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Education

- **Ph.D., Computer Science (Certificate in Computational Science & Engineering)** August 2011
University of Illinois at Urbana-Champaign, Urbana, IL
Advisor: Prof. Luke Olson in the Scientific Computing Group
Dissertation title: Finite Element Methods for Implicit Solvent Models
- **B.S., Computer Systems Engineering** May 2003
Ghulam Ishaq Khan Institute of Engineering Sciences and Technology, Topi, Pakistan

Research Experience

- **Postdoctoral Researcher** September 2014 – Present
Scientific Computing, Florida State University, Tallahassee, FL
Appointment in lab of Prof. Max Gunzburger
- **Postdoctoral Researcher** August 2011 – August 2014
Mathematics, Colorado State University, Fort Collins, CO
Appointment in lab of Prof. Donald Estep

Research Interests

- Adjoint based a-posteriori error estimation
- Multi-scale, multi-physics PDEs
- Reduced Order Modeling
- Uncertainty quantification
- Least squares finite element methods
- Stabilized methods for biomolecular simulation
- Parallel-in-time integration
- Implicit-explicit (IMEX) time integration

Publications

Accepted / Appeared

- [1] J. H. Chaudhry, K. Liu, K. Liu, T. A. Manteuffel, L. N. Olson, and L. Tang. Enhancing least-squares finite element methods through a quantity-of-interest. *SIAM Journal on Numerical Analysis* (2014)
- [2] J. H. Chaudhry, D. Estep, V. Ginting, J. N. Shadid, and S. Tavenver. Adjoint based a posteriori analysis of IMEX time integration schemes for partial differential equations. *Computer Methods in Applied Mechanics and Engineering* (2015)
- [3] V. Carey, J. H. Chaudhry, D. Estep, V. Ginting, A. Johansson, M. Larson, and S. Tavenver. Adaptive finite element solution of multiscale PDE-ODE systems. *Computer Methods in Applied Mechanics and Engineering* (Accepted, 2015)
- [4] J. H. Chaudhry, J. Comer, A. Aksimentiev, and L. N. Olson. A stabilized finite element method for modified Poisson-Nernst-Planck equations to determine ion flow through a nanopore. *Communications in Computational Physics* (2014)

- [5] J. H. Chaudhry, D. Estep, V. Ginting, and S. Tavenver. A posteriori analysis of an iterative multi-discretization method for reaction-diffusion systems. *Computer Methods in Applied Mechanics and Engineering* (2013)
- [6] J. H. Chaudhry, S. D. Bond, and L. N. Olson. A weighted adaptive least-squares finite element method for the Poisson-Boltzmann equation. *Applied Mathematics and Computation* (2012)
- [7] J. H. Chaudhry, S. D. Bond, and L. N. Olson. Finite element approximation to a finite-size modified Poisson-Boltzmann equation. *Journal of Scientific Computing* (2011)
- [8] S. D. Bond, J. H. Chaudhry, E. C. Cyr, and L. N. Olson. A first-order system least-squares finite element method for the Poisson-Boltzmann equation. *Journal of Computational Chemistry* (2010)
- [9] A. N. Hirani, K. B. Nakshatrala, and J. H. Chaudhry. Numerical method for Darcy flow derived using Discrete Exterior Calculus. *International Journal for Computational Methods in Engineering Science and Mechanics* (Accepted, 2014)

Submitted / In preparation

- [10] J. H. Chaudhry, D. Estep, V. Ginting, and S. Tavenver. A posteriori analysis of iterative evolution solvers for non-autonomous problems. *SIAM/ASA Journal on Uncertainty Quantification* (Submitted)
- [11] J. H. Chaudhry, D. Estep, S. Tavenver, V. Carey, and J. Sandelin. A posteriori error analysis of two stage computation methods with application to efficient resource allocation and the Parareal Algorithm. *SIAM Journal on Numerical Analysis* (Submitted)

