

Jeffrey D. Hyman

Ph.D. Candidate

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The Program in Applied Mathematics
The University of Arizona
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Education

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| PhD. 2009-Present | Applied Mathematics, University of Arizona, Tucson, Arizona
Primary Advisor : Dr. C. Larrabee Winter
Professor and Head Department of Hydrology and Water Resources
PhD. Minor : Hydrology and Water Resources
Minor Advisor : Dr. Shlomo P. Neuman, Regents Professor |
| M.S. 2010 | Applied Mathematics, University of Arizona, Tucson, Arizona
Advisor Dr. C. Larrabee Winter |
| Post-Baccalaureate 2008-2009 | Portland State University, Portland, Oregon |
| B.A. 2007 | St. Olaf College Northfield, Minnesota
Majors: Mathematics, Ancient Studies, and Religion
Advisor : Dr. Matthew Richey, Associate Dean of Natural Science
and Mathematics. |

Research Interest

Computational modeling of fluid flow and solute transport through explicit three dimensional pore structures with a focus on connecting characteristics of the steady state flow field to the pore wall geometry and network topology. Additional research interest include scientific computation of dynamical systems with high degrees of freedom, finite volume methods for hyperbolic problems, uncertainty quantification, computational percolation theory, computational geometry, and mesoscale modeling of monsoons.

Expertise

Programming Languages: Proficient in C, Fortran 77, MatLab, Python, Mathematica, and \LaTeX . Competent in Fortran 90/95, Maple, C++, and R.

Operating Systems : Mac OS X, Windows, Unix, and Linux

Service, Awards, and Societies

Fall 2013	Outstanding Graduate Teaching Assistant Award Univ. of Arizona Dept. of Mathematics
10/2013	Lead Organizer of the Mini-conference <i>Pore scale Simulation and Imaging</i> Hosted by the Univ. of Arizona
2013 - Present	Referee for <i>Water Resources Research</i>
Spring 2011 & 2013	Mentor for Undergraduate Mathematical Modeling Group
12/2012	Graduate and Professional Student Council Travel Grant Judge
12/2012	Graduate and Professional Student Council Travel Grant Awardee
10/2012	H.E. Carter Travel Grant Awardee
5 - 9/2012	Graduate Visitor Fellowship Award by the Advanced Study Program at the National Center for Atmospheric Research Supervisor : Dr. Piotr Smolarkiewicz
8/2012 - 5/2013	Super TA for Applied Mathematics Core Numerical Analysis Course
5/2012 - 5/2013	University of Arizona. SIAM Student Chapter Vice-President
2011 - Present	Member of AGU <i>American Geophysical Union</i>
5/2011 - 5/2012	University of Arizona. SIAM Student Chapter President
2010-2011	Panelist to promote graduate school with undergraduate scholars and first generation students at the University of Arizona
07/2009-05/2010	Awardee NSF VIGRE Fellowship
02/2006	Member of $E\Sigma\Phi$: The National Honorary Collegiate Society for Classical Studies
11/2005	Grant Recipient of the Lilly Endowment
2005 - Present	Member of AMS <i>American Mathematical Society</i>
2003 - Present	Member of SIAM <i>Society for Industrial and Applied Mathematics</i>

Publications

M. Siena, M. Riva, J.D.H, C.L. Winter, and A. Guadagnini (2014) Relationship between Pore Widths and Velocity Probability Distributions in Stochastically Generated Porous Media *Phys. Rev. E (Accepted)*

J.D.H. and C. L. Winter (2013), Hyperbolic Mixing Regions in Flows Through Three Dimensional Pore Structures *Phys. Rev. E* 88, 063014, doi:10.1103/PhysRevE.88.063014

J.D.H., P. K. Smolarkiewicz, and C. L. Winter (2013), Pedotransfer functions for permeability: A computational study at pore scales, *Water Resour. Res.*, 49, doi:10.1002/wrcr.20170.

J.D.H., P.K. Smolarkiewicz, and C.L. Winter (2012) Heterogeneities of Flow in Stochastically Generated Porous Media, *Phys. Rev. E* 86, 056701 doi:10.1103/PhysRevE.86.056701

M. Siena, A. Guadagnini, M. Riva, P. Gouze, P.K. Smolarkiewicz, C.L. Winter, J.D.H, F. Inzoli, G. Gudon, and E. Colombo (2012), A comparison of Body-Fitted and Immersed Boundary methods for pore- scale modeling of fully saturated flow in synthetic porous media *Proceedings of the 2012 IAHR International Groundwater Symposium, Kuwait, 1-8, 2012*

C. Wang, J.D.H., A. Percus, R. Caflisch (2008), Parallel Tempering for the Traveling Salesman Problem *International Journal of Modern Physics C*

J.D.H., C.W. Gable, S.L. Painter, Automated Meshing of Stochastically Generated Discrete Fracture Networks *Under Review at Siam J. Sci. Comput.*

J.D.H. and C.L. Winter (*In Preparation*) A level thresholding method for the stochastic generation of three dimensional porous structures

J.D.H. A. Guadagnini, and C.L. Winter (*In Preparation*) Multiple Regimes in First Passage Time Distributions Produced using Pore Scale Flow Simulations

M. Siena, A. Guadagnini, M. Riva, P. Gouze, P.K. Smolarkiewicz, C.L. Winter, J. D. Hyman, F. Inzoli, G. Gudon, and E. Colombo (*In Preparation*) Comparative analysis of methods for pore-scale numerical modeling of fully-saturated flow in natural porous media

Selected Conferences and Presentations

December 2012 : Frontiers in Computational Physics : Modeling the Earth System, NCAR, Boulder, Colorado
Simulating Three Dimensional Flow in Porous Media: An Immersed Boundary Approach with P.K. Smolarkiewicz and C.L. Winter

June 2012 : 3rd International EULAG workshop, Loughborough University, Loughborough, England
Simulating Three Dimensional Flow in Porous Media with P.K. Smolarkiewicz and C.L. Winter

October 2011 : Invited Speaker : Recent Progress of Waves Processes in Nature, Univ. Arizona, Tucson, Arizona
Automated Meshing of Stochastically Generated Discrete Fracture Networks with C.W. Gable and S.L. Painter.

Employment

09/2010- Present	Research Assistant / Teaching Assistant at the University of Arizona Courses Taught: College Algebra (Spring 2012), Pre-Calculus (Spring 2013, Summer 2013) Calculus I (Fall 2013), Calculus II (Spring 2014)
05/2011-9/2011	Graduate Intern at Los Alamos National Laboratory's Computational Earth Science Group Supervisors : Dr. Scott Painter and Dr. Carl Gable
01/2008 - 09/2010	Watershed Sciences: Remote Sensing Analyst & Software Development Developing software that address the various issues arising during processing of LiDAR (Light Detection and Ranging) data. Including normalizing intensity values, identification of building footprints, and construction of ground model via statistical methods, spatial reasoning, and sensitivity analysis.
6 - 8/2006	UCLA Department of Mathematics Research experience for undergraduates Supervisor: Dr. Russ Caflisch