

CURRICULUM VITA

A. Personal

JOSEPH D. HUGHES

Hydrologist

U.S. Geological Survey, Office of Groundwater

12201 Sunrise Valley Road

411 National Center

Reston, VA 20192

jdhughes@usgs.gov

<https://profile.usgs.gov/jdhughes>

(703) 648-5805

1. Areas of Interest:

Mathematical modeling of hydraulic and hydrologic systems, with emphasis on surface-water and groundwater interactions, variably-saturated groundwater flow, groundwater flow in coastal environments, thermohaline and double-diffusive groundwater flow, and surface-water and groundwater quality. Development of numerical simulation codes to solve surface-water flow, groundwater flow, and advective-dispersive transport equations. Development and application of linear sub-space methods to solve simultaneous systems of equations. Application of statistical, geostatistical, and uncertainty quantification methods in applied hydrologic studies.

2. Degrees Received:

DEGREE	INSTITUTION	YEAR
B.S.	University of South Florida	1992
M.S.	University of Michigan	1994
Ph.D.	University of South Florida	2006

3. Numerical Codes Developed:

- [Flopy](#) – A Python package to create, run, and post-process MODFLOW-based models.
- [PCGU Solver Package](#) – An unstructured preconditioned conjugate gradient solver for MODFLOW-USG.
- [SUTRA-MS](#) – A version of SUTRA modified to simulate heat and multiple-solute transport – finite element variable-density groundwater flow and transport code.
- [SWI2 Package](#) – A MODFLOW Package used to simulate density-dependent groundwater flow and movement of the freshwater-seawater interface by means of a sharp interface approach – finite-difference correction terms added to the groundwater flow continuity equation solved by MODFLOW.
- [SWR1 Process](#) – A MODFLOW Process used to model surface-water flow with MODFLOW – unstructured finite-volume surface-water routing code.
- [SWRPre](#) – A simple preprocessor for creating SWR1 Process connectivity from an Esri polyline shapefile and a MODFLOW discretization file.
- [UPCG Solver Package](#) – A preconditioned conjugate gradient solver that includes support for parallel solution of MODFLOW on (1) multi-core CPUs using OpenMP and (2) general purpose graphical processing units (GPGPUs) using the NVIDIA CUBLAS library.

4. Programming Languages:

C, C++, C#, CUDA, Fortran, Python

B. Scientific Leadership

1. Senior Expert Experience:

- Associate Editor for [Hydrogeology Journal](#).
- Convener for the “Open-Source Tools and Software Development for the Hydrological Sciences” session at the 2014 AGU Fall Meeting, December 15-19, 2014, San Francisco, California.
- Convener for the “The Biscayne and other Eogenetic Karst Aquifers: Characterization, Modeling, and Management” session at the Geological Society of America National Meeting, November 4-7, 2012, Charlotte, North Carolina.
- Modeling lead for the Florida Water Science Center (2011). Modeling lead responsibilities included (1) chief technical consultant and advisor for the Florida Water Science Center (FLWSC) on the planning, coordination, development, and execution of surface-water and groundwater modeling investigations; (2) coordinating periodic meetings among FLWSC modelers; (3) technical review of surface-water and groundwater modeling project proposals; (4) participation in FLWSC project reviews and technical reviews of any surface-water flow, groundwater flow or transport model study; (5) suggesting colleague reviewers for surface-water flow, groundwater flow, and transport modeling reports; (6) technical reviews of FLWSC surface-water and groundwater modeling reports; and (7) advising FLWSC management on staff training required to achieve and maintain technical proficiency in surface-water and groundwater modeling.
- Chairman of peer review panel tasked with reviewing the District-Wide Regulation Model (DWRM) developed by the Southwest Florida Water Management District. The DWRM is used by Southwest Florida Water Management District staff and consultants to evaluate groundwater permit applications. Since completion of the peer review, I have been a member of the technical advisory committee that is evaluating improvements to the DWRM and recalibration efforts.
- Panel discussion member at the Regional Workshop on Saltwater Intrusion Modeling and Implications of Sea Level Rise, West Palm Beach, Florida, July 23-24, 2014.
- Technical lead for integrated surface-water/groundwater modeling in North America for DHI Water and Environment (2006-2008). Responsible for technical review of surface-water and groundwater modeling project proposals and project reports produced in North America.

2. Special Assignments:

Invited to participate in a UNESCO Groundwater Resources Assessment under the Pressures of Humanity and Climate Change (GRAPHIC) meeting in Nassau, Bahamas (March 2-4, 2009) as a U.S. Geological Survey representative to provide input on data needs for development of a density-dependent ground-water flow and transport model of the Andros aquifer capable of assessing the susceptibility of the aquifer to sea-level rise and climate changes such as increased hurricane frequency.

3. Session Chair/Moderator:

- Surface-Water - Groundwater Interaction: Salt Water Intrusion – IAH International Congress 2013, September 15-20, 2013, Perth, Australia

- Designing Groundwater Models on a Budget: Asking the Right Questions – U.S. Geological Survey National Groundwater Workshop 2012, Lakewood, Colorado, August 6-10, 2012.
- Effects of sea level rise and climate change on coastal aquifers – 21st Salt Water Intrusion Meeting, June 21-26, 2010, Ponta Delgada, Azores, Portugal.

