Stanford

Margot Gerritsen

Professor of Energy Resources Engineering, Emerita

Energy Science & Engineering

Curriculum Vitae available Online

Bio

BIO

I was born and raised in the Netherlands. After receiving my MS degree in Applied Mathematics at the University of Delft, I moved to the U.S. in search of hillier and sunnier places. In 1996 I received my Ph.D. in Scientific Computing and Computational Mathematics at Stanford University. Before returning to Stanford in 2001, I spent nearly five years in Auckland, New Zealand as a faculty member in the Department of Engineering Science.

I’m a professor in the Department of Energy Resources Engineering at Stanford, interested in computer simulation and mathematical analysis of engineering and natural processes. From 2010 to 2018, I directed the Institute for Computational and Mathematical Engineering (http://icme.stanford.edu). Since 2015, I'm the Senior Associate Dean for Educational Affairs in the School of Earth, Energy and Environmental Sciences, as well as the co-director of Women in Data Science (WiDS, widsconference.org) and the host of the WiDS podcasts.

My primary interests are in sustainability, and renewable and fossil energy production. I am also active in coastal ocean dynamics and yacht design, as well as several areas in computational mathematics including search algorithm design and matrix computations. My latest research projects include traffic congestion and emissions simulation and mitigation, and wildland fire prediction and mitigation.

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Energy Science & Engineering
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Institute for Computational and Mathematical Engineering (ICME)

ADMINISTRATIVE APPOINTMENTS

- Associate Director, Stanford Data Science, (2020- present)
- Senior Associate Dean, School of Earth, Energy and Environmental Sciences, (2015-2020)
- Visiting Professor, Institut de Mechanique des Fluides, Toulouse, France, (2013-2013)
- Visiting Professor, Institut National Polytechnique de Toulouse, France, (2012-2013)
- Director, Institute for Computational & Mathematical Engineering, Stanford, (2010-2018)
- Adjunct Professor, Applied and Computational Mathematics, University of Bergen, Norway, (2010-2016)
- Visiting Professor, Department of Scientific Computing, Uppsala University, Sweden, (2008-2012)
- Visiting Professor, Applied Earth Sciences, Delft University of Technology, (2008-2010)

- Professor by courtesy, Mechanical Engineering, Stanford, (2004-2018)
- Steering committee, Institute for Computational Mathematics in Engineering, Stanford, (2004-2005)
- Professor, Department of Energy Resources Engineering, Stanford University, (2001- present)
- Adjunct Professor, Civil & Environmental Engineering, Stanford, (2000- present)
- Lecturer, Department of Engineering Science, University of Auckland, New Zealand, (1997-2001)
- Lecturer, University of Colorado, Denver, (1991-1991)
- Research Associate, Delft University of Technology, (1990-1990)
- Research Assistant, Shell Laboratories, Rijswijk, (1987-1987)
- Lecturer, Summer school, Delft University of Technology, (1985-1989)

HONORS AND AWARDS

- Deborah Rhode Lifetime Achievement Award, Faculty Womens Forum (2022)
- Eredoctoraat (Honorary Doctor), University of Eindhoven, the Netherlands (2021)
- Doctor Honoris Causa (Honorary Doctor), Uppsala Universitet, Sweden (2019)
- Fellow, Society for Industrial & Applied Mathematics (SIAM) (2018)
- Teaching Honor Roll, Tau Beta Pi (2018)
- Honorary Member, Cap and Gown Women's Leadership Honor Society, Stanford (2017)
- Oswald G. Villard University Fellow in Undergraduate Education, VPUE Stanford (2014, reappointed in 2019, 2020-2024)
- Richard W. Lyman Award, Stanford Alumni Association (2014)
- SWE Professor of the Year, Society for Women Engineers, Stanford (2014)
- 2011 Magne Espedal Professor II, University of Bergen, Norway (2011)
- School of Earth Sciences Award for Excellence in Teaching, Stanford University (2011)
- Stanford Fellow, Stanford University (2010-2012)
- Fellow, Leopold Leadership Program (2009)
- Faculty Research Fellow, Clayman Institute (2008 – 2010)
- Frederick E. Terman Fellow, Stanford University (2002 – 2004)
- Top 20 teacher, School of Engineering, Auckland University (1997-2001)
- International Rotary Award, Rotary (1990)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Executive Director, Women in Data Science Worldwide (2022 - present)
- Chair, Chair of Board of Trustees, Society of Industrial and Applied Mathematics (SIAM) (2020 - present)
- Member, Advisory Board, HRDAG (Human Rights Data Analysis Group) (2019 - present)
- Member, Sektorplan Commissie Kamer Beta, Ministerie van Onderwijs, Cultuur en Wetenschap (advisory role, research and education in applied sciences for the Dutch Department of Education, Science and Culture) (2018 - present)
- Co-chair, Global Women in Data Science Conference, Stanford, widsconference.org (2016 - present)
- Elected member, Board of Trustees, Society for Industrial & Applied Mathematics (2016 - present)
- Member, 49th Faculty Senate, Stanford (2016 - present)
- Member, SIAM Geosciences Prize Committee (2016 - present)
- Member, Organizing Committee, Geilo Winter School, Norway (2016 - present)
- Member, Organizing Committee SPE Reservoir Simulation Symposium, Houston, February 2017 (2016 - present)

