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Research Interests

My research group uses optimality principles, Bayesian statistics, Monte Carlo simulation and evolutionary strategies to better analyze the mismatch between models and data and help improve theory, understanding and predictability of environmental systems. We regularly develop new methods and use parallel computing to solve the most complex and computationally demanding (inverse) problems. We draw inspiration from emerging model-data synthesis problems in surface hydrology, soil physics, hydrogeophysics, hydrometeorology, and geophysics. Most recently, we have started working on ecological inference problems and use optimality hypotheses to understand why plants grow in certain patterns, and why birds choose certain migratory flight routes.

Education

Ph.D. Faculty of Science, University of Amsterdam, 2004, **Cum Laude**.

Dissertation: *Towards Improved Treatment of Parameter Uncertainty in Hydrologic Modeling*

M.S. Faculty of Social and Behavioral Sciences, University of Amsterdam, 1999, **Cum Laude**.

Employment

University of California, Irvine

Assistant Professor, Civil and Environmental Engineering, 2010–Present

Los Alamos National Laboratory

J. Robert Oppenheimer (JRO) Distinguished Postdoctoral Fellowship, 12/06–12/09

Director's Postdoctoral Fellowship, 3/05–11/06

University of Amsterdam

Senior Researcher / Guest Professor, Computational Geo-ecology, 8/07–present

Ph.D. Student, 1/00–6/04

University of California, Davis

Visiting Ph.D. student, 5/03–7/03

University of Arizona, Tucson

Visiting Ph.D. student; Travel Fellowship NWO, 3/02–9/02

Visiting Ph.D. student, Travel Fellowship NWO, 3/01–9/01

University of California, Davis

Visiting M.S. student, 4/99–10/99

Honors, Awards, & Fellowships

James B. Macelwane Medal, American Geophysical Union (AGU), 2010

Outstanding Young Scientist Award, European Geosciences Union (EGU), 2010

Fellow, American Geophysical Union (AGU), 2010

Top 50 of Most Talented Young People From the Netherlands (Elsevier), 2009

Early Career Award in Soil Physics, Soil Science Society of America (SSSA), 2007

Hydrology Prize 2004 - 2006, Dutch Hydrological Society (NHV), 2007

J. Robert Oppenheimer Distinguished Postdoctoral Fellowship (LANL), 2006

Director's Postdoctoral Fellowship (LANL), 2005

Graduated with *Cum Laude* for Ph.D. degree (UvA), 2004

Dutch National Science Foundation Travel Grant (NWO), 2001 & 2002

Graduated with *Cum Laude* for M.S. degree (UvA), 1999

News Items

The Netherlands

Vrugt wordt fellow, Elsevier, 2010

UvA-wetenschapper wint internationale prijs voor talentvolle geofysici, UvA, 2010

Jasper Vrugt een van 50 meeste getalenteerde jonge Nederlanders, Elsevier, 2009

Nederlandse academicus wint twee prestigieuze prijzen, Nuffic, 2007

Jonge wetenschapper van de UvA wint twee prestigieuze prijzen, UvA, 2007

United States of America

CEE assistant professor awarded prestigious Macelwane Medal, UCI, 2010

Vrugt named outstanding young scientist of European Geophysical Union, LANL, 2010

Unsaturated zone interest group advances interdisciplinary science, SSSA, 2009

Dr. Jasper Vrugt wins young outstanding scientist award, 2009

Jasper Vrugt wins soil science society of America early career award, LANL, 2007

Professional Activities

Memberships

American Geophysical Union (AGU)

Dutch Hydrologic Society (NHV)

European Geophysical Union (EGU)

Soil Science Society of America (SSSA)

Editorial

Associate Editor of Water Resources Research (WRR), 2010 - present

Editorial Board of Environmental Modeling & Software (EMS), 2009 - present

Reviewer for DOE Office of Science - Applied Mathematics, 2009 - present

Reviewer for U.S. Army Engineer Research and Development Center (ERDC), 2009 - present

Associate Editor of Hydrology and Earth Systems Sciences (HESS), 2008 - present

Associate Editor of Vadose Zone Journal (VZJ), 2008 - present

Guest-editor (with Shlomo P. Neuman) for special issue on Parameter Identification and Uncertainty Assessment in the Unsaturated Zone, *Vadose Zone Journal*, 5, 915 - 989, 2006

Reviewer for National Science Foundations of Belgium, the Netherlands, United Kingdom, and United States, 2006 - present

Reviewer for 20+ peer-reviewed journals (about 25 papers per year), 2002 - present

Member of committees

American Geophysical Union (AGU)

Surface Hydrology Committee, 2005–present

European Geophysical Union (EGU)

Unsaturated Zone Committee, 2004–present

Surface Hydrological Processes Committee, 2004–present

Los Alamos National Laboratory (LANL)

Laboratory Directed Research Development - ESS & Space Physics, 2008–2009

International

International Working Group on Uncertainty Analysis, 2004–present

Project Leader Uncertainty: Hydrologic Ensemble Prediction Experiment, 2005–present

Teaching Experience

University of California, Irvine

CEE-271: Unsaturated Zone Hydrology - Graduate Course: Topics include physical properties of soils and methods of measurement (direct and indirect). Emphasis is on movement of water, heat, gases, and chemicals through soil, September - December, 2010.

CEE-276: Hydrology - Graduate Course: Invited Lecturer on *Parameter exploration for environmental models: Theory, numerical approaches, and applications*. Three times in last 5 years.

Other Universities & International

Main Lecturer for a weekly short-course on *Bayesian inverse modeling and data assimilation methods to improve environmental and ecological models*. Institute for Biodiversity and Ecosystem Dynamics (IBED), University of Amsterdam, The Netherlands, July 6-10. I taught four lectures of about 3 hours to about 30 graduate students from different European countries and developed MATLAB exercises to support the lectures during afternoon computer sessions, 2009

Invited Lecturer on *Parameter estimation in subsurface hydrology: algorithms, numerical approaches and applications* at the Hydrology Program, University of California, Davis, May 26. Three hour lecture on parameter estimation in soil hydrology part of graduate course *Vadose Zone Modeling*, 2009

Main lecturer for a special weekly short-course on *Model Calibration in the Earth Sciences*. Organized at Katholieke Universiteit Leuven, Belgium, August 4-8. I taught four lectures of about 3 hours to 35 graduate students from different European countries and developed MATLAB exercises to support the lectures during afternoon computer sessions, 2008

Invited Lecturer on *Parameter estimation in subsurface hydrology: algorithms, numerical approaches and applications* at the Hydrology Program, University of California, Davis, June 7-8. Two hour lecture on parameter estimation in soil hydrology part of graduate course *Vadose Zone Modeling*, 2007

Invited Lecturer at International Summer School on Atmospheric and Oceanic Sciences (ISSAOS), L'Aquila, Italy, August 29-September 2. Two lectures of about 1 hour on parameter estimation and data assimilation in environmental modeling for international graduate students from various European countries, 2005