4. Invited Seminars:

- **Hughes, J.D.**, Langevin, C.D., and Verkaik, J., 2014, Advances in Salt Water Intrusion modeling – U.S. Geological Survey: Regional Workshop on Saltwater Intrusion Modeling and Implications of Sea Level Rise, West Palm Beach, Florida, July 23-24, 2014.
- Zygnerski, M. and **Hughes, J.D.**, 2014, Broward County water resources planning and investments for climate change: Regional Workshop on Saltwater Intrusion Modeling and Implications of Sea Level Rise, West Palm Beach, Florida, July 23-24, 2014.
- **Hughes, J.D.**, White, J.T., and Sifuentes, D.F., 2014, Central and south Broward saltwater intrusion model – Ft. Lauderdale, Florida, May 22, 2014.
- **Hughes, J.D.**, 2014, Hydrology of the Everglades Agricultural Area: South Florida Water Sustainability and Climate Project – agricultural penalty function workshop, Miami Florida, March 21-22, 2014.
- **Hughes, J.D.** and White, J.T., 2013, Urban Miami-Dade County surface-water/groundwater model – application for sea-level rise evaluation: Miami, Florida, November 14, 2013.
- **Hughes, J.D.**, 2013, Urban Miami-Dade County surface-water/groundwater model – application for sea-level rise evaluation: Florida Water and Climate Alliance Workshop 10, Miami, Florida, October 30, 2013.
- **Hughes, J.D.**, and Lohmann, M.A., 2013, Urban Miami-Dade County surface-water/groundwater model: Miami, Florida, August 21, 2012.
- Bakker, M., Schaars, F., **Hughes, J.D.**, Langevin, C.D., and Dausman, A.M., The Sea Water Intrusion (SWI) Package for MODFLOW-2005: Tampa Bay Water, Clearwater, Florida, January 23, 2012.
- Decker, J.D., **Hughes, J.D.**, and Sumner, D.M., 2012, Evaluation of the potential for increased inundation in flood prone regions of south Florida in response to climate and sea-level changes for Broward County, Florida: Tampa Bay Water, Clearwater, Florida, January 23, 2012.
- **Hughes, J.D.**, White, J.T., Brakefield, L.K., Walsh, V.M., and Langevin, C.D., Simulating surface-water control structures and surface-water/groundwater interactions in Miami-Dade County, Florida using the Surface-Water Routing Process for MODFLOW-2005: Tampa Bay Water, Clearwater, Florida, January 23, 2012.
- **Hughes, J.D.**, 2011, The Sea Water Intrusion (SWI) Package for MODFLOW-2005: South Florida Hydrologic Society, Ft. Lauderdale, Florida, May 17, 2011.
- **Hughes, J.D.**, 2010, Surface water modeling for groundwater modelers: Florida International University Department of Earth and Environment, Miami, Florida, September 17, 2010.
- **Hughes, J.D.**, 2010, Saltwater intrusion in southeast Florida: South Florida Hydrologic Society, Ft. Lauderdale, Florida, May 19, 2010.
- **Hughes, J.D.** and Langevin, C.D., 2010, The Surface Water Routing Package for MODFLOW-2005: South Florida Water Management District, West Palm Beach, Florida, February 4, 2010.
- **Hughes, J.D.** and Langevin, C.D., 2009, Advances in Modeling Coastal Groundwater: USF Department of Geology Colloquium Series, Tampa, Florida, October 9, 2009.

- **Hughes, J.D.** and Langevin, C.D., 2009, FISC Hydrologic Modeling: Innovations and Applications in South Florida: Tampa Bay Water, Clearwater, Florida, July 28 2009.
- **Hughes, J.D.** and Langevin, C.D., 2009, FISC Hydrologic Modeling: Innovations and Applications in South Florida: Southwest Florida Water Management District, Clearwater, Florida, July 30 2009.
- **Hughes, J.D.**, Langevin, C.D. and Brakefield-Goswami, L., 2009, Effect of hypersaline cooling canals on aquifer salinization: Biscayne Bay Regional Restoration Coordination Team Meeting, Miami, Florida, July 10, 2009.
- **Hughes, J.D.**, and Lee, T.M., 2009, Modeling Surface-Water/Groundwater Interactions in the Charlie Creek Watershed, southwest Florida: Southwest Florida Water Management District, Brooksville, Florida, June 4, 2009.
- **Hughes J.D.**, 2009, The Use of Integrated Surface-Water/Groundwater Models in southwest and south Florida, UNESCO-IHE Lectures, Fort Lauderdale, Florida, June 9-10, 2009.
- **Hughes, J.D.**, 2008, Susceptibility of the Floridan aquifer system to saltwater intrusion from sea-level rise: American Groundwater Trust Aquifer Storage Recovery VIII Meeting, Orlando Florida, September 22-23, 2008.
- **Hughes, J.D.**, 2008, The Use of Integrated Surface-Water/Groundwater Models in Support of CERP: UNESCO-IHE Lectures, Fort Lauderdale, Florida, June 11-12, 2008.

