David Topper

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Education

Columbia University, New York, NY, 1991-1996
B.S., Computer Science, Cum Laude, Minor in Music

Cornell University, Ithaca, NY, 1987-1988
Political Science and Philosophy

Work Experience

Amazon Web Services (AWS) Security, 2019-present
Software Development Engineer (SDE II)
https://aws.amazon.com/
Currently focused on development and design of Certificate Authority (CA) server technology to manage, sign and authenticate encrypted digital certificates. Work on developing improvements to and resolving issues within the rapidly changing AWS Security infrastructure. Implement solutions using AWS proprietary Continuous Integration and Continuous Deployment (CICD) tools using a wide range of computing languages including Java, Perl, Python, Ruby and Go. Successfully completed phase one of Amazon Machine Learning University (MLU Math).

Algorithmic Stock Market Trading, 2009-present
www.davetopper.com/algorithmic-trading
Continuously develop system to test, optimize and implement proprietary trading strategies using a multithreaded, distributed scheduler-to-threadpool application written in C++ (using QT and boost) running on a linux-based CPU cluster. Current research is focused on parallelizing existing code and methods to run efficiently on a GPU cluster (openCL/CUDA).

Clear Edge 3d, Manassas VA 2016-2016
Senior Software Engineer
http://www.clearedge3d.com/
Implemented upgrades and new features to company's proprietary EdgeWise software in C++ using Microsoft Visual Studio 2015. Projects ranged from improving 3d scanner (point cloud data, typically LIDAR or photogrammetry based) file processing, enhancements to feature extraction and general debugging / troubleshooting.

Niitek (now Chemring Sensors), Dulles, VA 2014-2016
Software Engineer / Contractor
www.chemringsensors.com
Contract position on site at client facility. Worked on software for ground penetrating radar (GPR) system. Using the Qt IDE and libraries in C++, implement new modules and GUI elements to meet US government specifications and requirements. Also design standalone applications for data analysis and visualization using OpenGL.

University of Virginia, Music, Charlottesville, VA, 1997-2014
Technical Director, Virginia Center for Computer Music (VCCM)
http://music.virginia.edu/vccm
Manage and support state-of-the-art computer music facilities. Provide research and software development to support student and faculty projects. Design and maintain laboratories and studios with computer and audio hardware to facilitate composition and research. Continue evaluating new technology to enrich lab environment. Purchase hardware, setup and maintain unix network, web and custom servers. Also serve as system administrator for the lab with unix, Mac, PC, and mobile clients.

NOMADS: Network Object Mobile Agent Dynamic System
www.davetopper.com/nomads
Lead developer and architect of a real-time, interactive network for mobile devices and web clients. Designed Java, iOS and Android classes to implement an efficient language for sending commands and routing data using TCP sockets. Classes form an API to facilitate the creation of new applications. System has been used for live performance interaction, conferences and the classroom

BIT: Being In Time
vimeo.com/72104801
Worked on the design and implementing of an MS kinect-based skeletal tracking system that provides an ensemble conductor with the ability to trigger and modify audio events via hand gestures in real-time. Research also explored the creation of an interactive, instructional application to teach students proper conducting technique.

VScore: A real-time visual application for scoring music
www.davetopper.com/wp-content/uploads/2018/12/Vscore.pdf
Developed an application for synchronized playback of graphical music scores and special meta-events such as user-timed alert signals and warnings. Project written in C++ using Qt GUI libraries under Mac OS. Current work is focused on porting to iOS and Android.

WISEAR: Wireless Sensor Array
www.davetopper.com/wp-content/uploads/2018/12/wisear05.pdf
Created both hardware and software designed to translate live dancer movement into sound in real-time. A variety of small analog and digital motion sensors were connected to an Intel-based TS 7000 single board computer (SBC) running a custom linux kernel. The device transmits sensor data via TCP over standard 80211.b/g wireless, with a client audio application (max/msp) on a laptop receiving the signal.

Spatio-Operational Spectral Synthesis (SOS)
www.davetopper.com/wp-content/uploads/2018/12/SOS-1.pdf
Explored research and developed techniques for separating real-time audio signals and additive synthesis models. Individual components were routed into discrete "audio objects" capable of moving through a multichannel environment. Theory behind the work was based on psycho-acoustic research http://www.academia.edu/157485/Kubovy1988.pdf. The code was written using RTcmix, C and C++.

GAIA: Graphical Audio Interface Application (Gaia)
www.davetopper.com/wp-content/uploads/2018/12/gaia2004.pdf

Created a graphical programming language using the Gnome/GTK libraries running under MacOS and linux written in C. The application implemented a front end to RTcmix providing an enhanced user experience in the realization of musical ideas. Developed an array of user-connectible objects offering atomic control of variables as well as a C-style script interface, interpreted and executed in near-real-time. Parsers were built with yacc, lex, and perlembed. Also designed an API development kit to facilitate the creation of new objects for the language. Built upon the architecture to read video from a wireless camera using video4linux, with the processed live signal able to control audio and musical events. A specific implementation ran for more than two months during the art and music installation, Tree Music, where the system altered tempo, sound and music based on the number of people and their movement within the gallery space.

