

# J. Caleb Wherry

## Software Architect

### CONTACT

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### SKILLS

- Software Architecture
- Mathematical Analysis
- Scientific Computing
- High-performance Computing

### EXPERTISE

- Modern C++ (11-20)
- C# (.NET Core)
- Python
- GPGPU

### EDUCATION

#### MASTER OF SCIENCE

Computer Science  
Georgia Tech  
2014 – TBD (On Hiatus)

#### BACHELOR OF SCIENCE

Computer Science  
Austin Peay State University  
2006 – 2011

### PROFILE

A versatile Software Architect and Leader with over a decade of experience productizing research-driven technologies. Expert in rapidly prototyping machine learning & mathematical algorithms from first principles into production-hardened systems that scale horizontally and vertically. Technical leader and innovator that pushes the boundaries of technologies and research capabilities for core product development.

### EXPERIENCE

#### Technical Lead / Engineering Manager

Microsoft / Atlanta, GA / Jun 2021 – Current

Manager and Technical Lead for an ML inference engine in E+D serving Bing, Windows, and O365 products. Low latency (sub-millisecond), high throughput (millions of QPS) inference engine running on CPUs, GPUs, & FPGAs using TensorFlow, ONNX, & other engines for ML workloads: Deep Learning (DNN, CNN), Classifiers (SVM, Decision Tree), and more.

- Driving feature develop for next generation ML inference engine.
- Helping lead growth of new Atlanta hub by hiring and mentoring new engineers at all levels.

#### Technical Lead / Senior Software Engineer

Microsoft / Atlanta, GA / Jun 2020 – May 2021

Technical Lead for vertical team on Azure Compute tackling long term enhancements and re-architectures for performance & reliability.

- Architect for new framework to test and validate Azure Compute core components at scales beyond what is currently possible in a given datacenter.
- Architect for new Azure Compute core component that leverages machine learning to predict customer compute usages to greatly enhance performance and reliability at scale (thousands of nodes, 30k+ VMs).
- Cross-functional driving of performance and reliability across all of Azure.
- Helping lead growth of new Atlanta hub by hiring and mentoring new engineers at all levels.

## EXPERIENCE CONTINUED

### Principal Software Engineer

Nexidia, Inc | NICE / Atlanta, GA / Mar 2015 – May 2020

Technical Lead for Research architecture and infrastructure. Rapid prototyping of C++, C# (.NET Core), & Python applications to provide efficient and robust solutions to kick-start productization of core research technologies.

- Architect for rapidly prototyped Redaction product leading to multi-millions in revenue.
- Architect for greenfield, cross-platform, containerized, gRPC-based product to modernize core research technologies for the entire tech stack.
- Productize machine learning models and inference engines using Tensorflow and ONNX in C++ and Python.
- Full SDLC support for cross-platform C++ SDK for speech research.
- Maintain cross platform wrappers in Java (JNI), Python, and .NET Core using SWIG and windows-only C# (Managed C++).
- Complete rewrite of build system in CMake to unify build process across Linux, Windows, and OSX leading to drastically reduced build and test times.
- Complete rewrite of all GPU features for better handling of errors and memory.
- Integrate and develop with ffmpeg for audio and video decoding/encoding/transcoding in multiple formats: MP4, 16-bit PCM, AAC, mulaw, etc.
- Develop multiple CI driven core infrastructures for in-house model training, model building, and research tasks.
- Develop multi-threaded algorithms and infrastructure to maximize vertical scaling for production and research.
- Develop multi-node algorithms and infrastructure using REST and gRPC to maximize horizontal scaling for production and research for OnPrem and cloud environments (AWS).
- Develop new and innovative features and products for POCs and new customers.

### Co-Founder

Korovasoft / Remote / Jan 2008 – May 2020

Providing efficient and robust software solutions to the scientific community.

- Researching computational & topological optimizations in genetic algorithms.
- Studying reproduction patterns in genetic algorithms.
- Using Rust as a means to provide more robust and fault-tolerant solutions.

### Research Scientist

Georgia Tech Research Institute / Atlanta, GA / Jun 2014 – Mar 2015

Software Architect for FPGA analysis tools. Applied mathematics research in multiple areas: circuits, graph theory, pattern matching, and computationally hard combinatorial problems.

- Developed C++ and Python tools to analyze FPGA netlists for emergent functionality using fuzzy pattern matching techniques and large-scale graph analytics.
- Complete rewrite of build system in CMake to reduce build and test times.
- Developed CI driven test system to run thousands of FPGA test suites to streamline analysis process.

## EXPERIENCE CONTINUED

### Application Analyst & Developer

Virginia Polytechnic Institute & State University / Blacksburg, VA / Aug 2012 – May 2014

Designed, developed, and maintained document/image storage systems and workflow software.

- Complete automation of Graduate School, University Invoicing, University HR, and Student Advising work process resulting in completely paperless workflows.
- Expert in PL/SQL stored procedures for retrieval of all student information for document and workflow systems.
- Developed Java desktop application to automate scanning of documents using QR codes into the document management system.
- Created all training material and trained 100+ VaTech faculty on how to use new workflows.

### Research Engineer

Luna Innovations / Roanoke, VA / May 2011 – Aug 2012

Developed FPGA analysis tools using graph-theoretic methods.