Graduate Teaching Assistant, University of Amsterdam, Netherlands. Ten lectures on soil physics for undergraduates in Physical Geography and Soil Science. Prepared lectures for lab session exercises, and graded laboratory assignments, homework and final papers, 2000

Teaching Assistant, University of Amsterdam, Netherlands. Ten lectures on soil physics for undergraduates in Physical Geography. Prepared lectures for lab session exercises, graded laboratory assignments, homework and final papers, 1999

Awards of (co-)Advised Students

Mojtaba Sadegh (University of California, Irvine), Henri Samueli Endowed Fellowship, 2010

External PhD examinator

Reza Entezarolmahdi (University of Trento, Italy), 2006

Ying Jang (Institute of Aquatic Science and Technology, Switzerland), 2006

Grants

Subsurface Transport Parameter Estimation with Multiscale, Multiobjective Optimization; Principal Investigator (PI): A. Wolfsberg, Co-PIs: Z. Dai, Z. Lu, P. Reimus, and **J.A. Vrugt**; Amount: $645,000, LDRD, 2006 - 2009.

Creating a Mathematical Foundation for High-dimensional Search and Optimization Algorithms to Solve Nonlinear Models; PI: **J.A. Vrugt**, Co-PIs: B.A. Robinson, and J.M. Hyman; Amount: $1,000,000, LDRD, 2006 - 2009.

Multilevel Adaptive Sampling for Multiscale Inverse Problems; D. Moulton, Co-PIs: D. Higdon, C. Fox, and **J.A. Vrugt**; Amount: $900,000, LDRD, 2007 - 2010.

Development of User-Friendly GUI Interfaces for the AMALGAM Optimization Suite; PI: **J.A. Vrugt**, Co-PIs: B.A. Robinson, and T. Marks; Amount: $50,000, TT, 2007.

Conferences and Symposia Activities

1. Chair and organizer of the European Geophysical Union session on *Model Calibration and Uncertainty Assessment of Unsaturated Flow and Transport Processes Across Spatial Scales*, Nice, France, 2004.
2. Chair and organizer of the European Geophysical Union session on *Effective Processes and Parameter Identification in the Unsaturated Zone*, Vienna, Austria, 2005.
3. Co-chair and co-convener European Geophysical Union session on *Quantification of Structural Error, Parameter Estimation and Uncertainty Assessment in Groundwater and Hydrological Catchment Modeling*, Vienna, Austria, 2005.
4. Chair and organizer of the American Geophysical Union Fall meeting session on *Calibration and Uncertainty Assessment of Spatially Distributed Hydrologic Models*, San Francisco, 2005.
5. Chair and organizer of the European Geophysical Union session on *Effective processes and parameter identification in the unsaturated zone*, Vienna, Austria, 2006.
6. Chair and organizer of the European Geophysical Union session on *Advances in Uncertainty Assessment of Hydrologic Models*, Vienna, Austria, 2006.
7. Chair and organizer of the workshop *Advances in Parameter Estimation in Computational Science: Strategies, Concepts, and Applications* at the International Conference on Computational Science 2006 (ICCS 2006), Reading, UK, 2006.
8. Chair and organizer of the American Geophysical Union session on *Improved Hydrologic Modeling Through Ensemble Forecasting: Strategies, Concepts, and Applications*, at Western Pacific Geophysics Meeting, Beijing, China, 2006.
9. Chair and co-organizer of the American Geophysical Union Fall meeting session on *Calibration and Uncertainty Assessment of Spatially Distributed Hydrologic Models, Methods, Applications and Strategies*, San Francisco, 2006.
10. Co-chair and organizer of the European Geophysical Union session on *Calibration of Spatially Distributed Models*, Vienna, Austria, 2007.
11. Co-chair of the AAPG Hedberg Research Conference session on *Data Quality, Inversion and Uncertainty Estimation*, The Hague, The Netherlands, 2007.
12. Co-chair and organizer of the American Geophysical Union Fall meeting session on *Parameter Estimation in Hydrology: Theoretical Developments and Applications*, San Francisco, 2007.
13. Co-chair and organizer of the American Geophysical Union Fall meeting session on *Advancing Data Assimilation and Uncertainty Assessment for Improved Hydrologic Predictions*, San Francisco, 2007.
14. Chair and organizer (by invitation) of the Computational Methods in Water Resources (CMWR) meeting session on *Ensemble Forecasting in Environmental Modeling*, San Francisco, 2008.
15. Chair and organizer of the European Geophysical Union session on *Reconciling Theory, Simulation, and Observations in Subsurface Flow and Transport Modeling*, Vienna, Austria, 2008.
16. Chair and organizer of the Soil Science Society of America (SSSA) Symposium on *Measurement and Modeling of Flow and Transport Processes in the Unsaturated Zone*, in honor of the retirement of Dr. Jacob Dane, Houston, 2008.

17. Co-chair and co-organizer of the American Geophysical Union Fall meeting session on *Joint Inversion Methods in Hydrogeophysics*, San Francisco, 2008.

18. Co-chair and co-organizer of the European Geophysical Union session on *Reconciling Theory, Simulation, and Observations in Subsurface Flow and Transport Modeling*, Vienna, Austria, 2009.

19. Co-chair and co-organizer of the European Geophysical Union session on *Combining Modeling and Measuring to Improve Understanding of Subsurface Flow and Transport Systems*, Vienna, Austria, 2010.

20. Co-chair and co-organizer of the American Geophysical Union session on *Challenges in Hydrologic Modeling and Forecasting* at the Western Pacific Geophysics Meeting, Taipei, Taiwan, 2010.

21. Co-chair and co-organizer of the American Geophysical Union Fall meeting session on *Using Data to Detect and Resolve Model Structural Errors*, San Francisco, 2010.

Publications

First author names with an underscore indicate the work of a (co-advised) student

1. **J.A. Vrugt**, A.H. Weerts, and W. Bouten (2001), Information content of data for identifying soil hydraulic parameters from outflow experiments, *Soil Science Society of America Journal*, 65, 19-27.

2. **J.A. Vrugt**, J.W. Hopmans, and J. Simunek (2001), Calibration of a two-dimensional root water uptake model, *Soil Science Society of America Journal*, 65, 1027-1037.

3. **J.A. Vrugt**, M.T. van Wijk, J.W. Hopmans, and J. Simunek (2001), One, two, and three-dimensional root water uptake functions for transient modeling, *Water Resources Research*, 37 (10), 2457-2470.

4. **J.A. Vrugt**, W. Bouten, S.C. Dekker, and P.A.D. Musters (2002), Transpiration dynamics of an Austrian Pine stand and its forest floor: identifying controlling conditions using artificial neural networks, *Advances in Water Resources*, 25, 293-303.

5. **J.A. Vrugt**, and W. Bouten (2002), Validity of first-order approximations to describe parameter uncertainty in soil hydrologic models, *Soil Science Society of America Journal*, 66 (6), 1740-1752.