Doctoral Dissertation

- [12] J. H. Chaudhry. *Finite element methods for implicit solvent models*. Ph.D. thesis, University of Illinois at Urbana-Champaign, Department of Computer Science (2011)

Presentations

- [1] *Multi-level Parallel Time Integration*. 13th Copper Mountain Conference on Iterative Methods, Copper Mountain, Colorado, April 6 – April 11, 2014.
- [2] *Goal-oriented least-squares finite element methods*. 12th U.S. National Congress on Computational Mechanics, Raleigh, North Carolina July 24, 2013.
- [3] *A posteriori analysis of implicit-explicit methods*. SIAM Conference on Computational Science & Engineering (CSE13), Boston MA, February 27, 2013.
- [4] *An a posteriori analysis of iterative technique for system of Odes*. Joint Mathematics Meetings, San Diego, CA. January 12, 2013.
- [5] *A posteriori analysis of multirate and multiscale evolution systems*. SIAM Annual Meeting, Minneapolis, MN. July 11, 2012.
- [6] *A goal-oriented approach to least-squares finite element methods, with application to the Poisson-Boltzmann equation*. Applied Math Seminar, Colorado State University. October 28, 2011.
- [7] *A goal-oriented approach to least-squares finite element methods*. Computational Math Seminar, University of Colorado Boulder. October 11, 2011.
- [8] *Finite element method for the modified Poisson-Nernst-Planck equations (MPNPE)*. SIAM Conference on Computational Science and Engineering (CSE11), Reno, Nevada. February 28, 2011.
- [9] *Efficient simulation of ionic current in a nanopore through implicit solvent models*. Computational Science and Engineering Annual Research Symposium, University of Illinois at Urbana-Champaign. April 2011.

- [10] *Finite element methods for Poisson-Boltzmann models*. Purdue University. November 17, 2010.
- [11] *Finite element methods for Poisson-Boltzmann models*. University of Colorado Boulder. October 26, 2010.
- [12] *Finite element methods for implicit solvent electrostatics*. Computational Science and Engineering Annual Research Symposium, University of Illinois at Urbana-Champaign. April 11, 2010.

Teaching Experience

At Colorado State University

- Introduction to Ordinary Differential Equations (Math 340), Instructor Fall 2013
- Elementary Probabilistic-Stochastic Modeling (Stat 321), Instructor Spring 2013
- Matrices and Linear Equations (Math 229), Instructor Spring 2012

At the University of Illinois at Urbana-Champaign

- Numerical Methods (CS 357), Teaching Assistant Spring 2009
- Numerical Methods (CS 357), Teaching Assistant Fall 2008
- Computer Systems Organization (CS 433), Teaching Assistant Fall 2007

Fellowships, Awards and Grants

- **Computational Science and Engineering Fellowship**, 2009-2010 and 2010-2011.
University of Illinois at Urbana-Champaign.
An annual competitive fellowship based on a call for interdisciplinary and computationally oriented research proposals.
- **Sohaib and Sara Abbasi Computer Science Fellowship**, 2005-2006 and 2006-2007.
University of Illinois at Urbana-Champaign.
- **Ghulam Ishaq Khan Medal and Computer Science Gold Medal**, 2003.
Ghulam Ishaq Khan Institute, Pakistan.
Gold medal for highest GPA in the graduating class among all departments, and gold medal for highest GPA in computer science.
- SIAM, travel award to for CSE11, CSE15 and UQ12.
- SAMSI travel award to the UQ Program 2012 workshops.

Skills

- Expertise in C/C++ and MATLAB
- Experience with Windows, Linux and Unix
- Experience in MPI, OpenMP, Python, Java and C#

Service

- President, SIAM University of Illinois at Urbana-Champaign Chapter, 2010-2011.
- Member, SIAM University of Illinois at Urbana-Champaign Chapter, 2008-2010.

Primary References

- Prof. Donald Estep
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- Prof. Luke Olson
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- Prof. Michael T. Heath
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- Prof. Max Gunzburger
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- Prof. Simon Tavener
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