

James G. Peterson

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Professional Summary

Software engineer with extensive experience in design and development of a large variety projects, including commercial software, medical devices, large-scale proprietary production systems, and R&D projects. Expertise in C++ development on Windows, Unix, and embedded platforms. Extensive experience in image processing and geospatial algorithms. Strong aptitude for mathematics and numerical algorithms.

Education

- MS in Computer Science – University of Illinois, Champaign-Urbana, IL
- MS in Mathematics – University of Illinois, Champaign-Urbana, IL
- BA in Mathematics – Indiana University, Bloomington, IN

Technologies / Skills

- Languages: C++ (Gnu, MS), C, Java
- Operating Systems: Unix/Linux/Ubuntu, Windows, TI-C6000 DSP BIOS
- Development Environments: QT, MFC/Win32, OpenCV, OpenMP
- IDEs: MS Visual Studio, QT Creator, Eclipse
- Tools: Git, Jira, Jenkins, TFS(MS), AccuRev, Synergy, Valgrind

Project Highlights

The Jackson Laboratory, Bar Harbor, ME

March 2016-present

- **Scientific Computing** – As a member of the computational services group, support researchers with a variety of programming. Techniques used in the projects I have worked on include image processing, combinatorics, and optimization methods.

Enercon, Gray, ME (contract)

January 2016-March 2016

- **Image Processing** – Designed and implemented a prototype High Dynamic Range (HDR) video processing chain for a new generation of disposable endoscope.

St. Jude Medical, Westford, MA (contract)

April 2015-Dec. 2015

- **Image Processing** – Development of image processing algorithms for an optical coherence tomography (OCT) system for imaging coronary arteries. Worked with a small team to develop algorithms for detection and measurement of features within the scan. The image processing detection algorithms relied on multi-threading, using OpenMP, to achieve performance goals.

Fluid Imaging, Scarborough, ME (contract)

2013-2015

- **Image Processing** – Redesigned the image processing chain for a particle analysis product. The product automates the analysis of microscopic objects identified in a stream of images. Processing includes: image segmentation and computation of many geometric and properties, as well as computation of statistical properties on collections of particles, and visualization of the results of sorting and classification.

Enercon, Gray, ME (contract)

2012-2015

- **Image Processing** – Designed and implemented image processing chain for a disposable endoscope (Boston Scientific). Processing included: Bayer filter, gamma correction, color

balance, fixed pattern noise reduction, sharpening, sensor calibration, defective pixel correction, and image enlargement. The image processing chain was implemented on a TI DSP.

- **Exposure Metering** – Designed and developed a system for efficiently metering the image density for the purpose of automatic illumination control.
- **Illumination Control** - Developed a feedback control loop for illumination control. The system controls two light sources independently. The control loop was optimized to converge on the desired exposure quickly without overshooting the target illumination level.

Delphi Electronics and Safety, Kokomo, IN (contract)

2011-2012

- **In-vehicle Navigation** – Worked on the GPS navigation portion of an automotive infotainment system for a major US automotive company. System runs on an embedded Ubuntu, Freescale platform.

Enercon, Gray, ME (contract)

2011

- **Sine Fitting** – Developed a C++ library for least-squares Sine curve fitting. In particular, it fits two data channels to a pair of Sine curves with common frequency to determine the phase shift between the channels. This code is to be deployed as part of a product for the power industry.

SG Cap Trading, Chicago, IL (contract)

2009-2011

- **Algorithmic Trading** – Development and optimization of a system for high frequency automated electronic securities trading. The system was a multi-threaded application running on multi-processor machines in real-time mode. The trading system itself was written in C++, while the algorithm control UI program was written in Java.