6. **J.A. Vrugt**, W. Bouten, H.V. Gupta, and S. Sorooshian (2002), Toward improved identifiability of hydrologic model parameters: The information content of experimental data, *Water Resources Research*, 38 (12), art. no. 1312, doi:10.1029/2001WR001118.

7. K.G.J. Nierop, B. Jansen, **J.A. Vrugt**, and J.M. Verstraten (2002), Copper complexation by dissolved organic matter and uncertainty assessment of their stability constants, *Chemosphere*, 49 (10), 1191-1200.

8. **J.A. Vrugt**, H.V. Gupta, W. Bouten, and S. Sorooshian (2003), A Shuffled Complex Evolution Metropolis algorithm for optimization and uncertainty assessment of hydrologic model parameters, *Water Resources Research*, 39 (8), art. No. 1201, doi:10.1029/2002WR001642.

9. **J.A. Vrugt**, H.V. Gupta, L.A. Bastidas, W. Bouten, and S. Sorooshian (2003), Effective and efficient algorithm for multi-objective optimization of hydrologic models, *Water Resources Research*, 39 (8), art. No. 1214, doi:10.1029/2002WR001746.

10. **J.A. Vrugt**, S.C. Dekker, and W. Bouten (2003), Identification of rainfall interception model parameters from measurements of throughfall and forest canopy storage, *Water Resources Research*, 39 (9), art. No. 1251, doi:10.1029/2003WR002013.

11. **J.A. Vrugt**, W. Bouten, H.V. Gupta, and J.W. Hopmans (2003), Toward improved identifiability of soil hydraulic parameters: On the selection of a suitable parametric model, *Vadose Zone Journal*, 2, 98-113.

12. J.A. Huisman, W. Bouten, **J.A. Vrugt**, and P.A. Ferré (2004), Accuracy of frequency domain analysis scenarios for the determination of complex dielectric permittivity, *Water Resources Research*, W02401, doi:10.1029/2002WR001601.

13. B. Jansen, K.G.J. Nierop, **J.A. Vrugt**, and J.M. Verstraten (2004), (Un)certainty of overall binding constants of Al with dissolved organic matter determined by the Scatchard approach, *Water Research*, 38, 1270-1280.

14. **J.A. Vrugt**, G.H. Schoups, J.W. Hopmans, C.H. Young, W. Wallender, T. Harter, and W. Bouten (2004), Inverse modeling of large scale spatially distributed vadose zone properties using global optimization, *Water Resources Research*, 40(6), W06503, doi:10.1029/2003WR002706.

15. T.J. Heimovaara, J.A. Huisman, **J.A. Vrugt**, and W. Bouten (2004), Obtaining the spatial distribution of water content along a TDR probe using the SCEM-UA Bayesian inverse modeling scheme, *Vadose Zone Journal*, 3, 1128-1145.

16. K.J. Raat, **J.A. Vrugt**, W. Bouten, and A. Tietema (2004), Towards reduced uncertainty in nitrogen catchment modeling: quantifying the effect of field observation uncertainty on model calibration, *Hydrology and Earth Systems Sciences*, 8(4), 751-763.

17. **J.A. Vrugt**, C.G.H. Diks, W. Bouten, H.V. Gupta, and J.M. Verstraten (2005), Improved treatment of uncertainty in hydrologic modeling: Combining the strengths of global optimization and data assimilation, *Water Resources Research*, 41(1), W01017, doi:10.1029/2004WR003059.

18. **J.A. Vrugt**, B.A. Robinson, and V.V. Vesselinov (2005), Improved inverse modeling of flow and transport in subsurface media: Combined parameter and state estimation, *Geophysical Research Letters*, 32, L18408, doi:10.1029/2005GL023940.

19. G. Schoups, J.W. Hopmans, C.A. Young, **J.A. Vrugt**, and W.W. Wallender (2005), Sustainability of irrigated agriculture in the San Joaquin Valley, California, *Proceedings of the National Academy of Sciences of the United States of America*, 102 (43), 15352-15356, doi:10.1073/pnas.0507723102.

Features as Editor's Choice in Science (2005), Science, 310, 593

20. G. Schoups, J.W. Hopmans, C.A. Young, **J.A. Vrugt**, and W.W. Wallender (2005), Multi-objective optimization of a regional spatially-distributed subsurface waterflow model, *Journal of Hydrology*, 20 - 48, 311(1-4), doi:10.1016/j.jhydrol.2005.01.001.

21. M.P. Clark, and **J.A. Vrugt** (2006), Unraveling uncertainties in hydrologic model calibration: Addressing the problem of compensatory parameters, *Geophysical Research Letters*, 33(6), L06406, doi:10.1029/2005GL025604.

22. **J.A. Vrugt**, H.V. Gupta, B. Ó Nualláin, and W. Bouten (2006), Real-time data assimilation for operational ensemble streamflow forecasting, *Journal of Hydrometeorology*, 7(3), 548-565, doi:10.1175/JHM504.1.

23. **J.A. Vrugt**, H.V. Gupta, S. Sorooshian, T. Wagener, and W. Bouten (2006), Application of stochastic parameter optimization to the Sacramento soil moisture accounting model, *Journal of Hydrology*, 325(1-4), 288 - 307, doi:10.1016/j.jhydrol.2005.10.041.

24. **J.A. Vrugt**, B. Ó Nualláin, B.A. Robinson, W. Bouten, S.C. Dekker, and P.M.A. Sloot (2006), Application of parallel computing to stochastic parameter estimation in environmental models, *Computers & Geosciences*, 32(8), 1139 - 1155, doi:10.1016/j.cageo.2005.10.015.

25. **J.A. Vrugt**, and Shlomo P. Neuman (2006), Introduction to special section on parameter estimation and uncertainty estimation in the unsaturated zone, *Vadose Zone Journal*, 5, 915-916, doi:10.2136/vzj2006.0098.

26. **J.A. Vrugt**, M.P. Clark, C.G.H. Diks, Q. Duan, and B.A. Robinson (2006), Multi-objective calibration of forecast ensembles using Bayesian Model Averaging, *Geophysical Research Letters*, 33, L19817, doi:10.1029/2006GL027126.

27. L. Feyen, **J.A. Vrugt**, B. Ó Nualláin, J. van der Knijff, and A. de Roo (2007), Parameter optimization and uncertainty assessment for large-scale streamflow forecasting, *Journal of Hydrology*, 332, 276-289.

28. **J.A. Vrugt**, and B.A. Robinson (2007), Treatment of uncertainty using ensemble methods: Comparison of sequential data assimilation and Bayesian model averaging, *Water Resources Research*, 43, W01411, doi:10.1029/2005WR004838.

29. **J.A. Vrugt**, and B.A. Robinson (2007), Improved evolutionary optimization from genetically adaptive multimethod search, *Proceedings of the National Academy of Sciences of the United States of America*, 104, 708-711, doi:10.1073/pnas.0610471104.

