

Josh Bevan

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SUMMARY

Background in computational engineering, applied math, computer science. Versatile skillset in mathematical modeling, numerical algorithms, high performance computing. Experienced with Python, C++, MATLAB, Fortran, FEA/CFD, numerical Linear Algebra/PDEs, parallel computing via OpenMP/MPI.

EDUCATION

Master of Science in Mechanical Engineering [Thermofluids Concentration]

University of Massachusetts, Lowell, MA, 2015

Thesis: "Vortex Dominated Flows: A High-order, Conservative Eulerian Method."

Bachelor of Science in Mechanical Engineering

University of Massachusetts, Lowell, MA, 2013

Senior Capstone: "Autonomous Control of a Hovercraft."

EMPLOYMENT/ EXPERIENCE

Senior Scientific Programmer/Analyst

Dec 2019 - Present

Boston University; Boston, MA

- Work with researchers/BU faculty to effectively use BU's Shared Computing Cluster (SCC) at the Massachusetts Green High Performance Computing Center (MGHPCC).
- Support thousands of researchers using >100 million core hours and petabytes of data.
- Work on range of activities including performance optimization, parallelization, and application of numerical methods/algorithms to a wide array of application areas.
- Example projects: optimization of kinetic Monte Carlo code for simulation of crystal formation (Fortran), specialized pseudo random number generator (pRNG) targeted for bulk generation (C/C++), implementation of custom algebraic solver for Group Theory problems (Fortran), optimization of bone cyst image post-processing (Matlab)
- Applied wide array of programming languages, parallel tools/APIs such as OpenMP and MPI, and numerical algorithms/mathematical modeling.

Computational Engineer, Freelance Consultant

Dec 2018 - Dec 2019

Joshua Bevan, Massachusetts Sole Proprietorship; Northborough, MA

- Provided diverse engineering and technical consulting to businesses and individuals.
- Example work includes computational modeling for product development, acoustic modeling for manufacturing expansion, and data analysis.

Research/Teaching Assistantship Appointment

March 2016 - June 2018

Univ. of Illinois Urbana-Champaign (UIUC)

PhD Student, Computer Science [Scientific Computing group]

- Investigated novel simulation methods for fluid dynamics/electromagnetics by numerical solution of partial differential equations with high-order-of-convergence.
- Adapted an algorithm for the Fast Multipole Method (FMM) for unstructured simplicial meshes for Finite Element-like discretizations.
- Code developed for heterogeneous GPU/CPU environments using mix of Python, C++, Fortran, and OpenCL.

Exascale Scalability of ParSplice, CDSS Team Member

May - Aug 2017

Applied Computer Science Group; Los Alamos National Laboratory, NM

- Improved parallelizability (MPI) of high-performance numerical molecular dynamics code for future Exascale computing platforms, including:
- Removed serial bottlenecks with separate threaded instances using OpenMP.
- Improved accuracy of predictive task scheduling of numerical computations.

MS Thesis Research: Numerical Solution of Euler Equations Aug 2013 - Jun 2015
Advisor: Prof. D.J. Willis, Lowell, MA

- Tool for simulating fluid vortices, with applications to wind turbine modeling.
- Implemented a high-order-of-convergence Discontinuous Galerkin numerical solver capable of arbitrary order solution of the Euler differential equations in MATLAB.

Engineer / International Project Manager Jan 2012 - Feb 2016
Cambrooke Therapeutics; Ayer, MA

- Designed and led project to overhaul product distribution/delivery to customers, cutting logistics cost by 35%. Modeled full logistics system end-to-end including cost and transit time using historical data, variable 3rd party logistics/warehousing costs, and variable package weight/size. Used Monte-Carlo approach to optimize full model, dealing with non-linear system behavior.
- Designed, built, and integrated custom hardware and software automation systems for aseptic clinical metabolics production conforming to FDA standards.
- Implemented regulatory compliant products and procedures (e.g. 21 CFR 11 compliant electronic records system etc).
- Managed projects including international market expansion/distributor management, regulatory acceptance and compliance, import/export, supply chain.

Engineer May 2011 - Sept 2011
JSB Industries; Lawrence, MA

- Created data-driven, predictive preventative maintenance scheduling system.
- Used Six Sigma methods to improve production throughput, reduce waste.

PUBLICATIONS

J.J. Bevan, D.J. Willis. “*A High-Order Conservative Eulerian Simulation Method for Vortex Dominated Flows.*” 46th AIAA Fluid Dynamics Conference. 2016.

Bevan, Junghans, Landsgesel, Linck, Pavel, Perez, Ramakrishnaiah, Ramil, Zhou.
“*Facilitating the Scalability of ParSplice for Exascale Testbeds.*” International Conference for High Performance Computing, Networking, Storage and Analysis. 2017.

Milechin, Aly, Bevan, Jahnke, Shen, Gregor. “*Pragmatic Benchmarking for Research Computing.*” 2021 IEEE High Performance Extreme Computing Conference (HPEC). IEEE, 2021.

AWARDS & ACTIVITIES

Certified Associate in Project Management, Project Mgmt. Institute (PMI), 2014
Society for Industrial and Applied Mathematics, UIUC Officer/President, 2016-2018
Craig T. Douglas Undergraduate Research Award, UMass Lowell, 2013
Eagle Scout, Boy Scouts of America, 2004