
 - Utilized Nim's innovative value semantics for high-performance, memory safety, and structural simplicity.
 - Documented using modern typesetting tools such as Typst and Markdown.
- ▶ Also lead engineer for:
 - Desktop GUI application for RS232 serial hardware configuration using Godot and GDScript.
 - Prototyping next-generation record data containers utilizing MessagePack.

IT Software Engineer

University of South Florida

Tampa, FL
January 2017 – November 2022

- ▶ Lead engineer for a full-stack asset management database application using Clojure & Datomic backend.
- ▶ Administered and documented for the USF GAIVI GPU HPC cluster.
- ▶ Graduate assistant: Lecturing, grading, tutoring, and administering curricula for graduate-level courses.

Co-Founder, Principal Software Engineer

Sigil Technologies, Inc.

Tampa, FL
October 2015 – August 2016

EDUCATION

M.S. in Computer Science, focus AI & Machine Learning

University of South Florida

Tampa, FL
May 2021

- ▶ **Alfred P. Sloan Foundation Minority Ph.D. Scholar**

B.S. in Computer Science

University of South Florida

Tampa, FL
May 2015

- ▶ **Dean's List** · USF College of Engineering · Fall 2014 & Spring 2015

OPEN SOURCE

nimgnuplot - <https://github.com/nervecenter/nimgnuplot>

- ▶ A Nim library for generating gnuplot plots from Datamancer dataframes.

PRESENTATIONS

The Virtues of Values (NimConf 2026) - <https://www.youtube.com/watch?v=Ki4-kbSCnXs>

- ▶ Describing how Nim's functional and value semantics enable memory-safe, clean, high-performance programs.

PUBLICATIONS

- **Collazo, C.**, Vargas, I., Cara, B., Weinheimer, C. J., Grabau, R. P., Goldgof, D., Hall, L., Wickline, S. A., & Pan, H. (2024). *Synergizing Deep Learning-Enabled Preprocessing and Human-AI Integration for Efficient Automatic Ground Truth Generation*. MDPI Bioengineering, 11(5), 434. <https://doi.org/10.3390/bioengineering11050434>
 - Summary: We formulate a “self-improvement” process for a convolutional segmentation model wherein it iteratively normalizes and retrains on its training data, called *bootstrapping*, improving its accuracy over time.
 - Source code: <https://github.com/nervecenter/bsp-experiment>
- **Collazo, C.**, Vargas, I., Cara, B., Weinheimer, C. J., Grabau, R. P., Goldgof, D., Hall, L., Wickline, S. A., & Pan, H. (2019). *Transferrable Deep Learning Algorithms for Identifying Area At Risk in Acute Myocardial Infarction*. Abstract. Biomedical Imaging and Instrumentation, Deep Learning in Microstructural Imaging (Oral), BMES Annual Meeting 2019. <https://submissions.mirasmart.com/SecureView/BMESArchive/radhjz5inj2.pdf>

SKILLS

Expert

- Building native- and statically-compiled CLI applications and libraries for server and embedded deployment.
 - C, Nim, Bash, Make, musl-libc, gcc toolchain, ARM & RISC-V cross-compilation
- Performing scientific analysis of large datasets.
 - Including statistical analysis, signal analysis, image/signal processing, deep learning, datavis, & dataframes.
 - Data such as: 1D vibration signals; environmental sensor data; 2D tissue sample images.
 - C, Python, Numpy, Pandas, PIL, Matplotlib, Seaborn, SciKit, Nim, Datamancer, gnuplot, Highcharts, OpenCV
- Document generation, typesetting, image processing, and graphic design.
 - LaTeX, Markdown, Typst, HTML, CSS, GIMP, RelaxedJS, Jinja/Nimja
- Building full-stack web and database applications.
 - Clojure, PostgreSQL, Datomic, JavaScript, TypeScript, jQuery, Zepto.js, HTML, CSS, Pico CSS, Bootstrap
- Formulating document specs and utilizing data container formats.
 - Text (JSON, CSV, XML, KDL), binary (MessagePack, UBJSON, proprietary)
- Version control.
 - Git, GitHub, GitLab, Bitbucket

Proficient

- Training and deploying convolutional deep learning models.
 - Python, PyTorch, Tensorflow, Keras, Numpy, SciKit, Numba, and Nvidia CUDA
- Professional and hobby experience building programs with the powerful Lisp family of languages.
 - Common Lisp, Clojure, Janet, Racket, Scheme
- Building cross-platform desktop GUI applications with Godot, GDScript, and GDEXTENSION.
 - Compiling minified slim Godot builds using SCons and C++ toolchains for small target distribution.

Intermediate

- Administering Linux HPC cluster systems and Python package deployments.
 - Bash, SSH, SGE, SLURM, Docker, Anaconda

Miscellaneous

- Past polyglot experience with numerous programming languages.
 - C#, C++, D, Elvish, F#, Haskell, Io, Java, Julia, OCaml, Rust, and more.