DeLorme Mapping, Yarmouth, ME

1996-2009

- **Map Engine** - Designed and developed, with a small team, the “map engine” used in DeLorme's commercial mapping software. In particular, I was responsible for the projection, graphics and symbolization libraries, as well as a “geo-math” library. Also wrote a Map Feature Design language for specification of map look and feel by the graphic artists and cartographers.
- **Panoramic Camera** - Designed and developed software for processing data from an experimental family of multi-sensor, 360-degree panoramic cameras. The camera function was internally controlled by a Xilinx FPGA and an ARM processor. External control was achieved via USB. The image processing included a means of measuring the lens model and the relative orientation of all image sensors and using this information for re-projecting and stitching the images into a seamless panorama.
- **Hand-held GPS** – Wrote embedded code for DeLorme's line of ARM-powered GPS receivers. Was responsible for the datum and coordinate conversion libraries, magnetic model library, astronomical library (sun and moon position), magnetic compass calibration, and auto calibration of the barometric altimeter.
- **Fast Contours** – Designed an algorithm for fast generation of elevation contour lines from digital elevation models. This development made DeLorme's Topo USA product feasible.
- **Fast Vectorization** – Designed an algorithm for efficient and accurate creation of land-cover polygons from classified LANDSAT imagery. The resulting data is used in many of DeLorme's software products, data products and paper maps.
- **Thermoforming** – Developed image processing software for pre-warping images used in thermoformed relief maps. The pre-warping counteracts the physical warping that occurs during the thermoforming process.
- **Digital Elevation Model Processing** – Developed an algorithm for intelligently filling voids in SRTM (Shuttle Radar Topography Mission) elevation data using alternate data sources when available.
- **World's Largest Globe** – Created the map projection and software for generating the imagery for DeLorme's 42-ft rotating and revolving globe, which is in the Guinness Book of Records.

- **Aerial Survey** – Oversaw the development a commercial aerial photography flight planning software package, and also the development of custom software for processing data collected by DeLorme's aerial survey plane. This plane operated a Leica ADS40 digital camera and a Leica ALS50 LIDAR system.

Digital Equipment Corporation, Littleton, MA

1984-1996

- **X-Server** - Led development of PC-based X-Windows servers.
- **Graphics Library** - Developed optimized graphics libraries for DEC Alpha computers.
- **Network Management** - Developed graphical configuration utility for central management of PCs on a LAN.

Compion Corporation, Urbana, IL

1983-1984

- **UNIX Port** – Contributed in the port of BSD Unix to a family of Gould mini-computers.

Coordinated Science Lab, University of Illinois, Urbana, IL

1981-1983

- **System programmer** - Developed and maintained system software on Unix and Tops10 systems.

Department of Mathematics, University of Illinois, Urbana, IL

1979-1981

- Associate Instructor – responsible for teaching Calculus I & II, Finite Math, Algebra

Publications / Patents:

“**Endoscope with Integrated Calibration**” – US Patent Application No. 62/094,720, Dec. 19, 2014. Co-inventors: K.Viering, R.Dresher, A.Levasseur, P.Aquilino. This patent application pertains to the calibration of the pixel response and the storage of the calibration in a disposable endoscope system.

“**Method and Apparatus for Panoramic Imaging**” – US Patent No. 7,834,910 B2, Nov. 16, 2010. Co-inventor: David DeLorme. This patent addresses reduction of motion artifacts in compound cameras deployed on moving platforms, by means of a combination of geometric design, trigger sequencing and image processing.

“**Effects of Government Policy on the Geospatial Industry**”, Jim Peterson and David DeLorme, PE&RS, American Society for Photogrammetry and Remote Sensing

“**Design of eXcursion V2**”, Jim Peterson et al., *Digital Technical Journal*, Vol. 8 No. 1, 1992

“**PC DECwindows**”, Jim Peterson and Dennis Giokas, *DEC Professional*, December 1989

“**A Grammar-Based Program Transformation System**”, James G. Peterson, Master’s Thesis, Computer Science Library, University of Illinois, July 1984

“**Permanents of Hadamard Matrices and of Vandermondes**”, E. T. Parker, James G. Peterson, Stanley J. Krolkowki, *Mathematics of Combinatorics*, 1983