- Member, Faculty Search Committee, Geological Sciences, Stanford (2016 - present)
- Member, Organizing Committee, Reactive Flows in Deformable Complex Media, 2nd Oberwolfach Conference, Germany, 2018 (2016 - present)
- Member, Steering Committee of the Faculty Senate, Stanford (2016 - present)
- Member, Faculty Search Committee, Math+X, Stanford (2016 - present)
- Member, Faculty Advisory Board, Knight-Hennessy Scholarship Program (2016 - present)
- Member, Faculty Search Committee, Aeronautics & Astronautics, Stanford (2016 - present)
- Co-chair, Bay Area Scientific Computing Day (2016 - 2016)
- Member, Presidential Search Committee, Stanford (2015 - 2016)
- Co-chair, local organizer, SIAM Geosciences Conference, Stanford, June 2015 (2015 - 2015)
- Co-initiator and co-chair, 1st Women in Data Science Conference, Stanford, widsconference.org (2015 - 2015)
- Member, Breadth Governance Board, Stanford (2014 - present)
- Member, Undergraduate Advisory Council, Stanford (2014 - present)
- Chair, Taskforce on Women in Leadership, Stanford (2014 - 2016)
- Member, SoE Future Committee (2014 - 2015)
- Member, 47th Faculty Senate, Stanford (2014 - 2015)
- Co-chair, CUDA on Campus Conference, Stanford (2014 - 2014)
- Co-chair, Bay Area Scientific Computing Day (2014 - 2014)
- Member, Faculty Search Committee, Management Science & Engineering, Stanford (2014 - 2014)
- Member, Faculty Search Committee, Math+X, Stanford (2014 - 2014)
- Member, Organizing Committee, Reactive Flows in Deformable Complex Media, Oberwolfach Conference, Germany (2014 - 2014)
- Associate Editor, Transport in Porous Media (Springer) (2013 - present)
- Member, SoE Dean Search Committee, Stanford (2013 - present)
- Member, Editorial Board, Survey & Review, SIAM (2013 - present)
- Member, University Course Evaluation Committee (2013 - 2015)
- Co-Chair, SIAM Annual Conference, Chicago, July 2014 (2013 - 2014)
- Member, Advisory Board, University College Dublin (2013 - 2014)
- Member, 46th Faculty Senate, Stanford (2013 - 2014)
- Co-chair, CUDA on Campus Conference, Stanford (2013 - 2013)
- Member, Faculty Search Committee, Aeronautics & Astronautics (2013 - 2013)
- Member, LLNL Computational Directorate Review Committee (2013 - 2013)
- Member, Faculty Advisory Group for Research Computing, Stanford (2012 - 2014)
- Member, 45th Faculty Senate, Stanford (2012 - 2013)
- Chair, Review Committee Computational Sciences, KAUST, February 2012 (2012 - 2012)
- Co-chair, CUDA on Campus Conference, Stanford (2012 - 2012)
- Co-chair, Bay Area Scientific Computing Day (2012 - 2012)
- Member, 44th Faculty Senate, Stanford (2011 - 2012)
- Co-chair, IMA Workshop on Societally Relevant Computing, Minneapolis, April 2011 (2011 - 2011)
- Member, Senate Committee on Committees, Stanford (2010 - 2012)
- Member (re-elected), Council of the Society of Industrial and Applied Mathematics (SIAM) (2010 - 2012)

