

Dr. Norman L. Jones

Curriculum Vita



- Address** 242 Clyde Building
Brigham Young University
Provo, Utah
801-422-7569
njones@byu.edu
- Position** Assistant Professor (91 - 96)
Associate Professor (97 - 02)
Professor (02 – present)
[Dept. of Civil and Environmental Engineering](#)
[Brigham Young University](#)
- 1998–present
Director
[Environmental Modeling Research Laboratory](#)
- Education** **B.S., April 1986**
[Brigham Young University](#)
Major: Civil Engineering
Outstanding Civil Engineering Graduate
Convocation Speaker for College
Summa Cum Laude.
- M.S., May 1988**
[University of Texas at Austin](#)
University Fellowship Recipient
Major: Geotechnical Engineering
Thesis: Applications of Computer-Aided Design Techniques for Site Characterization in Civil Engineering
- Ph.D., Dec. 1990**
[University of Texas at Austin](#)
University Fellowship Recipient
Major: Geotechnical Engineering
Dissertation: Solid Modeling of Earth Masses for Applications in Geotechnical Engineering
- Awards** **2001 Walter L. Huber Civil Engineering Research Prize**
The [American Society of Civil Engineers](#) awards this prize annually to four outstanding researchers age 40 or younger.
- 2002 College of Engineering & Technology Special Commendation Award**
In recognition of my efforts in successfully guiding our department through the ABET re-accreditation process as the Undergraduate Coordinator.

2003 Brigham Young University Technology Transfer Award

Awarded for many years of success in technology transfer. Co-recipient with Jim Nelson and Alan Zundel. At the time of the award, our software was the most successful tech transfer project in BYU history.

2007 Utah Engineering Educator of the Year

Awarded by the Utah Chapter of the [American Council of Engineering Companies](#).

Teaching**University Courses**

I have taught the following courses:

[CE En 270 – Computer Methods in Civil Engineering](#)

CE En 341 – Elementary Soil Mechanics

[CE En 540 – Geo-Environmental Engineering](#)

[CE EN 544 - Seepage and Slope Stability Analysis](#)

[CE En 547 – Ground Water Modeling](#)

CE En 641 – Advanced Soil Mechanics

Dept./College Committees

I have served on numerous faculty committees at the department and college level. I served as the undergraduate coordinator for our department from 2000-2006. As the undergraduate coordinator, I was the chair of the undergraduate committee. This committee has responsibility for all undergraduate curriculum and scholarships issues in the department. I was also responsible for preparing our department for our ABET accreditation visit in the fall of 2002. During this visit, we were evaluated under the new ABET 2000 guidelines and passed easily. These guidelines represent a substantial departure from past accreditation practice. Accordingly, I was in charge of reformulating our department objectives and designing an assessment strategy that is in harmony with the new ABET 2000 approach. I established an automated strategy for archiving our assessment data and I prepared the self-study document that was sent to ABET in the spring of 2002. I served for three years as the chair of the Faculty Development committee and on the College Building Committee. I am now a member of the college advancement in rank committee.

Prof. Societies/ Committees

American Geophysical Union

National Ground Water Association

NGWA Groundwater Modeling Interest Group Committee

American Society of Civil Engineers

EWRI Groundwater Management Committee

International Editorial Board for the Journal of HydroInformatics

Editor of AQUAmundi Journal

Research Laboratory Director

I am currently the director of the Environmental Modeling Research Laboratory (EMRL). The EMRL consists of three faculty, (Jim Nelson, Alan Zundel, and myself), eight full-time research associates, and over 35 graduate and undergraduate students. The mission of the EMRL is to provide a collaborative research environment where members can pursue cutting-edge research in groundwater, surface water, and watershed modeling. The EMRL is funded through a combination of external research grants and royalties from off-campus sales of modeling software developed at the EMRL (GMS, SMS, and WMS). The annual operating budget for the EMRL is \$1,500,000. The primary sponsor of EMRL research are the U.S. Army Engineer Research and Development Center in Vicksburg, Mississippi. Other sponsors include the Federal Highway Administration, the Department of Energy, and the Environmental Protection Agency. The EMRL funds numerous graduate students (including three Ph.D. students) and involves a large number of undergraduate students in research projects.