30. **J.A. Vrugt**, J. van Belle, and W. Bouten (2007), Pareto front analysis of flight time and energy use in long distance bird migration, *Journal of Avian Biology*, 38, 432-442, doi:10.1111/j.2007.0908-8857.03909.

See also: http://openwetware.org/wiki/Optimality_In_Biology

31. J. Koller, Y. Chen, G. D. Reeves, R. H. W. Friedel, T. E. Cayton, and **J.A. Vrugt** (2007), Identifying the radiation belt source region by data assimilation, *Journal of Geophysical Research - Space Physics*, 112, A06244, doi:10.1029/2006JA012196.

32. **J.A. Vrugt** (2007), Comment on: "How effective and efficient are multiobjective evolutionary algorithms at hydrologic model calibration?", *Hydrology and Earth System Sciences*, 11, 1435-1436.

33. P. Tittonell, M.T. van Wijk, M.C. Rufino, **J.A. Vrugt**, and K.E. Giller (2007), Analyzing trade-offs in resource and labor allocation by smallholder African farmers using inverse modeling techniques, *Agricultural Systems*, 95, 76-95.

34. T. Wöhling, **J.A. Vrugt**, and G.F. Barkle (2008), Comparison of three multiobjective optimization algorithms for inverse modeling of vadose zone hydraulic properties, *Soil Science Society of America Journal*, 72, 305-319, doi:10.2136/sssaj2007.0176.

35. R.S. Blasone, **J.A. Vrugt**, H. Madsen, D. Rosbjerg, G.A. Zyvoloski, and B.A. Robinson (2008), Generalized likelihood uncertainty estimation (GLUE) using adaptive Markov Chain Monte Carlo sampling, *Advances in Water Resources*, 31, 630-648, doi:10.1016/j.advwatres.2007.12.003.

36. L. Feyen, M. Khalas, and **J.A. Vrugt** (2008), Semi-distributed parameter optimization and uncertainty assessment for large-scale streamflow simulation using global optimization, *Hydrological Sciences Journal*, 53(2), 293-208.

37. D.R. Harp, Z. Dai, A.V. Wolfsberg, **J.A. Vrugt**, B.A. Robinson, and V.V. Vesselinov (2008), Aquifer structure identification using stochastic inversion, *Geophysical Research Letters*, 35, L08404, doi:10.1029/2008GL033585.

38. **J.A. Vrugt**, P.H. Stauffer, T. Wöhling, B.A. Robinson, and V.V. Vesselinov (2008), Inverse modeling of subsurface flow and transport properties: A review with new developments, *Vadose Zone Journal*, 7(2), 843-864, doi:10.2136/vzj2007.0078.

39. M.P. Clark, A.G. Slater, D.E. Rupp, R.A. Woods, **J.A. Vrugt**, H. Gupta, T. Wagener, and L. Hay (2008), Framework for understanding structural errors (FUSE): A modular framework to diagnose differences between hydrological models, *Water Resources Research*, 44, W00B02, doi:10.1029/2007WR006735.

40. H. Vereecken, J.A. Huisman, H. Bogena, J. Vanderborght, **J.A. Vrugt**, and J.W. Hopmans (2008), On the value of soil moisture measurements in vadose zone hydrology: A review, *Water Resources Research*, 44, W00D06, doi:10.1029/2008WR006829.

41. **J.A. Vrugt**, C.G.H. Diks, and M.P. Clark (2008), Ensemble Bayesian model averaging using Markov chain Monte Carlo sampling, *Environmental Fluid Mechanics*, 8(5-6), 579-595, doi:10.1007/s10652-008-9106-3.

42. C.J.F. ter Braak, and **J.A. Vrugt** (2008), Differential evolution Markov chain with snooker updater and fewer chains, *Statistics and Computing*, 18(4), 435-446, doi:10.1007/s11222-008-9104-9.

43. **J.A. Vrugt**, C.J.F. ter Braak, M.P. Clark, J.M. Hyman, and B.A. Robinson (2008), Treatment of input uncertainty in hydrologic modeling: Doing hydrology backward with Markov chain Monte Carlo simulation, *Water Resources Research*, 44, W00B09, doi:10.1029/2007WR006720.

44. T. Wöhling, and **J.A. Vrugt** (2008), Combining multi-objective optimization and Bayesian model averaging to calibrate forecast ensembles of soil hydraulic models, *Water Resources Research*, 44, W12432, doi:10.1029/2008WR007154.

45. A. Behrangi, B. Khakbaz, **J.A. Vrugt**, Q. Duan, and S. Sorooshian (2008), Comment on: "Dynamically dimensioned search algorithm for computationally efficient watershed model calibration", *Water Resources Research*, 44, W12603, doi:10.1029/2007WR006429.

46. **J.A. Vrugt**, B.A. Robinson, and J.M. Hyman (2009), Self-adaptive multimethod search for global optimization in real-parameter spaces, *IEEE Transactions on Evolutionary Computation*, 13(2), 243-259, doi:10.1109/TEVC.2008.924428.

47. **J.A. Vrugt**, C.J.F. ter Braak, C.G.H. Diks, D. Higdon, B.A. Robinson, and J.M. Hyman (2009), Accelerating Markov chain Monte Carlo simulation by differential evolution with self-adaptive randomized subspace sampling, *International Journal of Nonlinear Sciences and Numerical Simulation*, 10(3), 273-290.

48. P.H. Stauffer, **J.A. Vrugt**, H.J. Turin, C.W. Gable, and W.E. Soll (2009), Untangling diffusion from advection in unsaturated porous media: Experimental data, modeling and parameter uncertainty assessment, *Vadose Zone Journal*, 8(2), 510-522, doi:10.2136/vzj2008.0055.

Features on the cover (2009), Vadose Zone Journal, 8(2)

49. **J.A. Vrugt**, C.J.F. ter Braak, H.V. Gupta, and B.A. Robinson (2009), Equifinality of formal (DREAM) and informal (GLUE) Bayesian approaches in hydrologic modeling?, *Stochastic Environmental Research and Risk Assessment*, 23(7), 1011-1026, doi:10.1007/s00477-008-0274-y.

50. **J.A. Vrugt**, C.J.F. ter Braak, H.V. Gupta, and B.A. Robinson (2009), Reply to Comment on: "Equifinality of formal (DREAM) and informal (GLUE) Bayesian approaches in hydrologic modeling?" by Keith Beven, *Stochastic Environmental Research and Risk Assessment*, 23(7), 1061-1062, doi:10.1007/s00477-008-0284-9.

51. J.A. Huisman, J. Rings, **J.A. Vrugt**, J. Sorg, and H. Vereecken (2010), Hydraulic properties of a model dike from coupled Bayesian and multi-criteria hydrogeophysical inversion, *Journal of Hydrology*, 380(1-2), 62-73, doi:10.1016/j.jhydrol.2009.10.023.