- Member, 43rd Faculty Senate, Stanford (2010 - 2011)
- Member, Integrated Assessments, Powell Center working group USGS (2010 - 2011)
- Co-chair, Bay Area Scientific Computing Day (2010 - 2010)
- Member, Organizing Committee, Gordon Research Conference on Flow & Transport in Permeable Media (2010 - 2010)
- Chair (re-elected), SIAM Activity Group Geosciences (2009 - 2011)
- Chair, Woods and Precourt Large Scale Solar Technology & Policy Forum (2009 - 2010)
- Associate Editor, Journal of Sailboat Technology (2008 - present)
- Member, Council of the Society for Industrial and Applied Mathematics (SIAM) (2008 - 2010)
- Member, Council of InterPore, International Society for Porous Media (2008 - 2010)
- Member, Special Series Committee, Journal of Petroleum Technology, Society of Petroleum Engineers (2008 - 2010)
- Co-producer, Smart Energy podcast www.smartenergyshow.com (2007 - 2014)
- Co-director, Center of Excellence for Computational Approaches to Digital Stewardship (CADS) (2007 - 2011)
- Chair, SIAM Activity Group on Geosciences (2007 - 2009)
- Member, Council of the Society of Industrial and Applied Mathematics (SIAM) (2007 - 2009)
- Consultant, Library of Congress, World Digital Library development (2007 - 2007)
- Member, Diversity Committee Mechanical Engineering, Stanford (2005 - 2007)
- Member, Advisory Board, School of Earth Sciences, Stanford (2004 - 2007)
- Director, Stanford-National Geographic Pterosaur Replica Project (2004 - 2006)
- Member, Steering Committee, Institute for Computational & Mathematical Engineering, Stanford (2004 - 2006)
- Associate Editor, International Journal of Small Craft Technology (2003 - 2005)
- Member, Faculty search committee, Geological Sciences, Stanford (2003 - 2003)
- Reviewer, Journal of Computational Physics, Journal of Fluid Mechanics, Transport in Porous Media, Society of Petroleum Engineers, Department of Energy, US Civilian Research and Development Foundation (2003 - 2003)
- Advisor, Pre-major advisor, Stanford (on and off) (2002 - present)
- Faculty advisor, Stanford SIAM Student Chapter (2002 - present)
- Director, Stanford Yacht Research Unit (2002 - 2010)
- Member, SPE, AGU, SIAM, KIVI, AWIS, SWE (2001 - present)
- Member, Organizing Committee, Waitangi Conference, University of Auckland (2000 - 2000)
- Chair, Student Affairs Committee, School of Engineering, University of Auckland (1999 - 2001)
- Patron, Engineering Postgraduate Society, University of Auckland (1999 - 2000)
- Member, School Policy Team, School of Engineering, University of Auckland (1998 - 2000)
- Member, Equal Education Committee, School of Engineering, University of Auckland (1997 - 2001)
- Patron, Auckland University Engineering Society (1997 - 2000)
- Founder, SCCM, ICME Computational Consulting Group, Stanford (1995 - present)
- Teacher, Upward Bound Program, Palo Alto (1995 - 1995)

PROFESSIONAL EDUCATION

- PhD, Stanford University , Scientific Computing and Computational Mathematics (1997)
- MSc, Delft University of Technology , Applied Mathematics (1990)

LINKS

- Gerritsen Research: https://earth.stanford.edu/ere/about/energy-resources-engineering-faculty#gs.wtgaez
- Computational and Mathematical Engineering: http://icme.stanford.edu
- Computational Approaches to Digital Stewardship: http://cads.stanford.edu
- Personal Website: http://margot.stanford.edu

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Research

My work is about understanding and simulating complicated fluid flow problems. My research focuses on the design of highly accurate and efficient parallel computational methods to predict the performance of enhanced oil recovery methods. I'm particularly interested in gas injection and in-situ combustion processes. These recovery methods are extremely challenging to simulate because of the very strong nonlinearities in the governing equations. Outside petroleum engineering, I'm active in coastal ocean simulation with colleagues from the Department of Civil and Environmental Engineering, yacht research and pterosaur flight mechanics with colleagues from the Department of Mechanical and Aeronautical Engineering, and the design of search algorithms in collaboration with the Library of Congress and colleagues from the Institute of Computational and Mathematical Engineering.

Teaching

I teach courses in both energy related topics (reservoir simulation, energy, and the environment) in my department, and mathematics for engineers through the Institute of Computational and Mathematical Engineering (ICME). I also initiated two courses in professional development in our department (presentation skills and teaching assistant training), and a consulting course for graduate students in ICME, which offers expertise in computational methods to the Stanford community and selected industries.