5. Graduate Student Advising:

- Eric Stone. Professional M.S. project: Dynamic simulation of groundwater recharge in the Hillsborough River Basin using the MODFLOW-2005 Unsaturated Zone Package. Graduated 2010. Department of Geology, University of South Florida.
- William C. Hutchings. Dissertation subject: The effects of fractures on the occurrence and distribution of arsenic in the Upper Floridan aquifer during aquifer storage and recovery. Graduated 2012. Department of Geology, University of South Florida.
- Marty Solomon. Professional M.S. project: Geochemical modeling to assess the mobilization of arsenic by aquifer storage and recovery within different redox zones of the Upper Floridan aquifer. Graduated 2013. Department of Geology, University of South Florida.
- Andrew Raysin. Professional M.S. project: Capture fraction analysis of the Hillsborough River Basin. Graduated 2013. Department of Geology, University of South Florida.
- Jonathan Welker. Professional M.S. project: Hydrologic modeling to evaluate sediment accumulation and transport rates for Cedar Creek, Pinellas County, Florida. Graduated 2014. School of Geosciences, University of South Florida.
- Jeremy T. White. Dissertation subject: Accommodation of model error in hydrologic model uncertainty quantification. Graduated 2014. Department of Geosciences, University of South Florida.
- Hilary D. Flower. Dissertation subject: Phosphorous desorption and discharge in freshwater-saltwater mixing zone groundwater: potential nutrient source in the coastal Everglades wetland, Florida. Expected graduation 2015. Department of Geosciences, University of South Florida.
- Quanghee Yi. Dissertation subject: Evaluating the importance of surface-water quality on groundwater resources in southeast Florida. Expected graduation 2015. Department of Geosciences, University of South Florida.

6. Peer Reviewer:

German Research Foundation (proposals); Contaminant Hydrology; Ground Water; Hydrogeology Journal; Hydrologic Processes; Hydrology and Earth System Sciences;

Journal of Hydrology; Journal of Soil Science and Plant Nutrition; Lee County, Florida (consultant's reports); Mathematical Geosciences; Miami-Dade County Department of Environmental Resources Management (consultant's reports); the South Florida Water Management District-Interagency Modeling Center (consultant's reports); the Southwest Florida Water Management District (consultant's reports); Water Resources Research; internal reviewer for journal articles, reports, and abstracts written by U.S. Geological Survey scientists.

7. Professional Association and Registrations:

- American Geophysical Union
- International Association of Hydrogeologists
- National Ground Water Association
- South Florida Hydrologic Society
- Florida Licensed Professional Geologist (FL Reg. No. 2193)

C. Publications

1. Refereed Articles:

White, J.T., Karakhanian, A.S., Connor, C.B., Connor, L.J., **Hughes, J.D.**, Malservisi, Rocco, Wetmore, P.H., 2015, Coupling geophysical investigation with hydrothermal modeling to constrain the enthalpy classification of a potential geothermal resource: Journal of Volcanology and Geothermal Research, v. 298, 59-70, DOI: <http://dx.doi.org/10.1016/j.jvolgeores.2015.03.020>.

Hughes, J.D., Langevin, C.D., and White, J.T., 2014, MODFLOW-based coupled surface-water routing and groundwater flow simulation: Ground Water, DOI: <http://dx.doi.org/10.1111/gwat.12216>.

Schmid, Wolfgang, Hanson, R.T., Leake, S.A., **Hughes, J.D.**, and Niswonger, R.G., 2014, Feedback of land subsidence on the movement and conjunctive use of water resources: Environmental Modelling and Software, v. 62, 253-270, DOI: <http://dx.doi.org/10.1016/j.envsoft.2014.08.006>.

Swain, E.D, Decker, J.D., and **Hughes, J.D.**, 2014, Utilizing dimensional analysis with observed data to determine the significance of hydrodynamic solutions in coastal hydrology: Computational Water, Energy, and Environmental Engineering, v. 3, no. 2, 57-77, DOI: 10.4236/cweee.2014.32008.

White, J.T., Doherty, J.E., and **Hughes, J.D.**, 2014, Quantifying the predictive consequences of model error with linear subspace analysis: Water Resources Research, DOI: 10.1002/2013WR014767.

Hughes, J.D., and White, J.T., 2013, Use of general purpose graphical processing units with MODFLOW: Ground Water, DOI: 10.1111/gwat.12004.

Zhang, Jicai, Wang, Ping, and **Hughes J.D.**, 2012, EOF analysis of water level variations for microtidal and mangrove-covered Frog Creek system, West-Central Florida: Journal of Coastal Research, v. 28, no. 5, 1279-1288, DOI: 10.2112/JCOASTRES-D-11-00211.1.

Hughes, J.D., Decker, J.D., and Langevin, C.D., 2011, Use of upscaled elevation and surface roughness data in two-dimensional surface water models: Advances in Water Resources, DOI: 10.1016/j.advwatres.2011.02.004.