- Developed C++ and Python tools to analyze FPGA netlists for emergent functionality using pattern matching techniques and graph-theoretic methods.
- Developed Python QA automation framework to test all tools against general FPGA designs.
- Complete rewrite of test system to use CDash and CTest with new Python QA automation framework developed.
- DARPA Trusted Integrated Circuits (TRUST) – DARPA-BAA-07-24
- DARPA Integrity and Reliability of Integrated Circuits (IRIS) – DARPA-BAA-10-33

### Teaching Assistant

Austin Peay State University / Clarksville, TN / Fall 2009 - Spring 2011

Taught companion classes to main courses to help students understand material at a deeper level. Filled in for professors when absent. Courses:

- MATH 1730: Precalculus
- MATH 1910: Calculus I
- MATH 1920: Calculus II

### Visiting Research Scholar

Institute for Quantum Computing / Waterloo, ON, CA / Summer 2010

Researched genetic algorithm optimizations for pulse sequences in control theory for superconducting and NMR qubit implementations.

- Developed C++ tools to run genetic algorithm simulations using quantum operators for fitness functions and evolution.
- GRAPE & genetic algorithm hybrid methods researched.
- Studied quantum speedups of inverse problems in general relativity and differential geometry.

## EXPERIENCE CONTINUED

### Undergraduate Researcher

Austin Peay State University / Clarksville, TN / Fall 2009

Explored mathematics involved in the construction of Julia & Mandelbrot sets.

- Analyzed the above sets in the complex and quaternion algebras geometrically.
- Developed MATLAB algorithms and parallelized using MPI on university cluster to produce high-resolution images and high-definition animations of higher dimensional sets.
- Conference presentation: "Four Dimensional Julia Sets" 119<sup>th</sup> Tennessee Academy of Science Conference (Oct 2009). Knoxville, TN. Won best undergraduate mathematics presentation.

### Research Assistant

NASA JPL | CalTech / Pasadena, CA / Spring 2009, Summer 2009

Developed astrophysical software to analyze proper motion of pre-planetary nebulae.

- Developed full astrophysical software suit in IDL: PROMOS: (PROper MOtion Software).
- Image analysis C++ algorithms developed for Hubble Space Telescope images to calculate nebular proper motions.
- Streamlined astrophysical research processes with agile & modular software engineering methodologies.
- Conference presentation: "PRO-MOTIONS: PROper MOTION Software" 214<sup>th</sup> American Astronomical Society National Conference (Jun 2009). Pasadena, CA.

### Research Assistant

NASA Langley Research Center / Hampton, VA / Fall 2008

Developed software suit for evolution of polar stratospheric clouds (PSCs) research.

- Developed trajectory and microphysical mathematical models in FORTRAN to calculate the formation and flow of currently observed PSCs.
- Developed full atmospheric science software suit in IDL to streamline LaRC scientists' cloud research processes.

### Research Assistant

Lawrence Livermore National Laboratory (DOE) / Livermore, CA / Summer 2008

Statistically analyzed anomalous log behavior with Perl.

- Developed web-based log intrusion detection system (LIDS) written in Perl that monitored all DNS, HTTP, UDP, TCP, ICMP, CONN, and FTP logs.

## EXPERIENCE CONTINUED

### Software Development Intern

OEM Tube Assemblies / Clarksville, TN / Spring 2008

Streamlined worker interaction with machinery through FactoryPMI

- Developed hazard avoidance tools in Jython to keep employees safe in their work environment.
- Migrated MSSQL databases to MYSQL databases.

### Network Administrator

Visitation Hospital / Petite Rivière de Nippes, Haiti / Aug 2007 – Aug 2008

Designed server system for Visitation Hospital, a free health care clinic in Haiti.

- Pro bono work to create server layout and remotely admin the network.
- Developed plugins for OpenMRS, an open source electronic medical records system written in Java.
- Troubleshoot networking and software issues and management users and workflows.
- Oversaw transition of server management to local nurses and staff on site in Haiti after first year of operation.

## EDUCATION

### Georgia Institute of Technology

Master of Science, Computer Science / Atlanta, GA / Jan 2014 – Present (on hiatus)

- Concentrations: High Performance Computing and Machine Learning
- Notable courses:
  - CS 5510: Multiprocessor Programming (transfer from VaTech)
  - CS 7637: Knowledge-based Artificial Intelligence – Cognitive Systems
  - PHYS 5794: Computational Physics (transfer from VaTech)

### Austin Peay State University

Bachelor of Science, Computer Science / Clarksville, TN / Sept 2006 – May 2011

- Minors: Mathematics and Physics
- Senior Thesis: *A Complexity Analysis of Shor's Quantum Factoring Algorithm*
- Notable courses:
  - CS 4230: Programming Languages
  - MATH 4710: Real Analysis
  - PHYS 3800: Quantum Mechanics
- Notable awards:
  - 2011: International Mathematical Modeling Contest Honorable Mention
  - 2006-2008: Don Waller Computer Science Scholarship
- Summer schools:
  - 2009: Quantum Information Science For Undergraduates (QuISU), *MIT*
  - 2009: Mathematical Biology & Numerical Analysis Workshop, *University of Georgia*
  - 2010: Undergraduate School on Experimental Quantum Information Processing (USEQIP), *IQC*
  - 2011: Modern Computational Science, *University of Oldenburg*