Joshua Dennis Booth
Curriculum Vitae
Computer Science

Education

Ph.D. Computer Science and Engineering. The Pennsylvania State University.
2010-2014.
Area of Study: High Performance Computing, Performance and System Analysis, Scalable Scientific Computing
Thesis: Improving performance and energy of parallel sparse computations through hybrid linear solvers and model-driven optimization
Advisor: Padma Raghavan, Ph.D.

M.S. Computational Mathematics. Duquesne University.
2008-2010.
Area of Study: Compressive Sensing, Inverse Problems, Statistical Methods, Signal Processing
Thesis: Compressive Sensing
Advisor: Carl Toews, Ph.D.

B.S. Applied Mathematics and Secondary Education. Robert Morris University.
2004-2007.
Area of Study: Discrete Mathematics, Real Analysis, Mathematical Statistics (Actuarial Science), Pennsylvania Secondary Teaching Certification in Mathematics

Experience

2020-Present Assistant Professor of Computer Science. University of Alabama in Huntsville, Department of Computer Science.

2017-2019 Assistant Professor of Computer Science. Franklin & Marshall College, Department of Computer Science.

2016-2017. Visiting Assistant Professor. Bucknell University, Department of Computer Science.
Teaching and running student labs

2014-2016. Post-Doctoral Researcher. Sandia National Laboratories, Scalable Algorithms (1426).
Research on next generation systems, shared-memory sparse direct linear solvers, updating and contributing to Trilinos for Exascale Initiative

2014-2014. Graduate Lecturer. The Pennsylvania State University.
Responsible for all course material preparation, lecturing, evaluations, and office hours
CMPSC122 Computer Science 2, CMPSC 311 Systems Programming

2013-2013. Graduate Teaching Assistant. The Pennsylvania State University.
Responsible for in-class aiding, offices hours, and grading
CMPSC 203 Intro to Spreadsheets and Databases

2013-2013. Graduate Intern. Lawrence Livermore National Laboratory, Computation,
Institute for Scientific Computing Research Division under Greg Bronevetsky
Preliminary research on the reduction of simulation error and inaccuracy via statistical methods

2010-2013. Graduate Research Assistant. The Pennsylvania State University.
Sparse linear solvers in linear time and energy-aware system performance analysis

2010-2010. Graduate Teaching Assistant. The Pennsylvania State University.
CMPSC 121 Computer Science 1

2009-2009. Graduate Research Assistant. Duquesne University.
JAVA Graphical Authorship Attribution (JGAAP). Threading, Unit Testing, Data Mining.

2009-2009. Bio-Statistician Intern. Center for Disease Control,
National Institute for Occupational Safety and Health (CDC/NIOSH).
Building statistical database for modeling spread of H1N1 for hospital readiness

Teaching Experience

Pennsylvania State Teaching Certification: Secondary Mathematics.

Table 1: Classes Taught

UAH	Assistant Professor	CS 221, Comp Science II CS 317, Intro Design/Analysis Alg	C++11 data structures Algorithms
F&M	Assistant Professor	CPS 111, Computer Science 1 CPS 111L, Computer Science 1 Lab CPS 222, Computer Science 3 CPS 242, Computer Organization CPS 261, Algorithms CPS 376, Parallel Computing CPS 391, Compilers Optimization CPS 400, Capstone	Python3 based intro for all majors C++11 and advance data structures Circuits through out-of-order MPI, OpenMP, CUDA, algorithms
Bucknell	Visiting Professor	CSCI 203, Computer Science 1 CSCI 203L, Computer Science 1 Lab CSCI 204, Computer Science 2 CSCI 204L, Computer Science 2 Lab CSCI 206L Computer Organization Lab	Introduction following Harvey Mudd College Python3, data structures, and algorithms
Penn State	Graduate Lecturer Graduate TA	CS 311, System Programming CS 122, Computer Science 2 CS 203, Spreadsheets & Databases CS 121, Computer Science 1	Unix, Bash, C99, compilers, sockets, I/O C++11, data structures, and algorithms Introduction to C++
Duquesne	Graduate TA	Calculus I-III	

