

Charles W. Christine

1 Moorsleigh Way
Robbinsville, NJ 08691

609-532-0859
shodanbo@gmail.com

QUALIFICATION SUMMARY

Main programming languages: C, C++, C#, Java, JavaScript, Typescript

Secondary programming languages: PHP, Perl, Python, Make

General areas of expertise: IP based audio delivery/consumption, object oriented design, multi-threaded software design, parallel processing systems design, image and audio processing, network socket programming, platform independent software design, device driver design, user interface design for television based systems, hardware/software design for embedded systems, MPEG2 systems, video and audio standards (ISO/IEC 13818-1,2,7, ASF, Adobe RTMP). digital Television broadcast and distribution, cable television broadcast and distribution.

EMPLOYMENT HISTORY

September 2003 - present: **SiriusXM**

Lawrenceville NJ

Senior Principal Engineer

- **SiriusXM IP Streaming Web Client**
 - Took over architecture duties for AngularJS 1.5 Javascript Web App
 - Added HTML5 audio playback support using Web Audio/Web Crypto APIs
 - Led effort to use the web app codebase/design to create a native Windows 10 Universal App, shipped into production on 5/20./2017. Total time to adapt existing web app into Universal Windows Native (Javascript) app took approximately 3 months.
 - Ported a C++ based AAC decoder for usage with the Win10 native app in order to decode SiriusXM AAC audio without having to rely on the Web Audio API in Win10. This decoder was used with a C# bridge in the native app to “polyfill” the Web Audio API for the Win10 UWA platform until the Web Audio API became available in this platform.
 - Led effort to refactor the app from AngularJS 1.5 to AngularJS 4.
 - Worked with video vendor to bring live and on demand video to the refactored app
 - Created a framework independent service layer using Typescript that can be used for any JavaScript app platform that needs to interact with the SiriusXM IP streaming API.
 - Took over Chromecast development from a third party. Chromecast receiver development was to allow SiriusXM mobile and web apps to cast audio content to a Chromecast receiver.
- **SiriusXM Live Sports Metadata Ingestion System**
 - Python 3 ingestion system feeds normalized XML sports data into the SiriusXM metadata database
 - Java ingestion system (running in the SiriusXM API in Apache Tomcat) ingests XML sports data from the metadata database and formats the data for JSON delivery to web and mobile clients.
- **SiriusXM Live IP streaming platform**
 - Led team that developed the live IP streaming encoding platform. Platform was developed using C/C++, PHP, and C#
 - Developed scalable and fault tolerant architecture for encoding AAC+ streams to deliver up to 500 live channels at 4 different bitrates allowing clients to seamlessly switch between bitrates
 - Developed back end web architecture that allows up to 800 Mbps of encoded data to be generated and delivered to web clients in real time. Backend can handle up to 16K HTTP transactions per second.
 - Developed proof of concept Flash HLS decoder in order to replace legacy RTMP streaming technology with HLS.
 - Developed proof of concept iPhone player to vet seamless HLS splicing between different bitrates.

- Broadcast development
 - Helped introduce audio-over-ip audio ingest into broadcast environment.
 - Worked to move equipment to generic off-the-shelf hardware vs proprietary embedded systems.
- Technical liaison for Perceptual Audio Codec (PAC) development
 - Worked with chip-set firmware developers for SiriusXM chip-sets.
 - Worked on porting codec to different environments.
 - Worked with broadcast engineering on encoder improvements.
- Principal developer for Backseat TV™ decoder software
 - Multi-platform software that ran on a variety of media centric DSPs.
 - Final shipped product ran on a Nexperia (Phillips) DSP platform running pSOS.
 - Lead project to develop a new multiplexing standard for SiriusXM broadcast.
 - Coordinated with ASIC developers for SiriusXM BackseatTV™ chip-set.
- Decoder platform and support system for CES 2003 Backseat TV™ demonstration
 - Platform was Equator BSP15 DSP reference design running VxWorks.
 - Video decoder was standard WM9 video decoder on BSP15 ported by Equator

May 2000 - Sept 2003: ACTV Inc

Branchburg NJ

Senior Software Engineer

- Re-architect of Spot-On™ set-top box application for portability and maintenance.
- Supported Spot-On for Motorola, Scientific Atlanta, and Open-TV platforms.
- Led architectural efforts and co-originated SlipSTREAM project
 - Video splicing server for MPEG2.
 - Real time MPEG2 (ISO13818-1 and 2) processing C++ libraries.
 - MPEG2 decoder using SSE2, MMX and DirectX 7.0 for real time video rendering.
 - Re-quantization for reducing the bit-rate of all video streams in an MPEG2 transport stream.

June 2001 - Dec 2002: Mercer County Community College

Lawrenceville NJ

Adjunct Instructor

- Taught Summer and Fall Semesters of CIS256 Introduction to Programming classes (Java)

May 1997 – May 2000: Sarnoff Corporation

Princeton NJ

Member of the Technical Staff

- Implemented block artifact reduction algorithm for HDTV encoding software..
- Designed Graphical User Interface for MPEG2 decoder set-top box
- Wrote graphics drivers for Motorola Scorpion™ and MCT4000™ chips.
- Worked with team to debug the MCT4000™ ATSC compliant MPEG2 decoder ASIC.

Feb 1996 - Apr 1997: CCOR Electronics

State College PA

Hardware/Software Engineer

- Performed Xilinx CPLD design/simulation using ABEL/Xilinx Foundation tools.
- Redesigned hardware for Motorola HC11 based system
 - Added flash memory.
 - Added discrete SDRAM.
 - CPLD used for glue logic and port expansion.
 - Wrote driver software for FM cable modem (19.2kbps data rate).
 - Allowed firmware downloads to flash memory, with fault tolerance and downgrade support.

Sept 1993 to Sept 1996: Pennsylvania State University

State College PA

Programmer, Agricultural Expert Systems

- User interface design for MS-DOS and Macintosh based expert system.
- Expert system implementation and design.

EDUCATION

Master of Science, Computer Engineering

Pennsylvania State University, State College PA

Thesis: Memory Allocation Techniques for Butterfly Interconnection Networks

May 1996

Sept 1993 to May 1996

Bachelor of Science, Electrical Engineering

Temple University, Philadelphia PA

Member: ETA KAPPA NU Honor Fraternity

May 1993

Sept 1989 to May 1993

HONORS/AWARDS

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| The Outstanding E.E. Senior Design Project Award | Temple University 1993 |
| Top Presenter, Mission Possible | CCOR Electronics, 1997 |
| Team Award: HTDV Command and Control System | Sarnoff Corporation, 1998 |
| Team Award: MCT4000 CES Demonstration | Sarnoff Corporation, 1999 |
| “Being the Dog Award”: BackseatTV CES Demonstration | SiriusXM, 2004 |

VOLUNTEER ACTIVITIES

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| Pet Rescue Of Mercer | 2000 to 2004 |
| Hanover Wind Symphony (Trumpet) | 2002 to present |
| Hanover Wind Symphony (Librarian) | 2005 to 2008 |
| Red Cross Meals on Wheels , Trenton NJ | 2005 to 2009 |
| Karate Instructor , Northeast Academy of Martial Arts | 2008 to present |