Software

Through my research, I have directed the development of a computer program called the "Department of Defense Groundwater Modeling System" (GMS). GMS is a state-of-the-art three-dimensional environment for ground water model construction and visualization. It includes tools for site characterization including geostatistics and solid modeling of soil stratigraphy. It also includes interfaces to a large number of ground water models including MODFLOW, MODPATH, MT3DMS, SEAM3D, RT3D, UTCHEM, FEMWATER, NUFT, SEEP2D, FACT, and ADH. GMS has been designed using a conceptual model approach where model input is created in a grid independent fashion using GIS vector objects. The model discretization is then performed automatically. It also contains state-of-the-art tools for visualization of 3D model results. GMS is the most comprehensive and sophisticated groundwater modeling software available and is used by over 6000 organizations in over 90 countries.

Seminars/Short Courses I have taught approximately fifty seminars and short courses at various locations in the United States and internationally (China, Korea, Australia, Germany). The course topics have included beginning and advanced ground water modeling, and computer simulation of natural attenuation and bio-remediation. The courses are sponsored by National Ground Water Association and Environmental Modeling Systems, Inc.

Technical Exchange Program At the invitation of the university president, Merrill Bateman, the EMRL launched the *BYU-China Water Resources Technical Exchange Program* in the spring of 2001. This three-year program involves a series of seminars, hosting visiting professors, and providing EMRL software at a substantial discount. Our first seminar was held in May of 2001 at Beijing Normal University. Over sixty high-level engineers and researchers from all over China attended the seminar. Keynote addresses for the seminar were made by representatives of the U.S. Embassy and the Chinese Water Ministry. The main focus of the four-day seminar was to train the Chinese attendees how to use EMRL software to help solve some of China's pressing water resource management problems. As the director of the EMRL, I was heavily involved in developing the seminar and I also taught the classes in the seminar related to ground water modeling.

External Research Grants

1. Automated Mesh Generation For the TABS-2 System, \$19,000, 2/90 - 11/90, U.S. Army Engineer Waterways Experiment Station
2. A Geometry Pre-Processor for HEC-1 Employing Triangulated Irregular Networks, \$20,048, 3/91 - 10/91, U.S. Army Engineer Waterways Experiment Station
3. Real-Time Visualization for the TABS-2 Modelling System, \$14,123, 4/91 - 8/91, U.S. Army Engineer Waterways Experiment Station
4. An Investigation of X-Windows Interface Tools, \$49,556, 1/92 - 8/92, U.S. Army Engineer Waterways Experiment Station
5. Descriptive Geometry and Solid Rendering, \$24,000, 1/92 - 10/92, U.S. Army Engineer Waterways Experiment Station
6. An Investigation of Automated Pre-processing Schemes for TIN-Based Drainage Analysis, \$34,750, 4/92-10/92, U.S. Army Engineer Waterways Experiment Station
7. A Comprehensive Graphical User Environment for Groundwater Flow and Transport Modeling, \$246,526, 6/93-9/94, U.S. Army Engineer Waterways Experiment Station
8. An Integrated Surface Flow Modeling System, \$131,848, 1/94-1/95, U.S. Army Engineer Waterways Experiment Station
9. Productivity and Management Tools for Groundwater Flow and Transport Modeling, \$207,404, 5/94-4/95, U.S. Army Engineer Waterways Experiment Station
10. Enhanced Tools for Quality Control in Automated Groundwater Transport Modeling, \$246,553, 1/95-12/95, U.S. Army Engineer Waterways Experiment Station
11. Visualization for Two-Dimensional Surface Runoff Modeling, \$98,221, 1/95-10/95, U.S. Army Engineer Waterways Experiment Station
12. Visualization Tools for Two-Dimensional Finite Element Hydrologic Modeling, \$93,933, 11/95 -10/96, U.S. Army Engineer Waterways Experiment Station
13. A Graphical Environment for Multi-Dimensional Surface Water Modeling, \$49,789, 3/96-9/96, U.S. Army Engineer Waterways Experiment Station
14. A Conceptual Modeling Approach to Pre-processing of Groundwater Models, \$475,743, 11/95-11/97, U.S. Army Engineer Waterways Experiment Station
15. Hydrosystems Modeling, \$2,458,083, 5/97-4/02, U.S. Army Engineer Waterways Experiment Station
16. Second Generation Hydroinformatics Research, \$4,958,127. U.S. Army Engineer Research and Development Center.
17. Flux Calculations and 3D Visualization for the SCAPS Piezocone and GeoViz System, \$34,931, U.S. Navy.
18. Development of modeling methods and tools for predicting coupled reactive transport processes in porous media under multiple scales. \$949,000. US Dept. of Energy. 1/07-12/09.