52. B. Scharnagl, **J.A. Vrugt**, H. Vereecken, and M. Herbst (2010), Information content of incubation experiments for inverse estimation of pools in the Rothamsted carbon model: a Bayesian perspective, *Biogeosciences*, 7, 763-776.

53. A.W. Hinnell, T.P.A. Ferré, **J.A. Vrugt**, S. Moysey, J.A. Huisman, and M.B. Kowalsky (2010), Improved extraction of hydrologic information from geophysical data through coupled hydrogeophysical inversion, *Water Resources Research*, 46, W00D40, doi:10.1029/2008WR007060.

54. G.J. Kluitenberg, T. Kamai, **J.A. Vrugt**, and J.W. Hopmans (2010), Effect of probe deflection on dual-probe heat-pulse thermal conductivity measurements, *Soil Science Society of America Journal*, 74(5), doi:10.2136/sssaj2010.0016N.

55. C.G.H. Diks, and **J.A. Vrugt** (2010), Comparison of point forecast accuracy of model averaging methods in hydrologic applications, *Stochastic Environmental Research and Risk Assessment*, 24(6), 809-820, doi:10.1007/s00477-010-0378-z.

56. J.J. Gourley, S. Giangrande, Y. Hong, Z.L. Flamig, T. Schuur, and **J.A. Vrugt** (2010), Impacts of polarimetric radar observations on hydrologic simulation, *Journal of Hydrometeorology*, 11(3), 781-796, doi:10.1175/2010JHM1218.1.

57. K.W. Blasch, T.P.A. Ferré, and **J.A. Vrugt** (2010), Environmental controls on drainage behavior of an ephemeral stream: An example of the limitations of simple correlative data analyses, *Stochastic Environmental Research and Risk Assessment*, xx, xx, doi:10.1007/s00477-010-0398-8.

58. **J.A. Vrugt** (2010), Comment on: "Multi-strategy ensemble evolutionary algorithm for dynamic multi-objective optimization" by Yu Wang and Bin Li, *Memetic Computing*, 2, 161-162, doi:10.1007/s12293-010-0041-8.

59. E. Keating, J. Doherty, **J.A. Vrugt**, and Q. Kang (2010), Optimization and uncertainty assessment of strongly non-linear groundwater models with high parameter dimensionality, *Water Resources Research*, 46, W10517, doi:10.1029/2009WR008584.

60. G. Schoups, **J.A. Vrugt**, F. Fenicia, and N.C. van de Giesen (2010), Corruption of accuracy and efficiency of Markov Chain Monte Carlo simulation by inaccurate numerical implementation of conceptual hydrologic models, *Water Resources Research*, 46, W10530, doi:10.1029/2009WR008648.

61. G. Schoups, and **J.A. Vrugt** (2010), A formal likelihood function for parameter and predictive inference of hydrologic models with correlated, heteroscedastic and non-Gaussian errors, *Water Resources Research*, 46, W10531, doi:10.1029/2009WR008933.

62. S.C. Dekker, **J.A. Vrugt**, and R.J. Elkington (2010), Significant variation in vegetation characteristics and dynamics from ecohydrologic optimality of net carbon profit, *Ecohydrology*, In Press.

63. J.H. Dane, **J.A. Vrugt**, and E. Unsal (2010), Soil hydraulic functions determined from measurements of air permeability, capillary modeling and high-dimensional AMALGAM parameter estimation. *Vadose Zone Journal*, In Press.

64. T. Wöhling, and **J.A. Vrugt** (2010), Multi-response multi-layer vadose zone model calibration using Markov chain Monte Carlo simulation and field water retention data, *Water Resources Research*, In Press.

65. M. He, T.S. Hogue, K.J. Franz, S.A. Margulis, and **J.A. Vrugt** (2010), Characterizing parameter sensitivity and uncertainty for a snow model across hydroclimatic regimes, *Advances in Water Resources*, xx, xx, doi:10.1016/j.advwatres.2010.10.002.

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Papers in Review

1. B.Minasny, **J.A. Vrugt**, and A.B. McBratney (2010), Treatment of uncertainty in model-based geostatistics using Markov chain Monte Carlo simulation, *Geoderma*.

2. J. Rings, **J.A. Vrugt**, G. Schoups, J.A. Huisman, and H. Vereecken (2010), Bayesian model averaging using ensemble particle filtering and Gaussian mixture modeling, *Water Resources Research*.

3. H.V. Gupta, M.P. Clark, and **J.A. Vrugt** (2010), Towards an integrated approach to address model structural adequacy.

4. **J.A. Vrugt**, J. Rings, C.G.H. Diks, and C.J.F. ter Braak (2010), Sequential Monte Carlo using differential evolution particle filtering, Part I: Theory and initial results, *Water Resources Research*.

5. J. Rings, **J.A Vrugt**, J.A. Huisman, and H. Vereecken (2010), Sequential Monte Carlo using differential evolution particle filtering, Part II: Application to coupled hydrogeophysical parameter estimation, *Water Resources Research*.

6. D. Partridge, **J.A. Vrugt**, D. Gorea, P. Tunved, A.M.L. Ekman, and A. Sorooshian (2010), Response surface analysis of a cloud parcel model to explore the applicability of inverse modeling to cloud-aerosol studies.

7. D. Partridge, **J.A. Vrugt**, D. Gorea, P. Tunved, A.M.L. Ekman, and A. Sorooshian (2010), Sensitivity tests on liquid phase cloud-aerosol interactions using a Markov Chain Monte Carlo based approach: Part I.

8. C.G.H. Diks, and **J.A. Vrugt** (2010), Quantile regression provides heteroscedastic and smaller prediction intervals than Bayesian Model Averaging.

9. Y. Liu, T. Wagener, P. Young, and **J.A. Vrugt** with 20 other co-authors (in alphabetic order) (2010), Dynamic parameter identifiability analysis for hydrological and environmental model diagnostics and improvement.

10. K. Beven, J. Goetzinger, A. Montanari, and **J.A. Vrugt** with 20 other co-authors (in alphabetic order) (2010), How can we separate and identify input observation error versus model structural error?

11. B. Jackson, B. Schaefli, H. Gupta, and **J.A. Vrugt** with 20 other co-authors (in alphabetic order) (2010), What is the information content of hydrologic data?

Papers in Preparation

1. **J.A. Vrugt**, B.A. Robinson, C.J. Werth, G. Srinivasan, and J.D. Moulton (2010), Theory of transport in low permeability porous media inconsistent with Magnetic Resonance Imaging data.

2. M. Kandelous, T. Kamai, **J.A. Vrugt**, B. Hanson, J. Simunek, and J.W. Hopmans (2010), Multiple objective optimization of subsurface drip irrigation.

3. H. Gupta, M.P. Clark, and **J.A. Vrugt** (2010), Unifying the approaches used by different communities to model the terrestrial hydrosphere.