- Hughes, J.D.**, Langevin, C.D., and Brakefield-Goswami, L., 2010, Effect of hypersaline cooling canals on aquifer salinization: *Hydrogeology Journal*, DOI: 10.1007/s10040-009-0502-7.
- Hughes, J.D.**, Vacher, H.L., and Sanford, W.E., 2009, Temporal response of hydraulic head, temperature, and chloride concentrations to sea-level changes, Floridan aquifer system, USA: *Hydrogeology Journal*, v. 17, no. 4, DOI: 10.1007/s10040-008-0412-0.
- Hughes, J.D.**, and Liu, J., 2008, MIKE SHE: Software for Integrated Surface Water/Ground Water Modeling, *Ground Water*: v. 46, DOI: 10.1111/j.1745-6584.2008.00500.x.
- Hughes, J.D.**, Vacher, H.L., and Sanford, W.E., 2007, Three-dimensional flow in the Florida Platform: Theoretical analysis of Kohout convection at its type locality: *Geology*, v. 35, no. 7, DOI: 10.1130/G23374A.1.
- Hughes, J.D.**, Sanford, W.E., and Vacher, H.L., 2005, Numerical simulation of double-diffusive finger convection: *Water Resources Research*, v. 41, no. 1, W01019, DOI: 10.1029/2003WR002777
- Nyer, E., Mayfield, P., and **Hughes, J.D.**, 1998. Beyond the AFCEE Protocol for Natural Attenuation: *Ground Water Monitoring and Remediation*, v. 18, no. 3, 70-77.

2. USGS Reports:

- Hanson, R.T., Boyce, S.E., Schmid, Wolfgang, **Hughes, J.D.**, Mehl, S.M., Leake, S.A., Maddock, Thomas, III, and Niswonger, R.G., 2014, One-Water Hydrologic Flow Model (MODFLOW-OWHM): U.S. Geological Survey Techniques and Methods 6–A51, 120 p., <http://dx.doi.org/10.3133/tm6A51>.
- Hughes, J.D.**, and White, J.T., 2014, Hydrologic conditions in urban Miami-Dade County, Florida, and the effect of groundwater pumpage and increased sea level on canal leakage and regional groundwater flow: U.S. Geological Survey Scientific Investigations Report 2014–5162, 175 p., DOI: <http://dx.doi.org/10.3133/sir20145162>.
- Bakker, Mark, Schaars, Frans, **Hughes, J.D.**, Langevin, C.D., and Dausman, A.M., 2013, Documentation of the Seawater Intrusion (SWI2) Package for MODFLOW: U.S. Geological Survey Techniques and Methods book 6, chap. A46, 99 p.
- Panday, Sorab, Langevin, C.D., Niswonger, R.G., Ibaraki, Motomu, and **Hughes, J.D.**, 2013, MODFLOW–USG version 1: An unstructured grid version of MODFLOW for simulating groundwater flow and tightly coupled processes using a control volume finite-difference formulation: U.S. Geological Survey Techniques and Methods, book 6, chap. A45, 66 p.
- Brakefield, L., **Hughes, J.D.**, Langevin, C.D., and Chartier, K., 2013, Estimation of capture zones and drawdown at the Northwest and West Well Fields, Miami-Dade County, Florida, using an unconstrained Monte Carlo analysis: recent (2004) and proposed conditions: U.S. Geological Survey Open-File Report 2013–1086, 124 p.
- Hughes, J.D.**, Langevin, C.D., Chartier, K.L., and White, J.T., 2012, Documentation of the Surface-Water Routing (SWR1) Process for modeling surface-water flow with the U.S. Geological Survey Modular Ground-Water Model (MODFLOW–2005): U.S. Geological Survey Techniques and Methods, book 6, chap. A40 (Version 1.0), 113 p.
- Lee, T.M., Sacks, L.A., and **Hughes, J.D.**, 2010, Effect of groundwater levels and headwater wetlands on streamflow in the Charlie Creek Basin, Peace River Watershed, West-Central Florida: U.S. Geological Survey Scientific Investigations Report 2010-5189, 85 p.

Hughes, J.D. and Sanford, W.E., 2004, SUTRA-MS: A version of SUTRA modified to simulate heat and multiple-solute transport: U.S. Geological Survey Open-File Report 2004-1207, 141 p.

3. Proceedings:

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Hughes, J.D., Bakker, Mark, White, J.T., Langevin, C.D., Post, Vincent, Fienen, M.N., and Starn, J.J., 2015, FloPy Version 3 – a Python package for MODFLOW-based models: MODFLOW and More 2015: Modeling a Complex World, Golden, Colorado, May 31-June 3, 2015.

Hughes, J.D. and Langevin, C.D., 2015, Simulating multi-aquifer wells using a new object-oriented version of MODFLOW: MODFLOW and More 2015: Modeling a Complex World, Golden, Colorado, May 31-June 3, 2015.

Langevin, C.D., **Hughes, J.D.**, Panday, Sorab, Banta, E.R., and Niswonger, R.G., 2015, A new object-oriented framework for the U.S. Geological Survey's MODFLOW model: MODFLOW and More 2015: Modeling a Complex World, Golden, Colorado, May 31-June 3, 2015.