Professional Activities

Senior Associate Dean, School of Earth, Energy and Environmental Sciences, Stanford (from 2015); Director, Institute for Computational and Mathematical Engineering, Stanford (from 2010); Stanford Fellow (2010-2012); Magne Espedal Professor II, Bergen University (2011-2014); Aldo Leopold Fellow (2009); Chair, SIAM Activity group in Geosciences (2007, present, reelected in 2009); Faculty Research Fellow, Clayman Institute (2008); Elected to Council of Society of Industrial and Applied Mathematics (SIAM) (2007); organizing committee, 2008 Gordon Conference on Flow in Porous Media; producer, Smart Energy podcast channel; Director, Stanford Yacht Research; Co-director and founder, Stanford Center of Excellence for Computational Algorithms in Digital Stewardship; Editor, Journal of Small Craft Technology; Associate editor, Transport in Porous Media; Reviewer for various journals and organizations including SPE, DoE, NSF, Journal of Computational Physics, Journal of Scientific Computing, Transport in Porous Media, Computational Geosciences; member, SIAM, SPE, KIVI, AGU, and APS

Teaching

COURSES

2021-22

- ERE Master's Graduate Seminar: ENERGY 351 (Win)
- ERE PhD Graduate Seminar: ENERGY 352 (Win)

2020-21

- ERE Master's Graduate Seminar: ENERGY 351 (Win)
- ERE PhD Graduate Seminar: ENERGY 352 (Win)

- Education as Self-Fashioning: Unintended Consequences: ESF 10 (Aut)
- Education as Self-Fashioning: Unintended Consequences: ESF 10A (Aut)
- Fundamentals of Renewable Power: EARTHSYS 102, ENERGY 102 (Spr)
- Linear Algebra with Application to Engineering Computations: CME 200, ME 300A (Aut)
- Teaching Experience in Energy Resources Engineering: ENERGY 359 (Aut)

STANFORD ADVISEES

Doctoral (Program)

Sergio Camelo Gomez

Publications

PUBLICATIONS

- **Compositional effects in thermal, compositional and reactive simulation** *COMPUTATIONAL GEOSCIENCES*
  Cremon, M. A., Gerritsen, M. G.
  2021
- **Multi-level delumping strategy for thermal enhanced oil recovery simulations at low pressure** *FLUID PHASE EQUILIBRIA*
  Cremon, M. A., Gerritsen, M. G.
  2021; 528
- **Effect of Pressure on Crude-Oil Kinetics During In Situ Combustion** *ENERGY & FUELS*
  Yoo, K., Trujillo Portillo, M., Patino Ramirez, C., Sampaio, L., Gerritsen, M., Kovscek, A. R.
  2020; 34 (10): 12103–17
- **Thermal Imaging To Visualize and Characterize Combustion Fronts in Porous Media** *INDUSTRIAL & ENGINEERING CHEMISTRY RESEARCH*
  Yoo, K., Sampaio, L., Amanam, U., Gerritsen, M., Kovscek, A. R.
  2020; 59 (5): 2181–91
- **Monte Carlo simulation for uncertainty quantification in reservoir simulation: A convergence study** *Journal of Petroleum Science and Engineering*
  Cremon, M. A., Christie, M. A., Gerritsen, M. G.
  2020; 190
- **Numerical Artifacts in the Discontinuous Generalized Porous Medium Equation: How to Avoid Spurious Temporal Oscillations** *Journal of Computational Physics*
  Maddix, D., Sampaio, L., Gerritsen, M.
  2018; 368: 277-298
- **An optimization algorithm for evaluation of kinetic parameters for crude oil combustion** *Journal of Petroleum Science and Engineering*
  Koh Yoo, K. H., Sampaio, L., Gerritsen, M., Kovscek, A.
  2018; 169: 241-257
- **Numerical artifacts in the discontinuous generalized porous medium equation: how to avoid temporal oscillations** *Journal of Computational Physics*
  Maddix, D., Sampaio, L., Gerritsen, M.
  2018; 368: 277-298
- **Numerical artifacts in the Generalized Porous Medium Equation: Why harmonic averaging itself is not to blame** *Journal of Computational Physics*
  Maddix, D., Sampaio, L., Gerritsen, M.
  2018; 361
- **Placeholder: Numerical Linear Algebra**
  Darve, E., Gerritsen, M.
  SIAM.2017
- **Operation, Design and Performance of Tidal Turbines in Large Arrays** *Asian Wave and Tidal Energy Conference*
  Smeaton, M., Harang, A., Vennell, R., Gerritsen, M.