Contributions in Books

1. **J.A. Vrugt**, H.V. Gupta, W. Bouten, and S. Sorooshian (2002), A shuffled complex evolution Metropolis algorithm for estimating the posterior distribution of watershed model parameters, pp. 105-112 in Monograph on Advances in Automatic Calibration of Watershed Models, American Geophysical Union (Eds: Q. Duan, H.V. Gupta, S. Sorooshian, A.N. Rousseau, and R. Turcotte).

2. H.V. Gupta, L. Bastidas, **J.A. Vrugt**, and S. Sorooshian (2002), Multiple criteria global optimization for watershed model calibration, pp. 125-132 in Monograph on Advances in Automatic Calibration of Watershed Models, American Geophysical Union (Eds: Q. Duan, H.V. Gupta, S. Sorooshian, A.N. Rousseau, and R. Turcotte).

3. **J.A. Vrugt**, and J.H. Dane (2005), Inverse modeling of soil hydraulic properties, pp. 1003-1120 in Encyclopedia of Hydrological Sciences (Eds: M.G. Anderson, and J.J. McDonnell), John Wiley & Sons Ltd., Chichester, UK.

4. D. Higdon, C.S. Reese, J.D. Moulton, **J.A. Vrugt**, and C. Fox (2009), Posterior exploration for computationally intensive forward models, pp. xx-xx in The Handbook of Markov Chain Monte Carlo (Eds: X.L. Meng, A. Gelman, and G. Jones), Chapman & Hall/CRC Press.

5. K. Yilmaz, and **J.A. Vrugt**, H.V. Gupta, and S. Sorooshian (2010), Model calibration in watershed hydrology, Chapter 3 in Advances in Data-based Approaches for Hydrologic Modeling and Forecasting (Eds: B. Sivakumar, and R. Berndtsson), World Scientific.

Conference Proceedings

1. **J.A. Vrugt** (2003), Merging the strengths of global optimization and data-assimilation to simultaneously estimate parameters and state variables in hydrologic models, Proceedings of the ESF/LESC Exploratory Workshop on 'Hydrological risk: recent advances in peak river flow modeling, prediction and real time forecasting, Assessment of the impacts of land-use and climate change', Bologna, Italy, October, 23-25.

2. **J.A. Vrugt**, C.G.H. Diks, W. Bouten, and J.M. Verstraten (2004), Improved treatment of uncertainty in hydrologic modeling, Proceedings of the British Hydrological Society International Conference, Volume 1, pp. 389-397, Imperial College, London, England, July.

3. **J.A. Vrugt** (2007), Markov chain Monte Carlo sampling using multiple-chain differential evolution with adaptive proposal updating, Proceedings of the Fifth International Symposium on Environmental Hydraulics, Arizona State University, Tempe, December.

4. T. Wöhling, and **J.A. Vrugt** (2007), Multiobjective inverse parameter estimation for modeling vadose zone water movement, MODSIM07 - International Congress on Modeling and Simulation, Land, Water & Environmental Management: Integrated Systems for Sustainability, Christchurch, New Zealand, December.

5. J. Bikowski, J. van der Kruk, J.A. Huisman, H. Vereecken, and **J.A. Vrugt** (2010), Inversion and sensitivity analysis of GPR data with waveguide dispersion using Markov chain Monte Carlo simulation, Proceedings of the XIII International Conference on ground penetrating radar, pp. 1-5, Lecce, Italy, June 21-25, doi:10.1109/ICGPR.2010.5550147.

Invited Presentations

1. **J.A. Vrugt**, M*erging the strengths of global optimization and data-assimilation to simultaneously estimate parameters and state variables in hydrologic models*, Presented at the ESF/LESC Exploratory Workshop on Hydrological Risk: Recent Advances in Peak River Flow Modeling, Prediction and Real-time Forecasting, Assessment of the Impacts of Land-use and Climate Change, Bologna, Italy, October 23-25, 2003.

2. W. Bouten, and **J.A. Vrugt**, *Distributed modeling of catchments: Balancing modeling objectives, model complexity and data availability*, Presented at the General Assembly of the European Geophysical Union, Nice, France, April 25-30, 2004.

3. **J.A. Vrugt**, C.G.H. Diks, W. Bouten, and J.M. Verstraten, *Advanced parameter sampling strategies for environmental modeling*, Presented at 1st Meeting of the International Working Group on Uncertainty Analysis in Hydrologic Modeling, Lugano, Switzerland, July 5-8, 2004.

4. **J.A. Vrugt**, J.W. Hopmans, and P. Fisher, *Assessment of multi-dimensional root water uptake distributions: combining measuring and modeling*, Presented at University of Adelaide, Adelaide, Australia, August 16, 2004.

5. **J.A. Vrugt**, *Large scale spatially distributed vadose zone modeling using global optimization*, Presented at Subsurface Flow and Transport Modeling Team, Los Alamos National Laboratory, Los Alamos, August 24, 2004.

6. **J.A. Vrugt**, *Multi-criteria optimization of long-distance bird migration: analyzing the trade-off between flight time and energy-use*, Presented at 2nd EuroBAM Network Meeting, Amsterdam, Netherlands, November 8, 2004.

7. **J.A. Vrugt**, *Calibration of finite element models using combined parameter and state estimation*, Presented at Workshop on Community Finite Element Models for Fault Systems and Tectonic Studies, Los Alamos, July 13, 2005.

8. **J.A. Vrugt**, *Hydrologic model calibration, Concepts, strategies and applications*, Presented at ISSAOS Summer School, L'Aquila, Italy, August 31, 2005.

9. **J.A. Vrugt**, *Hydrologic uncertainty assessment, Recursive calibration and data assimilation*, Presented at International Summer School on Atmospheric and Oceanic Sciences (ISSAOS), L'Aquila, Italy, September 1, 2005.

10. **J.A. Vrugt**, and B.A. Robinson, *Development of a hydrologic analysis framework for improved treatment of uncertainty*, Presented at American Geophysical Union Fall Meeting, San Francisco, December 5, 2005.

11. **J.A. Vrugt**, and B.A. Robinson, *Spatially distributed modeling of root water uptake using global optimization*, Presented at workshop on Modeling Vadose Zone Flow and Transport Processes in Radioactive Waste Management, Mol, Belgium, February 23, 2006.

12. **J.A. Vrugt**, and B.A. Robinson, *Multi-objective parameter and state estimation for improved analysis of multi-tracer experiments in subsurface media*, Presented at the General Assembly of the European Geophysical Union, Vienna, Austria, April 5, 2006.

13. **J.A. Vrugt**, *Uncertainty estimation in environmental models*, Presented at Department of Civil and Environmental Engineering, University of Trento, Trento, Italy, February 23, 2006.

14. **J.A. Vrugt**, *Development of a hydrologic analysis framework for improved treatment of uncertainty*, Presented at Earth and Environmental Sciences Division Review, Los Alamos, May 17, 2006.

