

Blane Rhoads

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Summary

Senior Software Engineer with diverse background in modeling, optimization, and computational geometry. Publications on robotic motion planning and hierarchical spatial data structures. 10+ years experience with C++ and MATLAB includes R&D for Intel, UTRC, and Sandia National Labs. Able to find elegant solutions to difficult real-world problems through analytical insight and persistence. Experienced at formulating ambiguous problem statements mathematically and at managing complexity through high-quality object-oriented code. Innovative, conscientious, and self-reliant. Interested in broadening my knowledge of probabilistic modeling and artificial intelligence while deepening my expertise in geometry, optimization, and software design.

Skills

- Proficient in C++ (C++11, STL, Boost), MATLAB, Python, Bash, GNU make, git, CVS, Unix/Linux, debugging, refactoring, quadtrees/octrees, triangular/tetrahedral meshes, contours/isosurfaces, optimal control, image segmentation, signal processing, ODEs/PDEs, linear algebra, regression, parallel computing, big data.
- Familiar with C++14, Julia, Java, SQL, Visual Studio, LaTeX, Excel/VBA, k-d trees, graph theory, TCP/IP, computer vision, LIDAR, probability theory, Bayes' rule, machine learning.

Education

University of California, Santa Barbara 2007 – 2013

- PhD in Mechanical Engineering (3.96 GPA).
- Emphases in “Computational Science & Engineering” & “Dynamical Systems, Control & Robotics”.
- Thesis: [Efficient guidance of underpowered vehicles in time-varying flow fields](#).
- Coursework included Stochastic Processes, Real Analysis, Parallel Computing, Optimal Control, Linear and Nonlinear Systems, Numerical Methods for ODEs and PDEs, Level Set Methods.
- 2012-2013 Best Teaching Assistant (Robot Design).

University of Tulsa 2003 – 2007

- BS in Applied Mathematics, BS in Mechanical Engineering, minor in Spanish (4.00 GPA).
- Faculty Honors Medalist, Phi Beta Kappa, Tau Beta Pi.

Experience

Senior Software Engineer – Calibre OPC R&D – Mentor Graphics (C++) 2015 – present

- Developed new tool for reintroducing hierarchy into EUV (extreme ultraviolet) OPC flow through quadtree decomposition of high-resolution “flare” images.
- Debugged and enhanced next generation “Matrix OPC” algorithm for nmOPC – Calibre’s sub-65 nm Optical Proximity Correction (OPC) tool.
- Implemented C++ module for FFT-based convolution of vector images.
- Refactored lithography simulator into separate socket server, enabling custom user models.

Senior Software Engineer – Computational Lithography – Intel (C++) 2014 – 2015

- Introduced model-based image segmentation into production-critical defect identification tool. Reported to company by department manager. Contributed to record-setting 4th Intel Achievement Award.
- Overhauled contour averaging algorithm in less than a week to enable on-time release of group’s most advanced model calibration tool. Recognized by project lead.
- Eliminated file I/O and 98% of client memory w/ database and TCP/IP sockets for planar range query tool.

Research Assistant – UC Santa Barbara (C++, MATLAB) 2008 – 2013

- Lagrangian solvers and quad/octree/tetrahedral meshes for ODEs/PDEs of optimal control and neuron models.

Research Intern – United Technologies Research Center (C++, MATLAB) Fall 2012

- Deterministic & stochastic methods for drone obstacle avoidance. Hosted and coded with Cornell professor.

Research Intern – Combustion Research Facility – Sandia Nat’l Lab (C++) Summer 2009

- Made kd-tree anisotropic in 10-species “Computational Singular Perturbation” hydrogen combustion model.

Engineering Intern – Intel (Excel/VBA) Summer 2007

- Automated tool productivity visualization for 450mm viability research, benchmarked 2D barcode technology.

Private Tutor - Linear algebra, calculus, geometry, physics, Spanish 2004 – 2011