Langevin, C.D., **Hughes, J.D.**, Panday, Sorab, Banta, E.R., and Niswonger, R.G., 2015, An object-oriented framework for consolidating MODFLOW functionality: AQUA 2015 – 42nd IAH Congress – Hydrogeology: Back to the Future, Rome, Italy, September 13-18, 2015.

Panday, Sorab, Langevin, C.D., **Hughes, J.D.**, Niswonger, R.G., and Banta, E.R., 2015, The LNF model for a new object-oriented version of MODFLOW: MODFLOW and More 2015: Modeling a Complex World, Golden, Colorado, May 31-June 3, 2015.

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Hanson, R.T., Boyce, S.E., Schmid, Wolfgang, **Hughes, J.D.**, Leake, S.A., Niswonger, R.G., Traum, J.A., and Faunt, C.C., 2014, Examples and new methods for simulating the effects of climate change on conjunctive use and land subsidence: AGU Fall Meeting 2014, San Francisco, California, December 15-19, 2014.

Hughes, J.D. and Metz, P.A., 2014, Uncertainty quantification of surface-water/groundwater exchange estimates in large wetland systems using Python: AGU Fall Meeting 2014, San Francisco, California, December 15-19, 2014.

Hughes, J.D., White, J.T., and Langevin, C.D., 2014, Use of high-resolution tidal data and highly-parameterized inversion in managed coastal aquifers: Proceedings of the 23rd Salt Water Intrusion Meeting, Ponta Delgada, Husum, Germany, June 16-20, 2014.

Jurado, Jennifer, Decker, J.D., **Hughes, J.D.**, Powell, Barbara, White, J.T., and Zygnerski, Michael, 2014, Linking climate vulnerability and inundation modeling to decision-making in Broward County, Florida: 2014 AMS Annual Meeting, Atlanta, Georgia, February 2-6, 2014.

Langevin, C.D., **Hughes, J.D.**, Panday, Sorab, Banta, E.R., Niswonger, R.G., 2014, A new object-oriented MODFLOW framework for coupling multiple hydrologic models: AGU Fall Meeting 2014, San Francisco, California, December 15-19, 2014.

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Bakker, M., Post, V., **Hughes, J.D.**, Langevin, C.D., Frances, A., White, J., 2013. Enhanced FloPy scripts for constructing and running MODFLOW-based models:

- MODFLOW and More 2013: Translating Science Into Practice, Golden, Colorado, June 2-5, 2013
- Decker, J.D, and **Hughes, J.D.**, 2013, Urban Runoff (URO) process for MODFLOW 2005: Simulation of sub-grid scale urban hydrologic processes in Broward County, FL, MODFLOW and More 2013: Translating Science into Practice, Golden, Colorado, June 2-5, 2013.
- Hughes, J.D.**, 2013, Effective use of surface-water management to control saltwater intrusion: IAH International Congress 2013, Perth, Australia, September 15-20, 2013.
- Hughes, J.D.**, and White, J.T., 2013, Development of conceptual benchmark models to evaluate complex hydrologic model calibration in managed basins using Python, AGU Fall Meeting 2013, San Francisco, California, December 9-13, 2013.
- White, J.T., **Hughes, J.D.**, and Doherty, J.E., 2013, The predictive consequences of parameterization: AGU Fall Meeting 2013, San Francisco, California, December 9-13, 2013.

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- Brakefield, L.K., **Hughes, J.D.**, and Langevin, C.D., 2012, Branching between geological understanding and model process design of the Biscayne aquifer to examine effects from model uncertainty on well-field capture-zone estimates: Geological Society of America Abstracts with Programs 44(7), National Meeting, Charlotte, North Carolina, November 4-7, 2012.
- Brakefield, L.K., **Hughes, J.D.**, and Langevin, C.D., 2012, Use of a 2-D groundwater flow model in a stochastic framework to understand a complex karstic aquifer: U.S. Geological Survey National Groundwater Workshop 2012, Lakewood, Colorado, August 6-10, 2012.
- Hughes, J.D.**, White, J.T., and Lohmann, M.A., 2012, The effects of surface-water management and groundwater withdrawals on saltwater intrusion in the karst Biscayne aquifer, Miami-Dade County, Florida, USA: Geological Society of America Abstracts with Programs 44(7), National Meeting, Charlotte, North Carolina, November 4-7, 2012.
- Hughes, J.D.**, Lohmann, M.A., and White, J.T., 2012, Effective use of surface-water management to control saltwater: AGU Fall Meeting 2012, San Francisco, California, December 3-7, 2012.
- Hughes, J.D.**, and White, J.T., 2012, Fiscally frugal approaches for converting desktop computers into supercomputers: U.S. Geological Survey National Groundwater Workshop 2012, Lakewood, Colorado, August 6-10, 2012.
- Langevin, C.D., Panday, S.M, **Hughes, J.D.**, and Lien, Jyh-Ming, 2012, Modeling saltwater intrusion using adaptive mesh refinement: AGU Fall Meeting 2012, San Francisco, California, December 3-7, 2012.
- Schaars F.W, Bakker, Mark, **Hughes, J.D.**, and Langevin, C.D., 2012, The enhanced Sea Water Intrusion Package for MODFLOW 2005: Proceedings of the 22nd Salt Water Intrusion Meeting, Búzios, Brazil, June 17-22, 2012.
- White, J.T., and **Hughes, J.D.**, 2012, Using paired complex-simple models to reduce computational burden: U.S. Geological Survey National Groundwater Workshop 2012, Lakewood, Colorado, August 6-10, 2012.