15. **J.A. Vrugt**, *Ensemble prediction strategies in environmental modeling*, Presented at Workshop on Use of Long-range Hydrologic Forecasts for Reservoir Operations, Beijing, China, July 28, 2006.

16. **J.A. Vrugt**, *Confronting uncertainty in environmental modeling: Methods and applications*, Presented at Kickoff Workshop on Development, Assessment and Utilization of Complex Computer Models, Statistical and Applied Mathematical Sciences Institute (SAMSI), Durham, September 13, 2006.

17. **J.A. Vrugt**, *Confronting uncertainty in environmental modeling: Methods and applications*, Presented at Swiss Federal Institute of Aquatic Science and Technology, Duebendorf, Switzerland, September 19, 2006.

18. **J.A. Vrugt**, *Uncertainty estimation in environmental modeling: from parameter to state estimation*, Presented at University of Amsterdam, Amsterdam, The Netherlands, May 7, 2007.

19. **J.A. Vrugt**, *Improved model calibration from genetically adaptive multimethod search*, Presented at AAPG Hedberg Conference on Basin Modeling Perspectives: Innovative Developments and Novel Applications, The Hague, The Netherlands, May 9, 2007.

20. **J.A. Vrugt**, *AMALGAM: A general-purpose multimethod evolutionary search algorithm for inverse modeling*, Presented at Department of Geophysics, Stanford University, Stanford, June 6, 2007.

21. **J.A. Vrugt**, *Self-adaptive multimethod optimization, and Bayesian model averaging for calibration and uncertainty estimation*, Presented at Chevron, San Ramon, October 9, 2007.

22. **J.A. Vrugt**, *Self-adaptive Markov chain Monte Carlo simulation: methodological development and applications*, Presented at Fifth International Symposium on Environmental Hydraulics, Arizona State University, Phoenix, December 6, 2007.

23. **J.A. Vrugt**, and T. Wöhling, *Upscaling soil hydraulic properties using field-scale inverse modeling and Bayesian model averaging*, Presented at American Geophysical Union Fall Meeting, San Francisco, December 10-14, 2007.

24. **J.A. Vrugt**, *Improved treatment of uncertainty in hydrologic modeling*, Presented at Department of Civil and Environmental Engineering, University of California Berkeley, Berkeley, February 25, 2008.

25. **J.A. Vrugt**, *Treatment of hydrologic parameter uncertainty using Markov chain Monte Carlo sampling and high performance computing*, Presented at Department of Hydrology and Water Resources, The University of Arizona, Tucson, March 12, 2008.

26. **J.A. Vrugt**, *Adaptive Markov chain Monte Carlo sampling for estimating parameters in high-resolution three-dimensional flow and transport models*, Presented at New Mexico Institute of Technology, Socorro, March 24, 2008.

27. **J.A. Vrugt**, *Adaptive Markov chain Monte Carlo sampling and high performance computing for estimating parameters in high-resolution three-dimensional flow and transport models*, Presented at Computational Methods in Water Resources, XVII International Conference, San Francisco, July 6-10, 2008.

28. **J.A. Vrugt**, *Nonlinear parameter estimation using self-adaptive global optimization and Monte Carlo sampling*, Presented at Mathematisches Institut der Universität Basel, Basel, November 7, 2008.

29. **J.A. Vrugt**, *Inverse modeling to improve environmental models*, Presented at Institute of Biodiversity and Ecosystem Dynamics (IBED), University of Amsterdam, Amsterdam, November 13, 2008.

30. **J.A. Vrugt**, *Treatment of rainfall error using Markov chain Monte Carlo simulation*, Presented at Annual Meeting of the American Meteorological Society (AMS), Phoenix, January 11-15, 2009.

31. **J.A. Vrugt**, *Uncertainty estimation using adaptive Markov chain Monte Carlo simulation and particle filtering*, Presented at SIAM Conference on Computational Science and Engineering (CSE09), Miami, March 2-6, 2009.

32. **J.A. Vrugt**, *Parameter exploration using self-adaptive sampling and optimization algorithms to solve environmental models*, Presented at Henri Samueli School of Engineering, University of California, Irvine, Irvine, April 6, 2009.

33. **J.A. Vrugt**, *Toward a systematic framework for model evaluation in catchment hydrology*, Presented at General Assembly of the European Geophysical Union, Vienna, April 19-24, 2009.

34. **J.A. Vrugt**, *Parameter exploration using self-adaptive sampling and optimization algorithms to solve environmental models*, Presented at Faculty of Civil Engineering and Geosciences (48th Colloquium on Recent Advances in Water Resources), Delft University of Technology, Delft, July 2, 2009.

35. **J.A. Vrugt**, *Parameter exploration using self-adaptive sampling and optimization algorithms to solve environmental models*, Presented at Faculty of Geosciences, Utrecht University, Utrecht, July 15, 2009.

36. **J.A. Vrugt**, *Solving environmental models using parameter exploration and high performance computing*, Presented at Earth and Environmental Sciences Division (Frontiers in Geosciences Seminar Series), Los Alamos National Laboratory, Los Alamos, September 28, 2009.

37. **J.A. Vrugt**, *Self adaptive learning in global optimization and filtering*, First PEST Users Conference, Washington DC, November 2-4, 2009.

38. **J.A. Vrugt**, *Model calibration revisited*, Medal Lecture at General Assembly of the European Geophysical Union, Vienna, May 2-7, 2010.

39. **J.A. Vrugt**, *Calibration of environmental models: treatment of uncertainty*, To be presented at Department of Earth System Science, University of California, Irvine, Nov. 3, 2010.

40. **J.A. Vrugt**, *Markov chain Monte Carlo simulation: efficiency and parallel computation*, To be presented at Workshop on Bayesian inference in Econometrics, Finance and Earth System Science, University of Amsterdam, Amsterdam, Nov. 8, 2010.

41. **J.A. Vrugt**, *Model calibration revisited: uncertainty quantification*, To be presented at Department of International Meteorological Institute, Stockholm University, Stockholm, Nov. 9, 2010.

42. **J.A. Vrugt**, *Distributed MCMC simulation using differential evolution adaptive multi-try-Metropolis sampling*, To be presented at Department of Statistics, University of California, Irvine, Dec. 3, 2010.

43. **J.A. Vrugt**, *Distributed MCMC simulation using differential evolution adaptive multi-try-Metropolis sampling*, To be presented at MCMCski, Canyon Resort, Utah, Jan. 5-7, 2011.

Other Presentations

1. **J.A. Vrugt**, and W. Bouten, *Is the best fit to experimental data what we are really looking for?*, Presented at International Study Group on Inverse Modeling (ISGIM), Orange Coast, AL, USA, November 1-3, 2000.

2. **J.A. Vrugt**, J.W. Hopmans, and J. Simunek, *Application of one, two and three-dimensional root water uptake in transient flow modeling*, Presented at International Study Group on Inverse Modeling (ISGIM), Orange Coast, AL, USA, November 1-3, 2000.

