Peter Bailey
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Interests:

Digital systems integration, embedded development, high-performance/scientific and highly parallel computing, digital signal and image processing, robotics.

Education:

MS Electrical Engineering, Computer Science minor, June 2009 **GPA**: 3.79 / 4.0
Institute of Technology, University of Minnesota
Minneapolis, MN

BS Computer Engineering, Cum Laude, May 2008 **GPA**: 3.53 / 4.0
Institute of Technology, University of Minnesota

Security Clearance: DoD *Secret* security clearance obtained 6/09.

Work experience:

06/09 – 08/09: **Software Engineer**, Lockheed Martin Maritime Systems & Sensors, Eagan, MN. Performed software functionality and regression testing. Coordinated builds and installations of a multi-workstation, multi-platform application.

09/07 – 1/08, 9/08 – 5/09: **Lab Teaching Assistant**, Intro to Digital Design and Intro to Microcontrollers, ECE Department, University of Minnesota. Instructed 4 labs per semester of ~12 students each, graded lab reports and homework. Designed quizzes.

5/08 – 9/08: **Programmer**, Observational Cosmology Group, University of Minnesota Physics Department. Implemented software designs for the EBEX experiment, a balloon-borne telescope to measuring cosmic microwave background polarization. Data acquisition and custom RPC implementation using ATA over Ethernet, HTTP. Coded in C, Python.

5/07 – 8/07: **Software Engineer Intern**, MTS Systems Corporation, Eden Prairie, MN. Maintained, improved, and contributed to Windows applications. Software provided a UI for an automotive tire-testing machine. Reduced project build time from multiple hours to 20 minutes. Coded in VB6, C, C++, VBA, Excel.

5/05 – 10/07: **On-site Tech Support**, Minnesota Population Center, Minneapolis, MN. Part of a support team providing computer assistance directly to users, including OS and software installation, usage and maintenance, Windows networking configuration, hardware installation and troubleshooting.

7/04 - 9/04, 7/03 – 9/03: **Firmware programmer**, Micro Control Company, Fridley, MN. Implemented an embedded real-time power control and reporting system in C and assembly for a semiconductor device burn-in oven. Project involved deployment, testing, and code review.

Research Experience:

9/07 – 5/09: "**Acceleration of Lattice Boltzmann Methods on Graphics Hardware**," International Conference on Parallel Processing (ICPP 2009). Senior honors design project and master's project. Used graphics processing cards to parallelize and speed up a computational fluid dynamics simulation, resulting in 25x improvement over a CPU-based version. Coded in C, C++, CUDA.

Selected Honors:

Oscar A. Schott Undergraduate Scholarship, Fall 2007 & Spring 2008

ECE Senior Honors Design Program, Fall 2007 & Spring 2008
Dean's List, University of Minnesota Institute of Technology, Fall 2005 & Fall 2006
Ella Thorpe Math Scholarship, Spring 2006

Technical Societies:

2007 – Present: Member IEEE
2009 – Present: Member ACM

Technical Skills:

Programming languages, in order of experience:

C, Java, MATLAB, C++, Python, Verilog, VHDL, Lisp, various assembly languages, Visual Basic, MS-DOS batch files, JavaScript.

Software suites/methodologies:

Embedded & real-time development, Nvidia CUDA, MPI, OpenMP, Xilinx ISE, Cadence Design tools/PSPICE, Eclipse, MS Office, MS Visual Studio, various vendor-specific IDEs.

Software concepts:

DSP, adaptive DSP, fixed-point math, image processing, computer vision, multi-threading, parallel processing, vector/SIMD programming, object-oriented programming, network communication, hardware device I/O.

Hardware:

FPGAs, digital and analog system design + test, soldering, computer assembly, circuit and PCB prototyping.

Operating systems:

Linux distributions including Redhat, Debian, Ubuntu, Solaris. Windows Vista/XP/2000, etc.

Selected Coursework:

Computer Systems Performance Measurement, DSP Design, Image Processing, Robotics, Computer Vision, Digital Signal Processing, Programmable Digital Logic, Adv. Microcontrollers, Adv. Computer Architecture, Adv. Operating Systems, Networking, Real-Time Systems, Analog and Digital Electronics, Algorithms, Physical Optics, digital and analog design labs, three semesters honors physics.

Selected Course Projects:

Parallel-parking robot, Robotics, fall '07: programmed a pre-constructed robot to parallel-park itself between cardboard boxes. Used LIDAR for range sensing and line-finding algorithms to build a map of the boxes.

Simultaneous Localization and Mapping (SLAM) robot, Sensing and Estimation in Robotics, spring '08: programmed a pre-constructed robot to explore and build a map of its environment while using landmarks to localize itself within the map. Used LIDAR for range sensing and the extended Kalman filter to maintain consistency between partial maps.

Fast Fourier Transform (FFT) and Discrete Cosine Transform (DCT): DSP Design, spring '09: implemented a parallel FFT algorithm on an NVIDIA GPU using CUDA, implemented a hardware DCT algorithm on an FPGA using Matlab Simulink.

AM radio and amplifier, fall '06: designed and built an AM radio to receive and play back a single radio station. Design included power supply, AM amplifier, demodulator, and audio amplifier with volume control.

References:

David Lilja, U of M Electrical and Computer Engineering Department
Professor and Department Head, (612) 625-5007

Shaul Hanany, U of M Physics Department
Professor, (612) 626-8929

Pat Dziuk, MTS Systems Corporation
Software Manager, (952) 937-4238

William C. Block, PhD., Minnesota Population Center
Information Technology Core Director (612) 624-5818

Phil Bailey, Micro Control Company
V.P. Research and Design (763) 277-9239