Summary: PI or Co-PI on 18 projects totaling \$10,111,635.

Peer-Reviewed Publications

1. Jones, Norman L., Stephen G. Wright, and David R. Maidment, "Watershed delineation with triangle-based terrain models," *ASCE Journal of Hydraulic Engineering*, October, 1990, pp. 1232-1251.
2. Jones, Norman L. and Stephen G. Wright, "Algorithm for smoothing triangulated surfaces," *ASCE Journal of Computing in Civil Engineering*, January, 1991, pp. 85-102.
3. Jones, Norman L. and Stephen G. Wright, "Solid modeling for site representation in geotechnical engineering," *Geotechnical Engineering Congress*, June, 1991, pp. 1021-1031.

4. Richards, D.R., Norman L. Jones, H. C. Lin, "Graphical innovations in surface water flow analysis," *First International Conference on Integrating Geographic Information Systems and Environmental Modelling*, Sept. 15-19, 1991, Boulder, Colorado.
5. Jones, Norman L. and D.R. Richards, "Mesh generation for estuarine flow modelling," *ASCE Journal of Waterway, Port, and Coastal Engineering*, Vol. 118, No. 6, November/December, 1992, pp. 599-614.
6. Jones, Norman L. and Stephen G. Wright, "Subsurface characterization with solid models," *ASCE Geotechnical Engineering Journal*, Vol. 119, No. 11, November, 1993, pp. 1823-1839.
7. Nelson, James, Norman L. Jones, and A. Woodruff Miller, "Integrated hydrologic simulation with TINs," *Advances in Hydroscience and Engineering*, Volume 1, Sam S.Y. Wang, Ed., Proceedings of the First International Conference on Hydro-Science and Engineering, Washington, D.C., June 7-11, 1993, pp.571-578.
8. Jones, Norman L., and Takafumi Saito, "Flow animation techniques for two-dimensional hydrodynamic modeling," *Advances in Hydroscience and Engineering*, Volume 1, Sam S.Y. Wang, Ed., Proceedings of the First International Conference on Hydro-Science and Engineering, Washington, D.C., June 7-11, 1993, pp. 2091-2096.
9. Jones, Norman L., and E. J. Nelson, "Construction of TINs from borehole data," *Advances in Site Characterization: Data Acquisition, Data Management, and Data Interpretation*, ASCE Geotechnical Publication No. 37, 1993, pp. 13-26.
10. Nelson, J. E., Norman L. Jones, and A. Woodruff Miller, "An algorithm for precise drainage basin delineation," *ASCE Journal of Hydraulic Engineering*, Vol. 120, No. 3, March, 1994, pp. 298-312.
11. Jones, Norman L., and D. R. Richards, "A comprehensive modeling environment," *Proceedings of the First International Conference on HYDROINFORMATICS*, Delft, the Netherlands, Sept. 19-23, 1994, pp. 317-322.
12. Nelson, E. J., and Norman L. Jones, "Reducing roundoff error in digital elevation data," *Journal of Hydrology*, Vol. 169, 1995, pp. 37-49.
