Aaron C. Birenboim

Albuquerque, New Mexico 87106
(505) 750-8435
aaron@birenboim.com

Objective:

Work in software development, computer and electronics systems engineering, or systems administration. Software development for real-time/embedded systems, scientific computing, and/or signal and image processing is preferred.
Work must be able to be performed, at least in part, from Albuquerque, NM.

Experience:

11/05 to present **Senior Software Engineer, Tau Technologies, LLC**

Laser and optical system modeling and simulation
Software development and analysis performed primarily in C++, MATLAB, Java, and perl on Windows and LINUX platforms.

- Develop real-time camera emulation software for use in flight hardware-in-the-loop simulations. Scenes are simulated at high speed using NVIDIA GPU cards with OpenGL and CUDA for off-screen rendering.
- Develop and maintain DALE laser effects simulation module for JTO/AFRL, which is used in other simulations to model the state of health of systems exposed to high power lasers. Design and advise on several API's for use in systems simulations and larger scale Distributed Interactive Simulation (DIS) environments.
- Chief Architect and maintainer for HELSEEM laser and optics system modeling and simulation framework. This component module framework connects various optical and system modeling modules and programs into a single simulation. Components are developed at varying levels of speed and fidelity.
- Principal Investigator for highly parallel GPU-model based pose estimation algorithm and prototype implementation.
- Creation and development of novel image processing techniques for computational speed, and modeling of atmospheric and optical distortions.

Administered Windows/LINUX/MacOS network, including LINUX MPI Clusters.

10/02 to 11/05 **Senior Software Engineer, Northrup Grumman Information Technology, Advanced Technology Division**

Primary responsibility was direction and development of a new optical systems simulation framework, simulating propagation and imaging in optical systems involving lasers. Work performed under MS-Windows using MSVC++, Borland C++, and FORTRAN. Componentized, modular design supports ports to other

platforms, such as LINUX.

Other support work includes:

- Development of automated analysis scripts in perl, C, and MATLAB to characterize chemical laser beam profiles, and reconstruct beam wavefronts from Shack-Hartmann sensors.
- Developed astronomical and image processing algorithms, primarily in C and C++, to estimate celestial backgrounds for telescope simulations.
- Development of wave-optics propagation software running under Windows(Borland C++), MATLAB, Cygwin, LINUX, and AIX supercomputers.
- Development of a Neural Network module in C, C++, and FORTRAN to perform target classification from simulated digital camera data.
- Development of tracking algorithms from digital video data.
- Direction of software configuration management and testing procedures.

4/01 to 10/02 **Contract Software Engineer**

Upgrades and maintenance of data acquisition and data analysis software in IDL, PV-Wave, Perl, C and C++ under Solaris, Tru64 UNIX, LINUX, VxWorks and Windows at White Sands Missile Range with Applied Technology Associates.

Upgrades and maintenance of *Blue Spike*'s audio watermarking software in VC++.

Developed laser data analysis application in IDL for Boeing-SVS

10/00 to 6/01 **Signal Processing Engineer, Blue Spike**

Developed digital image watermarking algorithms in C++, C and IDL under Windows and Linux.
Developed numerical algorithms to improve existing audio watermarking software in C++.

Developed real-time data acquisition software under Linux. Designed and prototyped PostgreSQL database system and interfaces under Linux.

7/00 to 10/00 **Senior Software Developer, Essential Communications**

Maintenance of device drivers for HIPPI networking cards under Solaris and AIX.
Research for prototype hardware selection to develop next generation networking cards.

3/95 to 7/00 **Applied Technology Associates**

- Signal Analyst, Reflective Tomography Imaging Program
  Refined algorithms for processing of LaDAR signals for imaging application. Software developed in IDL and C.
  Provide development and maintenance support for data analysis under Solaris, and real-time control systems development in VxWorks for HABE/ATP project (described below).
- Computer Scientist, Adaptive Optics
  Developed real-time systems for data acquisition and control of Adaptive Optics. Systems implemented in a VME environment using custom real-time hardware and embedded array processors hosted under SunOS. Programming was done in C, controlled by a Motif GUI. Test and prototype systems developed under Windows in Visual C++. Data analysis software

developed in MATLAB.

- Systems Analyst, High Altitude Balloon Experiment (HABE)
  Developed real-time systems for data acquisition and feedback control systems in VxWorks and parallelC. Developed software for the analysis and characterization of video streams and control systems. Developed software and procedures for data acquisition and management. Design and development of of WWW systems.
  Provided software development and maintenance support for a similar data analysis and management system installed at WSMR.

8/94 to 2/95 **Software Developer, Zirkle Wells Software Group**
Sold to SkyConnect which was sold to NCUBE

C and C++ programming, MPEG-2 systems coding standards, for use in prototype video on demand systems.
Novell UNIXWare administration, Informix DBA

5/91 to 8/94 **MTS Math/CS, Hughes Information Technology Corp.**
Now Raytheon Information Technology Company

Earth-location and radiometric calibration of meteorological satellite data;
satellite data cartography; data fusion; satellite astrodynamics and navigation problems;
image restoration, and image compression.

9/89 to 12/90 **Graduate Research/Teaching Assistant, Georgia Tech**
Department of Electrical Engineering

Research in neural networks and stochastic process parameter estimation.
Teaching Assignments : electromagnetics laboratory, data structures in C

1/88 to 8/89 **MTS, The Aerospace Corporation**
Signal Processing Department

Projects included : digital image compression, feature extraction for pattern recognition, shock spectra analysis, CCD fidelity analysis, and optical sensor simulation.

Education:

9/89 to 12/90 **Georgia Institute of Technology**
M.S., School of Electrical Engineering GPA 3.7
Major : Digital Signal Processing

9/85 to 5/89 **University of Southern California**
B.S.E.E., Cum Laude GPA 3.8

Computer Skills:

Expertise in C++, C, MATLAB, perl, HTML/php/CGI, UNIX, Embedded Systems, and VxWorks. Highly skilled with a variety of analysis and visualization tools such as IDL, PV-Wave, Java, Mathematica. Well grounded in software engineering practices and Object Oriented design. Familiarity with many other operating systems and programming languages.

Security : Current DoD TS, SSBI debriefing 8/94