Research
Journal Papers

1. *An On-Node Scalable Sparse Incomplete LU Factorization for Many-Core Iterative Solver with Javelin,*
   J.D. Booth, and G. Bolet, Parallel Computing (2020)

2. *Basker: Parallel Sparse LU Factorization Utilizing Hierarchical Parallelism and Data Layouts,*
   J.D. Booth, N. Ellingwood, H. Thornquist, S. Rajamanickam, Parallel Computing (68), Special Issue on Heterogeneous Computing (2017)

Conference and Workshop Papers

1. *Javelin: A Scalable Implementation for Sparse Incomplete LU Factorization,*
   J.D. Booth and G. Bolet, Accelerators and Hybrid Exascale Systems (AsHES) at IPDPS (2019)

2. *Comparison of High-Level Programming Choice for Sparse Incomplete Factorization on Different Architectures,*
   J.D. Booth, K. Kim, and S. Rajamanickam, High-Level Parallel Programming Models and Supportive Environments (HIPS) at IPDPS (2016)

3. *Basker: A Threaded Sparse LU Factorization Utilizing Hierarchical Parallelism and Data Layouts,*
   J.D. Booth, S. Rajamanickam, H. Thornquist, Accelerators and Hybrid Exascale Systems (AsHES) at IPDPS (2016)

4. *STS-k: A Multilevel Sparse Triangular Solution Scheme for NUMA Multicore*
   H. Kabir, **J.D. Booth**, G. Aupy, A. Benoit, Y. Roberts, and P. Raghavan, Super Computing (2015)

5. *Phase Detection with Hidden Markov Models for DVFS on Many-Core Processors*,
   J.D. Booth, J. Kotra, H. Zhao, M. Kandemir, and P. Raghavan, International Conference on Distributed Computing Systems, ICDCS (2015)

6. *A Multilevel Compressed Sparse Row Format for Efficient Sparse Computations on Multicore Processors*,
   H. Kabir, **J.D. Booth**, and P. Raghavan, International Conference on High Performance Computing, HiPC(2014)

7. *Hybrid Sparse Linear Solutions with Substituted Factorization*,
   J.D. Booth and P. Raghavan, Springer Series: Lecture Notes in Computer Science (Selected For Extended Journal), VECPAR(2014)

8. *A Multilevel Cholesky Conjugate Gradients Hybrid Solver for Linear Systems with Multiple Right-hand Sides*,
   J.D. Booth, A. Chatterjee, P. Raghavan, and M. Frasca, Procedia CS 4: 2307-2316, ICCS (2011)

Posters

1. *Feasibility Study of Multilevel Schur Complement Methods for Sparse Linear Systems*
   J.D. Booth and G. Bolet, SIAM CSE (2019)

2. *Alternative Direct Solver for Symmetric Positive Systems Arising from Second-Order Elliptic Partial Differential Equations*,
   J.D. Booth and P. Raghavan, SIAM Parallel Processing (2014)

3. *Norm-Coarsened Ordering for Parallel Incomplete Cholesky Preconditioning*,
   J.D. Booth, Super Computing (2012)

Grants and Funding

1. XSEDE, *Near Linear Time Domain Solvers Using Numeric Approximations*, $2,803 (2020)

2. NSF, *CC* Compute: Building a state-of-the-art campus compute resource at Franklin & Marshall College*, $400k (2019)

Professional Organizations

ACM, SIAM, IEEE

Professional Activity

SIAM Journal of Scientific Computing

ACM Transactions on Mathematical Software (TOMS)

HPC SIM: Paper Review 2019, 2020, 2021

ICS (International Conference on Supercomputing): Workshops 2020

SuperComputing: Tutorials 2020, Student-Mentor Program 2017, 2018, 2020

IEEE Transactions on Computers 2020

IEEE Access 2019

Honors/Awards

2012. 3rd Place, ACM Graduate Student Research Competition, Super Computing 2012.
Norm based ordering for reduced iterations using parallel incomplete Cholesky preconditioning.

2004. 1st Place, Oracle International JAVA Competition.