White, J.T., and **Hughes, J.D.**, 2012, Quantifying simplification-induced error using subspace techniques: SIAM Conference on Uncertainty Quantification, Raleigh, North Carolina, April 2-5, 2012.

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Brakefield, L.K., Langevin, C.D., and **Hughes, J.D.**, 2011, Estimating well-field contributing areas in the presence of lakes using an unconstrained Monte-Carlo analysis: MODFLOW and More 2011, Golden, Colorado, June 5-8, 2011.

Hanson, R.T., Schmid, W., Leake, S., Mehl, S., Niswonger, R.G., **Hughes, J.D.**, and Maddock, T., 2011, Advances in conjunctive use analysis with MODFLOW-FMP: MODFLOW and More 2011, Golden, Colorado, June 5-8, 2011.

Hughes, J.D., White, J.T., and Langevin, C.D., 2011, Simulating surface-water management and surface-water/groundwater interactions using MODFLOW-2005: USGS National Surface-Water Conference and Hydroacoustics Workshop, Tampa, Florida, March 28-April 1, 2011.

Hughes, J.D., White, J.T., Brakefield-Goswami, L., Walsh, V.M., and Langevin, C.D., 2011, Simulating surface-water management and surface-water/groundwater interactions in Miami-Dade County, Florida using the Surface-Water Routing Process for MODFLOW-2005: MODFLOW and More 2011, Golden, Colorado, June 5-8, 2011.

Hughes, J.D., White, J.T., and Doherty, J.E., 2011, Use of linear prediction uncertainty analysis to guide conditioning of models simulating surface water/groundwater interactions: AGU Fall Meeting 2011, San Francisco, California, December 5-9, 2011.

Langevin, C.D., Panday, Sorab, Niswonger, R.G., **Hughes, J.D.**, and Ibaraki, Motomu, 2011, Evaluation of mesh alternatives for an unstructured grid version of MODFLOW: MODFLOW and More 2011, Golden, Colorado, June 5-8, 2011.

Lee, T.M., and **Hughes, J.D.**, 2011, Modeling the effects of headwater wetlands and groundwater interactions on stream flow from a central Florida basin: USGS National Surface-Water Conference and Hydroacoustics Workshop, Tampa, Florida, March 28-April 1, 2011.

Schaars, F.W., Bakker, M., **Hughes, J.D.**, Dausman, A.M., Langevin, C.D., 2011, Modeling regional seawater intrusion with MODFLOW-2005 and the SWI package: MODFLOW and More 2011, Golden, Colorado, June 5-8, 2011.

White, J.T., **Hughes, J.D.**, and Doherty, J.E., 2011, Using a paired simple-complex model approach to quantify predictive bias in variable density groundwater modeling: AGU Fall Meeting 2011, San Francisco, California, December 5-9, 2011.

White, J.T., and **Hughes, J.D.**, 2011, An unstructured GPGPU preconditioned conjugate gradient solver for MODFLOW 2005: MODFLOW and More 2011, Golden, Colorado, June 5-8, 2011.

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Hughes, J.D., Langevin, C.D., and White, J.T., 2010, Use of time series and harmonic constituents of tidal propagation to enhance estimation of coastal aquifer heterogeneity: Proceedings of the 21st Salt Water Intrusion Meeting, Ponta Delgada, Azores, Portugal, June 21-26, 2010.

Hughes, J.D., Decker, J.D., and Jawitz, J.W., 2010, Upscaling topographic and hydraulic resistance data in a two-dimensional hydrodynamic model of the Everglades ridge and

slough landscape: AGU Fall Meeting 2010, San Francisco, California, December 13-17, 2010.

Langevin, C.D., Zygnerski, M.R., White, J.T., and **Hughes, J.D.**, 2010, Effect of sea-level rise on future coastal groundwater resources in southern Florida, USA: Proceedings of the 21st Salt Water Intrusion Meeting, Ponta Delgada, Azores, Portugal, June 21-26, 2010.

Swain, E., Decker, J.D., and **Hughes, J.D.**, 2010, Determining the implications of Hydrodynamic Formulations with Field Measurements: AGU Fall Meeting 2010, San Francisco, California, December 13-17, 2010.

White, J.T. and **Hughes, J.D.**, 2010, On the inclusion of surface water observations into the ground water model calibration process: AGU Fall Meeting 2010, San Francisco, California, December 13-17, 2010.

White, J.T., Langevin, C.D., and **Hughes, J.D.**, 2010, Evaluating the effect of Tikhonov regularization schemes on predictions in a variable-density groundwater model: Proceedings of the 21st Salt Water Intrusion Meeting, Ponta Delgada, Azores, Portugal, June 21-26, 2010.