2016

- **Upscaling Kinetics for Field-Scale In-Situ-Combustion Simulation** *SPE RESERVOIR EVALUATION & ENGINEERING*
  Nissen, A., Zhu, Z., Kovscek, T., Castanier, L., Gerritsen, M.
  2015; 18 (2): 158-170

- **Kinetics Oxidation of Heavy Oil. 2. Application of Genetic Algorithm for Evaluation of Kinetic Parameters** *ENERGY & FUELS*
  Lapene, A., Debenest, G., Quintard, M., Castanier, L. M., Gerritsen, M. G., Kovscek, A. R.
  2015; 29 (2): 1119-1129

- **New hybrid Cartesian cut cell/enriched multipoint flux approximation approach for modelling and quantification of structural uncertainties in petroleum reservoirs** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN FLUIDS*
  Ahmadi, M., Christie, M., Gerritsen, M., Bazargan, H.
  2015; 80 (3): 181-228

- **Licht in the Digitale Duisternis dankzij Computertools voor Digital Beheer** *Nieuw Archief voor Wiskunde*
  Gerritsen, M., Gleich, D., Wang, Y., Meng, X., Ronaghi, F., Saberi, A.
  2015; 16 (4): 246-258

- **(In review) Micromodel Experiments of Fluid Flow through High Porosity Porous Media** *Advances in Water Resources*
  Chen, Q., Chen, T., Gerritsen, M.
  2015

- **A Gentle Introduction to Matrix Computations** *Gentle Introductions to Numerical Analysis*
  Gerritsen, M.
  Self-published, margot.stanford.edu.2015; 1

- **(In review) Structural Uncertainty Quantification for Petroleum Reservoirs Assisted by an Immersed Interface/ Cartesian Cut Cell Approach** *Computers & Geosciences*
  Ahmady, M., Christie, M., Gerritsen, M.
  2015

- **Acceleration of Geant-DNA Physics Models Performance using Graphics Processing Units** *Joint International Conference on Mathematics and Computation. Supercomputing in Nuclear Applications (SNA) and the Monte Carlo (MC) Method*
  Okada, S., Murakami, K., Sasaki, T., Amako, K., Incerti, S., Karamitros, M., Asai, M., Dotti, A., Henderson, N., Gerritsen, M.
  American Nuclear Society.2015

- **(In review) Geospatial optimization of siting large-scale solar energy projects** *International Journal of Geographical Information Science*
  Macknick, J., Komor, P., Gerritsen, M.
  2014

- **Improved Predictability of In-Situ-Combustion Enhanced Oil Recovery** *SPE RESERVOIR EVALUATION & ENGINEERING*
  Kovscek, A. R., Castanier, L. M., Gerritsen, M. G.
  2013; 16 (2): 172-182

- **High Order Stable Finite Difference Methods for the Schrodinger Equation** *JOURNAL OF SCIENTIFIC COMPUTING*
  Nissen, A., Kreiss, G., Gerritsen, M.
  2013; 55 (1): 173-199

- **A Framework for Quantitative Assessment of Impacts Related to Energy and Mineral Resource Development** *Natural Resources Research*
  Diffendorfer et al (including Gerritsen), H.,
  2013

- **Geant4 Based Simulation of Radiation Dosimetry in CUDA** *60th IEEE Nuclear Science Symposium (NSS) / Medical Imaging Conference (MIC) / 20th International Workshop on Room-Temperature Semiconductor X-ray and Gamma-ray Detectors*
  Murakami, K., Henderson, N., Amako, K., Asai, M., Aso, T., Dotti, A., Kimura, A., Gerritsen, M., Kurashige, H., Perl, J., Sasaki, T.
  IEEE.2013

- **Modeling Spatial and Structural Uncertainty in the Subsurface** *Computational Challenges in the Geosciences*
  Gerritsen,, M., Caers, J.
  2013: 143–167

