ChangQing Wang 2019

Contact Information

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Qualifications And Interests

- Software Development, OOAD, Software Testing, xUnit, Continuous Integration
- Agile Methodologies, Test-Driven Development
- Mathematical Modeling, Finite Element, Numerical Analysis, Parallel Computing, Fluid Dynamics, Domain Decomposition Methods
- Statistics, Data Analysis, Data Visualization, Machine Learning

Programming Skills

- MATLAB, Python, C++, JavaScript, VueJS, HTML, SQL, Fortran, Solidity
- xUnit Testing, Google Benchmark, Jenkins, Git
- R, FreeFem++, MPI/OpenMP, Linux, LaTeX

Education

Department of Mathematics, University of Pittsburgh

Ph.D., Mathematics, Sept 2011 – Aug 2016, GPA: 3.95/4.0

- Thesis Topic: Domain decomposition methods for coupled Stokes-Darcy flows
- Advisor: Dr. Ivan Yotov

Department of Mathematics, Tufts University

Ph.D. Candidate (Transferred), Sept 2010 – July 2011, GPA: 4.0/4.0

Department of Mathematics, Beijing Normal University

B.S. in Mathematics, July 2010, GPA: 86.0/100

Working Experience

The MathWorks, Inc., Natick, MA, Sep. 2016 - Now
Software Developer

Develop and evolve the MATLABUnit, an xUnit testing framework for MATLAB and Simulink customers.

Gather user requirements, design and develop the next generation tools and interfaces for measuring MATLAB code (e.g. benchmarking frameworks, scalability testing framework, memory testing frameworks); design and develop features for data analysis, data visualization, and data persistence for MATLABUnit. Integrate flamegraphs, XPerf, VTune, Google Benchmark and other third party performance testing tools with MATLAB.

Develop and integrate MATLAB for CI/CD workflow on Jenkins and GitHub.

Present the latest product features to global customers on the 2018 annual MathWorks Advisory Board (MAB) event.

The MathWorks, Inc., Natick, MA, Jan 2016 - May 2016
Quality Engineering Intern

Work with Math team on the libMATLAB project, converting all the legacy testing files to class-based MATLABUnit tests. Design and develop automation tool in MATLAB to process the conversion in batch.

Create test procedure and test files for the new features in MATLAB following xUnit testing patterns. Ensure stable, high-quality product delivery.

Research Experience

Research Assistant, University of Pittsburgh, 2011-2015
Department of Mathematics

Worked with Dr. Ivan Yotov, proposed and studied a domain decomposition method for coupled Stokes-Darcy flows.

Coupling Stokes and Darcy equations is useful in many different applications, such as interaction of surface water and groundwater in aquifer, where Stokes equation describes the motion of incompressible fluids and Darcy equation describes the infiltration process. Stochasticity can be added to the model in rock permeability or fluid source.

In our algorithm, the computational domain is divided into subdomains for solving the problem on a massively parallel computer. Other techniques (non-matching grids and multiscale basis) are introduced to improve computation efficiency. I have implemented the algorithms in Fortran/C++ with MPI, developed a finite element software package named PARCEL, and published several results on academic journals.

Research Assistant (Data Analyst), Beijing Normal University, 2008-2011
College of Global Change and Earth System Science

Worked in Dr. XiaoGu Zheng's lab, studied a new approach to map near-surface massive data of air temperature, pressure, relative humidity and wind speed over mainland China with high spatiotemporal resolution. The approach is implemented in R, Python and Matlab and it comprises two steps: (1) Fit a partial thin-plate smoothing spline to ground-based observations for estimating a trend surface; (2) Apply a simple kriging procedure to the residual for trend surface correction.

Honors and Awards

Fall 2012	Math Department Fellowship, University of Pittsburgh
Spring 2010	Meritorious Prize, The Mathematical Contest in Modeling (USA MCM 2010)
Fall 2009	Second Prize, The 7th Programming Competition (C++) of Beijing Normal University
Fall 2009	University Academic Scholarship, Beijing Normal University

Publications

I. Ambartsumyan, E. Khattatov, C. Wang, and I. Yotov, *Stochastic multiscale flux basis for Stokes-Darcy flows.* (Preprints)

B. Ganis, D. Vassilev, C. Wang, and I. Yotov, *A multiscale flux basis for mortar discretizations of Stokes-Darcy flows*, Computer Methods in Applied Mechanics and Engineering, 313 (2017), pp. 259-278.

D. Vassilev, C. Wang, and I. Yotov, *Domain decomposition for coupled Stokes and Darcy flows*, Computer Methods in Applied Mechanics and Engineering, 268 (2014), pp. 264-283.

P. Song, C. Wang, and I. Yotov, *Domain decomposition for Stokes-Darcy flows with curved interfaces*, Procedia Computer Science, 18:1077-1086, 2013.

Conference Talks

Domain decomposition for coupled Stokes and Darcy flows with floating Stokes domains, 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, PA, November, 2013

Domain decomposition for coupled Stokes and Darcy flows with floating Stokes domains, Dietrich School of Arts and Sciences Grad Expo, University of Pittsburgh, Pittsburgh, PA, March, 2013

Conference Posters

Domain decomposition for coupled Stokes and Darcy flows, Workshop on Computational Geo-mechanics, University of Pittsburgh, Pittsburgh, PA, May 2014

Domain decomposition method on Stokes-Darcy flow, Workshop on Advanced Numerical Methods in the Mathematical Sciences, Texas A&M University, College Station, TX, May 2015

Domain decomposition method on Stokes-Darcy flow, SIAM Conference on Mathematical and Computational Issues in the Geo-sciences, Stanford University, Stanford, CA, July 2015

Teaching Experience

Summer	2015	Teaching Assistant, Calculus I
Summer	2014	Teaching Assistant, Calculus III
Spring	2012	Grader, Linear Algebra
Fall	2011	Teaching Assistant, Calculus I
Fall	2010	Grader, Probability

Miscellaneous

Summer 2008 Official Volunteer of The Beijing Organizing Committee for the Games of the XXIX Olympiad (BOCOG), Beijing, China
VIP guest assistant at Ying Tung Natatorium

Relevant Skills

Languages: English, Mandarin