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Langevin, C.D. and **Hughes, J.D.**, 2009, Effect of numerical dispersion on calibration of a highly parameterized saltwater intrusion model: Proceedings of the 2009 PEST Conference, Potomac, Maryland, November 2-4, 2009.

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Hughes J.D., Swain, E.D., Brakefield-Goswami, L., Langevin, C.D., and Niswonger, R.G., 2008 – Dynamic simulation of canal stages and surface-water structure operations in SEAWAT to evaluate conjunctive water use in Miami-Dade County: Florida Integrated Science Center Meeting, Orlando, Florida, November 22-23, 2008.

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Loinaz, M., Nath, A., **Hughes, J.D.**, and Hosseinipour, E.Z., 2006, Application of integrated surface-groundwater model for large scale wetland restoration: Proceedings of the AWRA 2006 Annual Water Resources Conference, Baltimore, Maryland, November 6-9, 2006.

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Hughes, J.D., and Wilkinson, B.H., 1993, On the use of textural criteria in evaluating the importance of diagenetic processes in carbonates: Geological Society of America Abstracts with Programs 25(6), National Meeting, Boston, Massachusetts, October 25-28, 1993.

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Hughes, J.D., Allmon, W.D., and Kohn, A.J., 1992, Ecology of Conid gastropod communities in the Pliocene Pinecrest Beds, Southwest Florida: Geological Society of America Abstracts with Programs 24(2), Southeastern Section Meeting, Winston-Salem, North Carolina, March 18-20, 1992.

4. Graduate Work:

Hughes, J.D., 2006, Salinity- and temperature-dependent groundwater flow in the Floridan aquifer system of South Florida: Ph.D. Dissertation, University of South Florida.

Hughes J.D., 1994. Timing and progression of diagenetic alteration in the Oligocene Suwannee Limestone, west-central Florida: Implications for rates of calcitic carbonate diagenesis: Master's Thesis, The University of Michigan.

5. Unpublished Reports:

Hughes J.D., Stewart, M.T., Tara, P., 2009, Technical Peer Review – District Wide Regulation Model, Version 2 Southwest Florida Water Management District: report prepared for the Southwest Florida Water Management District, 60 p.

Earth Tech and DHI Water and Environment, 2007, Kissimmee Basin Modeling and Operations Study KBMOS AFET Model Documentation / Calibration Report: prepared for the South Florida Water Management District, 317 p. plus appendix.

Parsons Water and Infrastructure, DHI Water and Environment, and ADA Engineering, 2007, PSRP H&H Modeling - Phase 2: Deliverable 2.4.1 –Technical Memorandum: Model Calibration: prepared for the South Florida Water Management District, 82 p. plus appendix.

SDI Environmental Services, BPC Group, and DHI Water and Environment, 2007, Southwest Florida Feasibility Study Integrated Hydrologic Model: Model Documentation Report: prepared for the South Florida Water Management District, 117 p. plus appendices (4).

- DHI Water and Environment, 2006, BDR Technical Appendix: Water Quantity and Water Quality Report, Napa County, CA: prepared for Napa County, California, 90 p. plus appendices (5).
- Earth Tech and DHI Water and Environment, 2006, Kissimmee Basin Modeling and Operations Study, Phase II, Alternate Formulation and Evaluation Tool Development – Acceptance Test Plan: prepared for the South Florida Water Management District, 89 p.
- HydroGeoLogic, 2006, Development of a Density-Dependent Saltwater Intrusion Model for the Lower East Coast Project Area: prepared for the South Florida Water Management District, 166 p. plus appendices (3).
- HydroGeoLogic, DHI Water and Environment, and Applied Technology and Management, 2006, Hydrologic-Hydraulic and Environmental Assessment for the Camp Keais Flowway: prepared for the South Florida Water Management District – Big Cypress Basin Field Office, 94 p. plus appendix.
- Parsons Water and Infrastructure, DHI Water and Environment, and ADA Engineering, 2006, PSRP H&H Modeling - Phase 1: Deliverable 3.3.5.2 – Final Technical Memorandum – Model Documentation: prepared for the South Florida Water Management District, 97 p.
- Camp Dresser and McKee and DHI Water and Environment, 2005, Tiger Bay/Bennett Swamp Integrated Groundwater/Surface Water Model – Phase 3: prepared for the St. Johns River Water Management District, 181 p. plus appendix.
- DHI Water and Environment and Camp Dresser and McKee, 2005, Task 4.2 South Area Drainage Assessment MIKE SHE Model Report: Broward County, Florida: prepared for Broward County, 173 p.
- DHI Water and Environment, 2004, Big Cypress Basin Integrated Surface/Ground Water Model Development and Calibration Report: prepared for the South Florida Water Management District, 70 p. plus appendices (3).
- HydroGeoLogic and DHI Water and Environment, 2004, Conceptual Hydrogeologic Model for the Northern District Water Resources Assessment Project Area: prepared for the Southwest Florida Water Management District, 73 p.
- Kimley-Horn and Associated and DHI Water and Environment, 2004, Everglades Agricultural Area Storage Reservoirs – Phase 1: B.2 Hydraulics, B.2.3 Hydrologic Model Calibration and Verification: prepared for the South Florida Water Management District and the United States Army Corps of Engineers, 115 p. with attachments (2).
- Camp Dresser and McKee and DHI Water and Environment, 2002, Tiger Bay/Bennett Swamp Integrated Groundwater and Surface Water Model Numerical Model Development & Calibration Report: prepared for the St. Johns River Water Management District, 147 p. plus appendix.
- DHI Water and Environment, 2002, Fanno Creek Watershed Model: consultant’s report prepared for the Portland Bureau of Environmental Services, 73 p. plus appendix.
- DHI Water and Environment, 2002, Tidal Caloosahatchee Basin Model, Model Calibration and Validation: prepared for the South Florida Water Management District, 92 p. plus appendices (4).
- SDI Environmental Services, 2001, Mass transport model simulation of the City of Clearwater well field: prepared for the City of Clearwater, 93 p. plus appendices (2).