- **Computational Challenges in the Geosciences** *The IMA Volumes in Mathematics and its Applications*
  edited by Dawson, C., Gerritsen, M.
  Springer-Verlag New York.2013; 156
- **Structural Uncertainty Quantification with Immersed Interface Methods** *SPE Journal*
  Ahmadi, M., Christie, M., Gerritsen, M.
  2013
- **Stability at Nonconforming Grid Interfaces for a High Order Discretization of the Schrodinger Equation** *JOURNAL OF SCIENTIFIC COMPUTING*
  Nissen, A., Kreiss, G., Gerritsen, M.
  2012; 53 (3): 528-551
- **Streamline Simulation** *Getting up to Speed*
  edited by Thiele, M., Gerritsen, M., Blunt, M.
  Society of Petroleum Engineers.2012
- **Kinetics Oxidation of Heavy Oil. 1. Compositional and Full Equation of State Model** *ENERGY & FUELS*
  Lapene, A., Debenest, G., Quintard, M., Castanier, L. M., Gerritsen, M. G., Kovscek, A. R.
  2011; 25 (11): 4886-4895
- **Multidimensional upstream weighting for multiphase transport in porous media** *COMPUTATIONAL GEOSCIENCES*
  Kozdon, J. E., Mallison, B. T., Gerritsen, M. G.
  2011; 15 (3): 399-419
- **Multidimensional Upwinding for Multiphase Transport in Porous Media** *SPE Reservoir Simulation Symposium*
  Kozdon, J., Mallison, B., Gerritsen, M., Chen, W.
  SOC PETROLEUM ENG.2011: 263–72
- **Some computational tools for digital archive and metadata maintenance** *BIT NUMERICAL MATHEMATICS*
  Gleich, D. F., Wang, Y., Meng, X., Ronaghi, F., Gerritsen, M., Saberi, A.
  2011; 51 (1): 127-154
- **Thermal Streamline Simulation: Steam Floods** *SPE Reservoir Simulation Symposium*
  Zhu, Z., Thiele, M. R., Gerritsen, M. G.
  2011
- **Upscaling for Field-scale In-situ Combustion Simulation** *SPE Western North American Region Meeting*
  Zhu, Z., Bazargan, M., Lapene, A., Gerritsen, M. G., Castanier, L., Kovscek, A. R.
  2011
- **Thermal Streamline Simulation for Hot Waterflooding** *SPE Reservoir Simulation Symposium*
  Zhu, Z., Gerritsen, M. G., Thiele, M. R.
  SOC PETROLEUM ENG.2010: 372–82
- **Modeling Foam Displacement With the Local-Equilibrium Approximation: Theory and Experimental Verification** *2008 SPE Annual Technical Conference and Exhibition*
  Chen, Q., Gerritsen, M. G., Kovscek, A. R.
  SOC PETROLEUM ENG.2010: 171–83
- **Investigating an advective approach to subgrid modeling in large-eddy simulations** *COMPUTERS & FLUIDS*
  Sampaio, L. E., Nieckele, A. O., Gerritsen, M.
  2010; 39 (1): 125-136
- **Improving Steam Assisted Gravity Drainage using Mobility Controlled Foam: Foam Assisted SAGD (FA-SAGD)** *SPE Improved Oil Recovery Symposium*
  Chen, Q., Gerritsen, M. G., Kovscek, A. R.
  2010
- **Global variable compact multipoint methods for accurate upscaling with full-tensor effects** *COMPUTATIONAL GEOSCIENCES*
  Chen, T., Gerritsen, M. G., Lambers, J. V., Durlofsky, L. J.

2010; 14 (1): 65-81

- **Robust Multi-D Transport Schemes with Reduced Grid Orientation Effects** *TRANSPORT IN POROUS MEDIA*
  Kozdon, J., Mallison, B., Gerritsen, M.
  2009; 78 (1): 47-75
- **Parallel implementations of streamline simulators** *COMPUTATIONAL GEOSCIENCES*
  Gerritsen, M. G., Loef, H., Thiele, M. R.
  2009; 13 (1): 135-149
- **An Equation-of-State Compositional In-Situ Combustion Model: A Study of Phase Behavior Sensitivity** *TRANSPORT IN POROUS MEDIA*
  Kristensen, M. R., Gerritsen, M. G., Thomsen, P. G., Michelsen, M. L., Stenby, E. H.
  2009; 76 (2): 219-246
- **Parallel Streamline Simulation** *Europec/EAGE Conference and Exhibition*
  Loef, H., Gerritsen, M., Thiele, M.
  2009
- **Efficient flight of pterosaurs - An Unsteady Aerodynamic Approach** *7th AIAA Aerospace Sciences Meeting and Exhibit*
  Strang, A., Gerritsen, M., Kroo, I., Delp, S.
  2009
- **Multi-phase 3D Simulation with Integrated Upscaling, MPFA Discretization and Adaptivity** *SPE Reservoir Simulation Symposium*
  Lambers, J. V., Gerritsen, M. G., Fragola, D.
  2009
- **Multi-D Upwinding for Multi-Phase Transport in Porous Media** *SPE Reservoir Simulation Symposium*
  Kozdon, J., Mallison, B., Gerritsen, M. G.
  2009
- **Adaptive Local-Global VCMP Methods for Coarse-Scale Reservoir Modeling** *SPE Reservoir Simulation Symposium*
  Chen, T., Gerritsen, M. G., Durlofsky, L., Lambers, J.
  2009
- **Algorithms for Large, Sparse Network Alignment Problems** *9th IEEE International Conference on Data Mining*
  Bayati, M., Gerritsen, M., Gleich, D. F., Saberi, A., Wang, Y.
  IEEE.2009: 705–710
- **SPATIALLY-VARYING COMPACT MULTI-POINT FLUX APPROXIMATIONS FOR 3-D ADAPTED GRIDS WITH GUARANTEED MONOTONICITY** *ASME International Mechanical Engineering Congress and Exposition*
  Lambers, J. V., Gerritsen, M. G.
  AMER SOC MECHANICAL ENGINEERS.2009: 61–62
- **Analysis of stresses in two-dimensional isostatic granular systems** *PHYSICA A-STATISTICAL MECHANICS AND ITS APPLICATIONS*
  Gerritsen, M., Kreiss, G., Blumenfeld, R.
  2008; 387 (25): 6263-6276
- **Effects of Reservoir Heterogeneities on the Steam-Assisted Gravity-Drainage Process** *SPE RESERVOIR EVALUATION & ENGINEERING*
  Chen, Q., Gerritsen, M. G., Kovscek, A. R.
  2008; 11 (5): 921-932
- **Accurate local upscaling with variable compact multipoint transmissibility calculations** *COMPUTATIONAL GEOSCIENCES*
  Lambers, J. V., Gerritsen, M. G., Mallison, B. T.
  2008; 12 (3): 399-416
- **Stress chain solutions in two-dimensional isostatic granular systems: Fabric-dependent paths, leakage, and branching** *PHYSICAL REVIEW LETTERS*
  Gerritsen, M., Kreiss, G., Blumenfeld, R.
  2008; 101 (9)
- **Grid orientation revisited: Near-well, early-time effects and solution coupling methods** *TRANSPORT IN POROUS MEDIA*
  Kozdon, J., Gerritsen, M., Christie, M.

