Josh Bevan

jjbevan2@illinois.edu
(774) 329-0343 | JoshBevan.com

EDUCATION

PhD, Computer Science [Scientific Computing group]
Univ. of Illinois Urbana-Champaign, Urbana, IL, Expected Graduation: 2021;
Advisor: Prof. Andreas Kloeckner

MS in Mechanical Engineering [Thermofluids Concentration]
University of Massachusetts, Lowell, MA, 2015;
Thesis: "Vortex Dominated Flows: A High-order, Conservative Eulerian Simulation Method." Advisor: Prof. D.J. Willis

Bachelor of Science in Mechanical Engineering
University of Massachusetts, Lowell, MA, 2013
Senior Capstone: "Autonomous Control of a Hovercraft."

RESEARCH EXPERIENCE

The Scalability of ParSplice, Co-Design Summer School May-August 2017
Los Alamos National Laboratory, Los Alamos, NM

- Assessed current baseline performance of ParSplice for current architectures, and determined several avenues of improvement
- Developed separate threaded instance for splicer task, removing serial bottleneck
- Developed proof of concept high-temperature exploration routine for quick evaluation of potential landscape

Research Assistantship Appointment 2016-2017
Advisor: Prof. Andreas Kloeckner, Urbana, IL

- Investigated extension of Quadrature-by-Expansion (QBX) integral equation methods to volume-type integrals.
- Worked on adapting a Fast Multipole Method (FMM) for unstructured simplicial meshes for finite element-like discretizations
- Investigated importance of kernel induced effects on QBX approximations for volume potentials

Application of Discontinuous Galerkin and Vortex Transport Methods to Turbine-Turbine Interaction Simulations 2013-2015
Advisor: Prof. D.J. Willis, Lowell, MA

- Implemented a high-order DG solver capable of arbitrary order solution of the Euler equations using Line-DG style approach.
- Implemented high-order velocity-vorticity inviscid solver (2D domains) for calculation of velocity fields due to vorticity by means of Biot-Savart integral.
- Investigated accuracy effects of integrable singularities on computed velocities for both singular and de-singularized kernels.
- Performed validation of method and solver using test cases with known analytical solutions as well as empirical results from literature.

A Parallelizable Solver of Inviscid Fluid Flow 2013
Special Topics Directed Study with Prof. J.P. Trelles, Lowell, MA

- Developed a potential flow solver via solution of Poisson equation.
- Implemented in C with the PETSc library to allow scalable parallelism via MPI.
- Measured scaling efficiency for several test cases. Examined effect of mesh/node conditioning on inter-processor communication and effect on scaling.

Undergraduate Capstone: Autonomous Hovercraft Project 2012 - 2013
Autonomous Robotic Systems Laboratory; Lowell, MA

- Developed closed feedback two-stage linearized control algorithm for navigation.
- Implemented real-time control program on micro-controller using IMU output and remote telemetry over serial radio.
- Created autonomously navigating hovercraft platform with full servo/brushless motor control via micro-controller.

Farnsworth-Hirsch Fusor Project 2008 - 2011
Van der Graff Accelerator Lab; Lowell, MA

- Designed and built high vacuum pump systems and chambers.
- Modified and built high-voltage and current-regulated power supplies.
- Worked with RF and ECR ionization and plasma manipulation techniques.

TEACHING

Teaching Assistant, CS 450: Numerical Analysis Fall 2017
Univ. of Illinois Urbana-Champaign, Urbana, IL

Teaching Assistant, CS 450: Numerical Analysis Spring 2017
Univ. of Illinois Urbana-Champaign, Urbana, IL

Introduction to Discontinuous Galerkin Methods Spring 2015
University of Massachusetts, Lowell, MA

- Developed curriculum for introductory graduate course on DG methods.
- Created course materials for curriculum: slides, demonstrative programs.
- Performed, recorded, and edited 44 video lectures series covering course material.
- Video lectures available online at: `www.bit.ly/IntroDG`

Programming Language Proficiency

- Proficient: MATLAB, Python
- Competent: C/C++/Fortran
- Also familiar with various scientific computing-related packages including OpenCL, PETSC, and the Python ecosystem of packages (e.g. NumPy, SciPy, etc.)

PUBLICATIONS

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

POSTERS

Ramakrishnaiah, Landsgesell, Zhou, Linck, Ramil, Bevan, Perez, Vernon, Swinburne, Pavel, Junghans.
"Facilitating the Scalability of ParSplice for Exascale Testbeds." International Conference for High Performance Computing, Networking, Storage and Analysis. 2017.

PATENTS

Sizer, C; Bevan, J; Olson K. 2012. Formulation and Processing of a High-Protein, Isotonic Beverage For the Treatment of Metabolic Disorders. Patent Pending.

AWARDS & ACTIVITIES

Andrew & Shana Laursen Fellowship, UIUC, 2016
Society for Industrial and Applied Mathematics (SIAM), UIUC Chapter Officer, 2016
Craig T. Douglas Undergraduate Research Award, UMass Lowell, 2013
Certified Associate in Project Management, Project Mgmt. Institute (PMI), 2014
Founder, Near Space High-Altitude Balloon Club, 2008-2012
Eagle Scout, Boy Scouts of America, 2004

EMPLOYMENT

Engineer / International Project Manager Dec. 2011 to Feb. 2016

Cambrooke Therapeutics Inc.; Ayer, MA

- Designed, built, and optimized thermo-fluid processing systems.
- 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, 21 CFR 113/114 Thermal Processing, etc).
- Managed projects including international market expansion, logistics, regulatory acceptance and compliance, import/export, supply chain, and international distributor management.
- Responsible for new equipment/instrumentation installation and validation.

Engineer Nov. 2010 to Dec. 2011

JSB Industries; Lawrence, MA

- Troubleshooted and improved the safety, reliability, and efficiency of processing and packaging equipment and instrumentation.
- Created data-driven, predictive preventative maintenance scheduling system.
- Improved production throughput and uptime, minimized production waste.