3. **J.A. Vrugt**, H.V. Gupta, W. Bouten, and S. Sorooshian, *A Shuffled Complex Evolution Metropolis algorithm for optimization and uncertainty assessment of hydrological model parameters*, Presented at AGU fall meeting, San Francisco, CA, USA, December 6-10, 2002.

4. **J.A. Vrugt**, H.V. Gupta, W. Bouten, and S. Sorooshian, *Confronting uncertainty in hydrologic modeling*, Presented at International Study Group on Inverse Modeling (ISGIM), Thurnau, Germany, April 3-5, 2003.

5. **J.A. Vrugt**, H.V. Gupta, W. Bouten, and S. Sorooshian, *A Shuffled Complex Evolution Metropolis algorithm for confronting parameter uncertainty in hydrologic modeling*, Presented at General Assembly of the European Geophysical Society, Nice, France, April 6-11, 2003.

6. **J.A. Vrugt**, G.H. Schoups, J.W. Hopmans, C.A. Young, W.W. Wallender, T. Harter, and W. Bouten, *Identification of spatially distributed soil hydraulic properties in hydrologic modeling using global optimization*, Presented at AGU fall meeting, San Francisco, CA, USA, December 8-12, 2003.

7. **J.A. Vrugt**, C.G.H. Diks, W. Bouten, H.V. Gupta, and J.M. Verstraten, *Towards a complete treatment of uncertainty in hydrologic modeling: Combining the strengths of global optimization and data assimilation*, Presented at 7th Netherlands Earth Sciences conference, April 5-6, Veldhoven, 2004.

8. **J.A. Vrugt**, *Improved treatment of uncertainty in hydrologic modeling*, Presented at British Hydrological Society International Conference on Hydrology: Science & Practice for the 21st Century, Imperial College, London, England, July 12-16, 2004.

9. **J.A. Vrugt**, C.G.H. Diks, W. Bouten, H.V. Gupta, and J.M. Verstraten, *Improved treatment of uncertainty in hydrologic modeling: combining the strengths of global optimization and data assimilation*, Presented at General Assembly of the European Geophysical Union, Nice, France, April 25-30, 2004.

10. **J.A. Vrugt**, and H.V. Gupta, *Real-time data assimilation for operational ensemble streamflow forecasting*, Presented at 2nd HEPEX workshop, Boulder, CO, USA, July 19-22, 2006.

11. **J.A. Vrugt**, *Improved treatment of uncertainty in hydrologic modeling*, Presented at New Mexico water resources symposium, Socorro, NM, USA, August 16, 2005.

12. **J.A. Vrugt**, and B.A. Robinson, *On the value of sequential data assimilation and Bayesian model averaging for probabilistic ensemble streamflow forecasting*, Presented at Western Pacific Geophysics Meeting, Beijing, China, July 23-27, 2006.
13. **J.A. Vrugt**, and B.A Robinson, *Improved interpretation of multi-tracer experiments in subsurface media: multi-objective parameter and state estimation*, Presented at 2006 international annual meeting of the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America, Indianapolis, IN, USA, Nov 12-16, 2006.
14. **J.A. Vrugt**, and B.A Robinson, *Improved evolutionary optimization from genetically adaptive multi-method search*, Presented at AGU fall meeting, San Francisco, CA, USA, December 10-15, 2006.
15. **J.A. Vrugt**, *Self-adaptive multimethod search for improved calibration of hydrologic models*, Presented at Water Research Symposium, Socorro, NM, USA, August 14, 2007.
16. **J.A. Vrugt**, *Inverse modeling of subsurface flow and transport parameters using recent advances in global optimization and parallel computing*, Presented at Unsaturated Zone Interest Group (UZIG) meeting, Los Alamos, NM, USA, August 27-30, 2007.
17. **J.A. Vrugt**, *A universal multimethod search strategy for computationally efficient global optimization*, Presented at Geological Society of America Annual Meeting, Denver, CO, USA, October 28-31, 2007.
18. **J.A. Vrugt**, B.A. Robinson, and J.M. Hyman, *Self-adaptive multimethod search for global optimization of hydrologic model parameters*, Presented at General Assembly of the European Geophysical Union, Nice, France, April 13-18, 2008.
19. **J.A. Vrugt**, C.J.F. ter Braak, M.P. Clark, J.M. Hyman, and B.A. Robinson, *Bayesian treatment of forcing error using adaptive Markov chain Monte Carlo sampling*, Presented at General Assembly of the European Geophysical Union, Nice, France, April 13-18, 2008.
20. **J.A. Vrugt**, *A differential evolution adaptive Metropolis (DREAM) particle filter for environmental model diagnostics*, Presented at General Assembly of the European Geophysical Union, Vienna, April 19-24, 2009.

Posters

1. T. Wagener, **J.A. Vrugt**, H.S. Wheater, H.V. Gupta, and S. Sorooshian, A dynamic approach to the identification of conceptual hydrological models, AGU fall meeting, San Francisco, CA, USA, December 6-10, 2002.
2. **J.A. Vrugt**, G.H. Schoups, J.W. Hopmans, C.A. Young, W.W. Wallender, T. Harter, and W. Bouten, Inverse modeling of large-scale spatially distributed vadose zone properties using global optimization, General Assembly of the European Geophysical Union, Nice, France, April 25-30, 2004.
3. J.W. Hopmans, G.H. Schoups, **J.A. Vrugt**, C. Young, T. Harter, and W.W. Wallender, Parameter identification of large-scale spatially distributed vadose zone properties using global optimization, Gordon Conference on Flow and Transport in Porous Media, Oxford, England, July 11-16, 2004.
4. **J.A. Vrugt**, H.V. Gupta, B.Ó Nualláin, H.V. Gupta, and W. Bouten, Real-time data assimilation for operational ensemble streamflow forecasting, EGU meeting, Vienna, April 2005.
5. P.H. Stauffer, and **J.A. Vrugt**, The unsaturated zone transport test, Busted Butte, NV: Phase 1B: Experimental results and model validation Unsaturated Zone Interest Group (UZIG) meeting, Los Alamos, NM, USA, August 27 - 30, 2007.
6. T.P.A. Ferré, **J.A. Vrugt**, and A.C. Hinnell, Hydrogeophysical estimation of soil hydraulic properties during one-step outflow, AGU fall meeting, San Francisco, December, 2007.
7. G. Schoups, **J.A. Vrugt**, F. Fenicia, and N. van de Giesen, Identification of accurate nonlinear rainfall-runoff models with unique parameters, EGU meeting, Vienna, April 2009.

Computer/ Programming Skills

Excellent in MATLAB/OCTAVE, proficient in Fortran, Unix/shell script programming, LaTeX, MPI, parallel computing, and all aspects of Windows platform (Word, PowerPoint, Excel, WordPerfect). Familiar with GIS software and C programming.

Language Skills

Dutch (native), English (fluent), German (fluent), Farsi (Basic), French (Basic).

References

Available upon request.

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