2008; 73 (3): 255-277

- **Integration of local-global upscaling and grid adaptivity for simulation of subsurface flow in heterogeneous formations** *COMPUTATIONAL GEOSCIENCES*
  Gerritsen, M., Lambers, J. V.
  2008; 12 (2): 193-208

- **High-resolution prediction of enhanced condensate recovery processes** *2006 SPE/DOE Symposium on Improved Oil Recovery*
  Jessen, K., Gerritsen, M. G., Mallison, B. T.
  SOC PETROLEUM ENG.2008: 257–66

- **A variable relaxation scheme for multiphase, multicomponent flow** *TRANSPORT IN POROUS MEDIA*
  Krishnamurthy, S. B., Gerritsen, M. G.
  2008; 71 (3): 345-377

- **Performance of two-equation turbulence models for flat plate flows with leading edge bubbles** *JOURNAL OF FLUIDS ENGINEERING-TRANSACTIONS OF THE ASME*
  Collie, S., Gerritsen, M., Jackson, P.
  2008; 130 (2)

- **Performance Assessment of a New Advective Subgrid Model Through Two Classic Benchmark Test Cases** *1st Meeting on Quality and Reliability of Large-Eddy Simulation*
  Sampaio, L. E., Nieckele, A. O., Gerritsen, M.
  SPRINGER.2008: 69–80

- **Asynchronous Time Integration of Flux-conservative Transport** *Proceedings of the 11th European Conference on the Mathematics of Oil Recovery*
  Mallison, B. T., Gerritsen, M. G., Kreiss, G.
  2008

- **Matching Wikipedia Categories to the Library of Congress Subject Headings with Network Alignment** *Second ACM International Conference on Web Search and Data Mining*
  Bayati, M., Gerritsen, M., Gleich, D., Saberi, A., Wang, Y.
  2008

- **Impact of Phase Behavior Modeling on In-Situ Combustion Process Performance** *SPE/DOE Symposium on Improved Oil Recovery*
  Kristensen, M. R., Gerritsen, M. G., Thomsen, P. G., Michelsen, M. L., Stenby, E. H.
  2008

- **Efficient integration of stiff kinetics with phase change detection for reactive reservoir processes** *TRANSPORT IN POROUS MEDIA*
  Kristensen, M. R., Gerritsen, M. G., Thomsen, P. G., Michelsen, M. L., Stenby, E. H.
  2007; 69 (3): 383-409

- **Effects of grid resolution on the simulation of internal tides** *16th International Offshore and Polar Engineering Conference (ISOPE 2006)*
  Jachec, S. M., Fringer, O. B., Street, R. L., Gerritsen, M. G.
  INT SOC OFFSHORE POLAR ENGINEERS.2007: 105–11