13. Jones, Norman L., S. J. Owen, and E. C. Perry, "Plume characterization with natural neighbor interpolation," *GEOENVIRONMENT 2000*, ASCE Geotechnical Special Publication No 46, 1995, pp. 331-345.
14. James Nelson, A. Woodruff Miller, and Norman L. Jones, "A TIN based watershed delineation technique for both rural and urban runoff," *Water in the 21st Century: Conservation, Demand, and Supply*, American Water Resources Association, Salt Lake City, Utah, April 1995, pp. 643-652.
15. Owen, Steven J., Norman L. Jones, and Jeffrey P. Holland, "A comprehensive modeling environment for the simulation of groundwater flow and transport," *Engineering With Computers*, Dec., 1996, pp. 235-242.
16. Jones, Norman L., and R. J. Davis, "Three-Dimensional Characterization of Contaminant Plumes," 1996 Meeting of the Transportation Research Board, Washington, D.C., January 7-11, 1996.
17. Alan K. Zundel, and Norman L. Jones, "An integrated surface water modeling system," *Proceedings of the Second International Conference on HYDROINFORMATICS*, Zurich, Switzerland, Sept. 9-13, 1996.
18. Norman L. Jones, and David R. Richards, "A conceptual model approach to hydroinformatics," *Proceedings of the Second International Conference on HYDROINFORMATICS*, Zurich, Switzerland, Sept. 9-13, 1996.
19. David R. Richards, and Norman L. Jones, "A blueprint for hydroinformatic design of US Army hydrologic models," *Proceedings of the Second International Conference on HYDROINFORMATICS*, Zurich, Switzerland, Sept. 9-13, 1996.
20. Jones, Norman L., E.V. Edris, Jr., and M.J. Kennard, "Three-dimensional characterization of contaminant plumes using cone penetrometer data," *Proceedings of the Second International Conference on Environmental Geotechnics*, IS-Osaka '96, Nov. 5-8, 1996, Osaka, Japan.
21. Staten, Matthew L., and Norman L. Jones, "Local Refinement of Three-Dimensional Finite Element Meshes," *Engineering With Computers*, 1997, Vol. 13, pp. 165-174.
22. Jones, Norman L., E.V. Edris, Jr., "Calibration tools for hydroinformatics systems," *Proceedings of the Third International Conference on HYDROINFORMATICS*, Copenhagen, Denmark, Aug. 24-26, 1998.
23. Zundel, A.K., Demirbilek, Z., Fugal, A.L., N.L. Jones, "Automatic definition of two-dimensional finite element coastal models," *Proceedings of the Third International Conference on HYDROINFORMATICS*, Copenhagen, Denmark, Aug. 24-26, 1998.
24. Nelson, E.J., N.L. Jones, R.J. Berrett, "Adaptive tessellation method for creating TINs from GIS data," *ASCE Journal of Hydrologic Engineering*, Vol. 4, No. 1, January, 1999.
25. Jones, Norman L., A.M. Lemon, C. Talbot, "Integrating GIS Data with 3D Finite Element Groundwater Models," *Proceedings of the International Symposium 2000 on Groundwater IAHR*, Saitama, Japan, May 8-10, 2000.