Multichannel RTcmix
www.davetopper.com/wp-content/uploads/2018/12/multichan_rtcmix_js2k-1.pdf
> Co-authored additional extensions to the RTcmix language implementing a multichannel and digital bus architecture.

Time Inc., New Media. Pathfinder, New York, NY, 1996-1997
Associate Systems Engineer, Website Usage, Analysis and Tracking
https://en.wikipedia.org/wiki/Pathfinder_(website)
> Authored key components to a customized reporting system that provided Time Inc. publication and marketing departments with detailed reports on website traffic via CGI, Perl, and Sybase SQL Server 11 queries. Authored the graphical web-based front end for the display and analysis of multidimensional data using the Perl GD library. Wrote an automation interface using Platinum Technology's Autosys. The system explored the limit of how much website traffic could be analyzed and parsed within a 24-hr period in order to provide daily reports. Supervised the evaluation of new systems and evaluated Oracle 8 vs. Sybase IQ as possible real-time database solutions. Worked closely with Oracle and Sybase representatives to benchmark systems using a wide variety of test queries and database indexing schemas.

Columbia University, Electronic Music Center, NY, 1995-1997
Research Assistant
www.rtcmix.org
> Co-authored with Prof. Brad Garton a real-time version of the Cmix music synthesis package. Project involved programming in C and C++ as well as techniques for passing data between both languages. Specific work focused on coding a dynamic, real-time scheduling algorithm in C++ capable of handling asynchronous events. The language has recently been ported to iOS and Android.

Freelance Software Consultant, Weehawken, NJ, 1994-1996
Self Employed
> Provided clients with a wide range of computer related services including tutoring, HTML web page development, website hosting, consulting, computer repair, setup, and custom programming.

Delphi Economics Inc., Weehawken, NJ, 1988-1993
Researcher
https://www.vikingen.se

Investment Trading and Research
> Created interactive, automated software tutorials on how to design and back-test trading strategies. Methods were written using in-house trading language running on proprietary "Viking" software. Assisted in translation and authoring of the English manual for the application. Gave key input on design, troubleshooting, and upgrade suggestions. Also provided top tier technical support for users. Edited the company's monthly newsletter.

Startup Operations
> Managed operations and developmental functions related to the start up and maintenance of a U. S. office for a Scandinavian investment research firm. Authored dBase III database and interface to track all company functions, telemarketing, sales statistics, client management, billing, and mailings. Maintained stock databases sold both in the U. S. and in Europe. Designed automated program to download, process and send end-of-day data. Created advertisements for software, newsletter and consulting services.

Personal Research

3D Printing 2015-present
http://www.etsy.com/shop/3DGenera

In October of 2016 opened a storefront featuring original designs. Since January of 2015 have been designing objects for artistic and practical purposes using AutoDesk Fusion 360 http://www.autodesk.com/products/fusion-360 and OpenSCAD http://www.openscad.org. Enjoy optimizing manufacturing techniques with the help of Simplify3d https://www.simplify3d.com. Perpetually building upgrades for a small but growing network of 3d printers. Also a member of the eNable community http://enablingthefuture.org constructing prosthetic hands for handicapped children. Other 3D printing projects and models can be found on at: http://www.thingiverse.com/marvinmartian/designs.

Bitcoin Mining, 2011, 2014-2015
http://Bitcoin.org/en/

From April 2014 to April 2015 administered and maintained two (2) CoinTerra TerraMiner IV liquid-cooled ASIC bitcoin miners running at 1.6TH/s each, overcoming design flaws in thermal heat dissipation with custom liquid cooling solutions and thermal interface compounds.

April of 2011 assembled and administered a Bitcoin mining cluster consisting of twenty four (24) Ubuntu Linux based workstations each retrofitted with ATI graphics hardware, running openCL based mining software (Diablominer) connected to various mining pools (Deepbit, BTCGuild). The system ran at a steady peak of 7GH/s producing 2-4 Bitcoins daily. Wrote performance-tuning software in Perl to aid in GPU speed optimization and general system maintenance. GPU clock speeds were set automatically to run 24hrs a day at maximum speed allowable by GPU hardware thermal limits.

Languages and Environments

C, C++, Java, ObjectiveC, Perl, Python, IOS, Android , Qt, Qtcreator, Gnome, GTK, PCL, VTK, OpenGL, OpenCL, CUDA, Yacc, Lex, Perlembed, SQL, Bash, ZSH, CSH, CGI, HTML, Apache, Lisp, Scheme, Visual Studio, Visual basic, Unix, Linux, Solaris, Irix, Next, MacOS, TS7000, Gumstix, Arduino, Emacs, Make, Bash, Git, Github, CVS, SVN, Gerrit, Eclipse, IntelliJ, Agile and Waterfall methodology.

Interests

Aviation (private pilot), 2009-present
Completed FAA VFR private pilot license in 2009.

Sailing (mono and multihull), 2013-present
American Sailing Association (ASA) 101, 103 and 114.

SCUBA diving, 2000-present
PADI Open Water Diver certified.

Italian
Semi-fluent in reading, writing and speaking.