Berryman and Henigar and SDI Environmental, 2000, Phase 1 Mitigation Plan - Candidate Sites Evaluation Study: prepared for the Tampa Bay Water Authority.

SDI Environmental Services, 1999, Update to Integrated Hydrologic Model of Central Northern Tampa Bay Area: ISGW/CNTB Model Run No. 121: prepared for the Tampa Bay Water Authority, 87 p. plus appendices.

SDI Environmental Services, 1999, Water Resource Evaluation and Cone Ranch Integrated Hydrologic Model: prepared for the Tampa Bay Water Authority, 92 p. plus appendices.

D. Teaching

- Instructor for five-day training class titled “Python Programming Language and Groundwater Modeling”, Portland, Oregon, February 2015.
- Instructor for a five-day advanced MODFLOW groundwater class – sessions on (1) the Surface-Water Routing (SWR1) Process for MODFLOW, (2) the Saltwater Intrusion (SWI2) Package for MODFLOW, and (3) an overview of MODFLOW-2015 (with Christian Langevin and Ned Banta), Lakewood, Colorado, November 2014.
- Instructor for five-day training class titled “Python Programming Language and Groundwater Modeling”, Tucson Arizona, May 2014
- Instructor for a two-day training class titled “Four new generation MODFLOW processes relevant to Australia”, IAH International Congress 2013, Perth, Australia, September 2013.
- Instructor for a one-day training class titled “Using Python to Improve Groundwater Modeling Effectiveness”, U.S. Geological Survey National Groundwater Workshop 2012, Lakewood, Colorado, August 2012.
- Instructor for a one-day training class titled “Recent MODFLOW Developments” – sessions on the use of the Surface-Water Routing (SWR1) Process for MODFLOW-2005 and the Sea Water Intrusion (SWI2) Package for MODFLOW-2005, U.S. Geological Survey National Groundwater Workshop 2012, Lakewood, Colorado, August 2012.
- Instructor for a five-day advanced MODFLOW groundwater class – session on the use of the Surface-Water Routing (SWR1) Process for MODFLOW-2005, Lakewood, Colorado, November 2010.
- Instructor for a five-day density-dependent groundwater class using SEAWAT, Ponta Delgada, Azores, Portugal, June 2010
- Instructor for a three-day integrated surface-water/ground-water class using MIKE SHE, Tampa, Florida, April 2008
- Instructor for a three-day integrated surface-water/ground-water class using MIKE SHE, Cambridge, Ontario, October 2007
- Instructor for a three-day integrated surface-water/ground-water class using MIKE SHE, Golder and Associates, Calgary, Alberta, August 2007
- Lead instructor for three-day integrated surface-water/ground-water class using MIKE SHE, Earth Tech, Miami, Florida, August 2006
- Lead instructor for a three-day integrated surface-water/ground-water class using MIKE SHE, Interagency Modeling Center, South Florida Water Management District, December 2006
- Instructor for a three-day advanced integrated surface-water/ground-water class using MIKE SHE, City of Portland Bureau of Environmental Services, Portland, Oregon, November 2005
- Instructor for a four-day integrated surface-water/ground-water class using MIKE SHE, U.S. Bureau of Reclamation, Sacramento, California, April 2004

- Assistant Instructor for an informal three-day integrated surface-water/ground-water class using MIKE SHE, Tampa, Florida, April 2003
- Instructor for a five-day integrated surface-water/ground-water class using MIKE SHE, St. Johns River Water Management District, Palatka, Florida, November 2002
- Instructor for a five-day integrated surface-water/ground-water class using MIKE SHE, South Florida Water Management District, West Palm Beach, Florida, October 2002
- Instructor for a one-day integrated surface-water/ground-water class using MIKE SHE, U.S. Army Corps of Engineers, Jacksonville, Florida, June 2002
- Instructor for a five-day integrated surface-water/ground-water class using ISGW (explicit coupling of HSPF and MODFLOW), Waterstone Environmental Engineering & Hydrology, Inc., Boulder, Colorado, August 2001
- University of Michigan, Geological Sciences Department, Ann Arbor, Michigan, 1993 Fall Semester, Physical Geology.