26. Jones, Norman L., Michael J. Kennard, Alan K. Zundel, "Fast algorithm for generating sorted contour strings," *Computers and Geosciences*, Vol. 26, pp. 831-837, 2000.
27. Jones, Norman L., E. James Nelson and Colby T. Manwaring, "Managing temporal data in a comprehensive modeling environment," *Journal of Hydroinformatics*, Vol. 2, No. 2, pp. 105-112, 2000.
28. Jones, Norman L., Alan M. Lemon, and Fred T. Tracy, "A hybrid approach to flow net generation," *International Journal of Numerical and Analytical Methods in Geomechanics*, Vol. 25, pp. 1339-1349, Sept. 2001.
29. Jones, Norman L., Trevor J. Budge, Alan K. Zundel, Alan M. Lemon, "Generating MODFLOW grids from boundary-representation solid models," *Ground Water*, Vol. 40, No. 2, March-April 2002, pp. 194-200.
30. Jones, Norman L., R.J. Davis, W. Sabbah, "A comparison of 3D interpolation techniques for plume characterization," *Ground Water*, Vol. 41, No. 4, July-August 2003, pp. 411-419.
31. Lemon, A.M., N.L. Jones, "Building solid models from boreholes and user-defined cross-sections," *Computers and Geosciences*, Vol. 29, No. 5, June, 2003, pp 547-555.
32. Jones, N.L., 2002, "Using transition probability geostatistics with MODFLOW," *Calibration and Reliability in Groundwater Modelling: A Few Steps Closer to Reality* (Proceedings of ModelCARE'2002, Prague, Czech Republic, 17-20 June 2002). IAHS Publ. no. 277, pp. 359-364.
33. Jones, N.L., J.I. Green, and J.R. Walker, "Stochastic inverse modeling for capture zone analysis," *Groundwater Quality Modeling and Management Under Uncertainty*, Proceedings of the Symposium, EWRI Congress, June 23-26, 2003, Philadelphia, Pa., Srikanta Mishra, Ed., American Society of Civil Engineers, pp. 1-12.
34. Jones, Norman L., J.R. Walker, & S.F. Carle, "Hydrogeologic unit flow characterization using transition probability geostatistics," *Ground Water*, Vol. 43, No. 2, Mar-Apr 2005, pp. 285-289.
35. Wallace, R.M., A. Byrd, C. Butler, N. Jones, R. Jones, "Generic Model Data Format", *Proceedings of the European Simulation Interoperability Workshop 2005*, Toulouse France. June. (document # 05E-SIW-046).
36. Jones, Norman L., T.P. Clement, C.H. Hansen, "A Three-Dimensional Analytical Modeling System for Risk Assessment at Chlorinated Solvent Sites," *Ground Water*, Vol. 44, No. 5, July-August 2006, pp. 613-617.
37. R. Wallace, K. Pathak, J. P. Holland, D. Stuart, C. Butler, D. R. Richards, M. Fife, N. L. Jones and J. Harris, "Information infrastructure for integrated ecohydraulic and water resources modeling and assessment", *Journal of Hydroinformatics*, Vol. 8, No. 4, 2006, pp 317-333.
38. Strassberg G., D.R. Maidment, N.L. Jones, "A geographic data model for representing ground water systems," *Ground Water*, Vol. 45, No. 4, July-August 2007, pp. 515-518.
39. Jones N.L., and G. Strassberg, "The Arc Hydro MODFLOW data model", *Water Resources Impact*, Vol. 10, Num 1, January 2008, pp. 17-19.
40. Williams, G, N. Jones, T. Winkel, A. Mayo, 2008, "Field description and multi-phase modeling of a naturally occurring inverted density groundwater interface," *Proceedings of the American Society of Civil Engineers (ASCE) Environmental and Water Resources Institute*, May 2008, Honolulu, HI.
41. Williams, G, N. Jones, T. Winkel, A. Mayo, 2008, "Field measurements and an osmotic conceptual model of a steady-state groundwater pressure ridge," *Proceedings of the American Society of Civil Engineers (ASCE) Environmental and Water Resources Institute*, May 2008, Honolulu, HI.
42. Jones N.L., J.R. Handy, R.M. Wallace, "Levee Analyst: A GIS-based levee modeling and management system," *Proceedings of the Association of State Dam Safety Officials Annual Conference 2008*, September 7-11, Indian Wells, California.
43. Gustavious P. Williams, Norman Jones, and Jeffrey Handy, "A Heuristic Algorithm for Optimal Alignment and Matching of Borehole Stratigraphy", *Proceedings of the ASCE Environmental and Water Resources Institute 2008 Conference*, Kansas City, Kansas, May 2009.
44. Jones, N., Lemon, A, Patton, R., "Automated well permitting in a coastal region using SEAWAT and ArcGIS", *SWIM21 - 21st Salt Water Intrusion Meeting*, Azores, Portugal, June 21-26, 2010, pp. 187-190.
45. Strassberg, G., Jones, N., "Arc Hydro Groundwater Data Model and Tools: Overview and Use Cases," *AQUA mundi*, Vol. 1, No. 2, December 2010, pp. 101-114.
46. Jones, N., Wallace, R., Jones, R., Butler, C., Zundel, A. "Efficient Application Programming Interface for Multi-Dimensional Modeling Data", *Journal of Hydroinformatics*, 2011 (in press).
47. Whiteaker, T., N. Jones, G. Strassberg, A. Lemon, D. Gallup, "GIS-based Data Model and Tools for Creating and Managing Two-Dimensional Cross Sections," *Computers and Geosciences*, 2011 (in press).

**Books
Manuals
Reports**

1. Jones, N.L., *FastTABS Reference Manual*, Engineering Computer Graphics Laboratory, Brigham Young University, 1992. 150 pp.
2. Jones, N.L., *FastTABS Tutorials*, Engineering Computer Graphics Laboratory, Brigham Young University, 1992. 85 pp.
3. Jones, N.L., D.R. Richards, *RMA-2 Primer*. , U.S. Army Engineer Waterways Experiment Station, 1993. 165 pp.
4. Jones, N.L., *GMS v1.0 Reference Manual*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 1994, 300 pp.
5. Jones, N.L., *GMS v1.0 Tutorials*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 1994, 175 pp.
6. Jones, N.L., *GMS v2.0 Reference Manual*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 1996, 350 pp.
7. Jones, N.L., *GMS v2.0 Tutorials*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 1996, 200 pp.
8. Jones, N.L., *GMS v2.1 Reference Manual*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 1997, 425 pp.
9. Jones, N.L., *GMS v2.1 Tutorials*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 1997, 230 pp.
10. Lin, Richards, Talbot, Yeh, Cheng, Cheng, Jones, *FEMWATER (version 2.0) : A Three-Dimensional Finite Element Computer Model for Simulating Density-Dependent Flow and Transport in Variably Saturated Media*. Technical Report CHL-97-12, U.S. Army Engineer Waterways Experiment Station, July 1997, 151 pp.
11. Jones, N.L., *GMS v3.0 Reference Manual*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 1999, 584 pp.
12. Jones, N.L., *GMS v3.0 Tutorials*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 1999, 261 pp.
13. *Jones, N.L., *GMS v3.0 File Formats*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 1999, 94 pp.
14. *T.P. Clement, and N.L.Jones, *RT3D Tutorials for GMS v3.0 Users*, Battelle Pacific Northwest National Lab, Hanford, Washington, 1998, 99 pp.
15. Jones, N.L., *SEEP2D Primer*. Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 1999, 94 pp.
16. Richards, Lin, Cheng, Talbot, Jones, *Development of a multidimensional hydroinformatic system for simulating canal, overland, and groundwater flow in South Florida*, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi, 2000, 350 pp.
17. Jones, N.L., *GMS v3.1 HTML Help Document*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 2000.
18. Jones, N.L., *GMS v3.1 Tutorials*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 2000, 313 pp.
19. T.P. Clement, and N.L.Jones, *RT3D Tutorials for GMS v3.1 Users*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 2000, 97 pp.
20. N.L. Jones, *Ground Water Modeling with GMS Training Manual, EMS-I*, Provo, Utah, 2000.
21. N.L. Jones, *Advance Ground Water Modeling with GMS Training Manual, EMS-I*, Provo, Utah, 2000.
22. Lin, Richards, Talbot, Yeh, Cheng, Cheng, Jones, *FEMWATER: A Three-Dimensional Finite Element Computer Model for Simulating Density-Dependent Flow and Transport in Variably Saturated Media, Version 3.0*. Technical Report CHL-01-??, U.S. Army Engineer Waterways Experiment Station, 2001, 153 pp.
23. EMRL, *Groundwater Modeling System (GMS) version 4.0 Help File*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 2002.
24. EMRL, *Groundwater Modeling System (GMS) version 4.0 Tutorial Documents, Volumes 1-4*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 2002.
25. EMRL, *Groundwater Modeling System (GMS) version 4.0 Tutorial Documents, Volumes 1-4*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 2002.
26. EMRL, *Groundwater Modeling System (GMS) version 5.0 Help File*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 2004.
27. EMRL, *Groundwater Modeling System (GMS) version 5.0 Tutorial Documents, Volumes 1-4*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 2004.
28. *X MDF User Manual*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 2004.
29. EMRL, *Groundwater Modeling System (GMS) version 6.0 Help File*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 2005.
30. EMRL, *Groundwater Modeling System (GMS) version 6.0 Tutorial Documents, Volumes 1-4*, Environmental Modeling Research Laboratory, Brigham Young University, Provo, Utah, 2005.
31. South Florida RSM Peer Review Report.
32. *X MDF manual published as an ERDC technical report.*

33. Sacramento Regional Model Groundwater Modeling Report, Aquaveo LLC, Provo, Utah. 2010
34. Strassber, G., Jones, N., Maidment, D. (2011). *Arc Hydro Groundwater: GIS for Hydrology*. ESRI Press, Redlands, California, 250 pp.

Other Technical Publications

1. Jones, Norman L., S. G. Wright, R. Gloyd, and D. Maidment, "An Algorithm for automated drainage analysis of a triangle-based terrain model," *Proceedings of the First International Conference on Applications of Advanced Technology in Transportation Engineering*, San Diego, Calif., Feb 5-8, 1989.
2. Lin, H.C., Norman L. Jones, and D.R. Richards "A microcomputer-based system for two-dimensional flow modelling," *Proceedings of the ASCE 1991 National Conference on Hydraulic Engineering and International Symposium on Ground Water*, Nashville, Tennessee, July 29 - Aug. 2, 1991.
3. Jones, Norman L., and James Nelson, "Drainage analysis using triangulated irregular networks," *ASCE 8th Conference on Computing in Civil Engineering - Symposium on Geographic Information Analysis*, June 7-9, 1992, Dallas, Texas.
4. Jones, Norman L., and James Nelson, "Automated delineation of catchment area boundaries with TINs," *ASCE Water Forum 1992*, Aug 3-5, 1992, Baltimore, Maryland.
5. Lin, H.C., Norman L. Jones, D.R. Richards, "Multitasking application of surface water flow modeling," *ASCE Water Forum 1992*, Aug 3-5, 1992, Baltimore, Maryland.
6. Jones, Norman L. and James Nelson, "Geoscientific modeling with TINs," *GeoByte*, August, 1992, pp. 44-49.
7. Talbot, C., Jones, Norman L., and A.Woodruff Miller, "Floodplain delineation with TINs," *Proceedings of the Fifth International Conference on Computing in Civil Engineering*, Anaheim, California, June 7-9, 1993.
8. Christiansen, H.C., T.W. Sederberg, N.L. Jones, A.K. Zundel, and S.E. Benzley, "The academic role of the Engineering Computer Graphics Laboratory of Brigham Young University," *EduGraphics '93*, Alvor, Algarve, Portugal, Dec. 5-10, pp. 12-20.
9. Jones, Norman L., D. R. Richards, and J. P. Holland, "The Department of Defense groundwater modeling system," *Geotechnical Engineering News*, June, 1994, Vol. 12, No. 2, pp. 41-44.
10. Richards, D.R., N.L. Jones, and J.P. Holland, "Department of Defense Groundwater Modeling System," *Proceedings of the 1994 Groundwater Modeling Conference*, August 10-12, 1994, pp. 277-284.
11. Lin, H.C., G.T. Yeh, N.L. Jones, and D.R. Richards, "A state-of-the-art tool for studying sea water intrusion problems in coastal aquifers," *Proceedings of the 26th Midatlantic Industrial and Hazardous Waste Conference*, Newark, Delaware, August 7-10, 1994.
12. Jones, Norman L., D.R. Richards, and R.A. Evans, "A graphical environment for three-dimensional finite element groundwater modeling," *Groundwater Management, Proceedings of the International Symposium*, ASCE, San Antonio, Texas, August 14-16, 1995, pp. 373-378.
13. Jones, Norman L., A.K. Zundel, and R.M. Wallace, "A comprehensive graphical environment for surface water flow modeling," *Water Resources Engineering, Proceedings of the First International Conference*, ASCE, San Antonio, Texas, August 14-16, 1995, pp. 405-409.
14. Nelson, E.J., N.L. Jones, and J.D. Jorgeson, "A comprehensive environment for watershed modeling and hydrologic analysis," *Water Resources Engineering, Proceedings of the First International Conference*, ASCE, San Antonio, Texas, August 14-16, 1995, pp. 829-833.
15. Nelson, E.J., and N.L. Jones, "Using the ARC/INFO data model to build conceptual models for environmental/hydraulic/hydrologic simulations," *Proceedings of the 1996 ESRI User Conference*, May 20-24, 1996.
16. Nelson, E.J., and N.L. Jones, "Automated tools for spatially distributed rainfall/runoff modeling," *Proceedings of the ASCE North American Water and Environment Congress*, Anaheim, California, June 22-28, 1996, 6 pp.
17. Richards, and N.L. Jones, "The DoD Groundwater Modeling System: a conceptual model approach," *Proceedings of the ASCE North American Water and Environment Congress*, Anaheim, California, June 22-28, 1996, 6 pp.
18. Zundel, and N.L. Jones, "A graphical environment for multi-dimensional surface water modeling," *Proceedings of the ASCE North American Water and Environment Congress*, Anaheim, California, June 22-28, 1996, 6 pp.
19. Nelson, N.L. Jones, C. Smemoe, "From a grid or coverage to a hydrograph: unlocking your gis data for hydrologic applications," 1997 ESRI User Group Conference.
20. Richards, and N.L. Jones, "A conceptual modeling approach to modeling groundwater with GMS," *Proceedings of the ASCE Water Resources Conference*, San Francisco, California, 1997.
21. N.L. Jones, Edris, E.V., Poeter, E., "Utilizing GIS objects for flux calibration," *Proceedings of the MODFLOW 98 Conference*, Golden, Colorado, Oct. 5-8, 1998.

22. Kennard, M., Holland, J., Jones, N., "GIS tools in GMS – a state of the art report," *Proceedings of the MODFLOW 98 Conference*, Golden, Colorado, Oct. 5-8, 1998.
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