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- **Numerical simulation of internal tides and the resulting energetics within Monterey Bay and the surrounding area** *GEOPHYSICAL RESEARCH LETTERS*
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  Fringer, O. B., Gerritsen, M., Street, R. L.
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- **An Efficient Optimization Algorithm for Yacht Sails** *Journal of Small Craft Technology, RINA Transactions*
  Doyle, T., Gerritsen, M.
  2006; Part B2
- **Multi-Scale Process Coupling by Adaptive Fractional Stepping: An In-Situ Combustion Model** *SPE/DOE Symposium on Improved Oil Recovery*
  Younis, R., Gerritsen, M.
  2006
- **Sky Monsters** *National Geographic Documentary*
  Gerritsen, M., Collie, S., Strang, A., Train, H.
  2006
- **Effects of grid resolution on the simulation of internal tides** *16th International Offshore and Polar Engineering Conference (ISOPE 2006)*
  Jachec, S. M., Fringer, O. B., Street, R. L., Gerritsen, M. G.
  INTERNATIONAL SOCIETY OFFSHORE& POLAR ENGINEERS.2006: 432–438
- **High-order upwind schemes for two-phase, multicomponent flow** *2003 SPE Reservoir Simulation Symposium*
  Mallison, B. T., Gerritsen, M. G., Jessen, K., Orr, F. M.
  SOC PETROLEUM ENG.2005: 297–311
- **Modeling fluid flow in oil reservoirs** *ANNUAL REVIEW OF FLUID MECHANICS*
  Gerritsen, M. G., Durlofsky, L. J.
  2005; 37: 211-238
- **Internal Waves in Monterey Bay: an application of SUNTANS** *Environmental Hydraulics and Sustainable Water Management*
  Fringer, O., Gerritsen, M., Street, R.
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  2005: 67–76
- **Optimizing streamline coverage for efficiency and accuracy** *SPE Reservoir Simulation Symposium*
  Matringe , S., Gerritsen, M., Mallison, B.
  2005
- **A Fully Adaptive Streamline Framework for the Challenging Simulation of Gas Injection Processes** *SPE Annual Technical Conference and Exhibition*
  Gerritsen, M., Jessen, K., Mallison, B., Lambers, J.
  2005
- **An Integration of Multi-Level Local-Global Upscaling and Adaptivity,** *SPE Annual Technical Conference and Exhibition*
  Lambers, J., Gerritsen, M.
  2005
- **Sail Shape Optimization of a Modern Clipper Yacht** *International Journal of Small Craft Technology*
  Doyle, T., Gerritsen, M. G., Iaccarino, G.
  2005; Part B2
- **A novel Adaptive Anisotropic Grid Framework for Efficient Reservoir Simulation** *SPE Reservoir Simulation Symposium*
  Nilsson, J., Gerritsen, M., Younis, R.
  2005
- **High-Order Upwind Schemes for Three-Phase Multicomponent Flows: A Preliminary Investigation** *SPE Annual Technical Conference and Exhibition*
  Valenti, G., Mallison, B., Jessen, K., Gerritsen, M.
  2004: 2004
- **Experimental Investigation and High Resolution Simulator of in-situ Combustion Processes; 1. Simulator Design and Improved Combustion with Metallic Additives** *SPE International Thermal Operations and Heavy Oil Symposium and Western Regional Meeting*
  Gerritsen, M., Kovscek, A., Castanier, L., Nilsson, J., Younis, R., He, B.

2004

- **Internal waves in Monterey Bay: an application of SUNTANS** *4th International Symposium on Environmental Hydraulics*
  Fringer, O., Gerritsen, M., Street, R.
  2004
- **On accurate tracing of streamlines** *SPE Annual Technical Conference and Exhibition*
  Matringe, S., Gerritsen, M.
  2004
- **Parallel Anisotropic Cartesian Grid Adaptation for In-Situ Combustion Simulations** *9th European Conference on the Mathematics of Oil Recovery*
  Nilsson, J., Gerritsen, M., Younis, R.
  2004
- **Two-dimensional CFD-based parametric Analysis of Downwind Sail Designs** *Journal of Small Craft Technology, RINA Transactions*
  Collie, S., Gerritsen, M., Jackson, P., Fallow, B.
  2004; Part B1
- **A coupled local-global upscaling approach for simulating flow in highly heterogeneous formations** *ADVANCES IN WATER RESOURCES*
  Chen, Y., Durlofsky, L. J., Gerritsen, M., Wen, X. H.
  2003; 26 (10): 1041-1060
- **Non-hydrostatic Parallel Coastal Ocean Modeling: The SUNTANS Project** *Ocean Modeling, Expert System Developers Meeting*
  Fringer, O. B., Gerritsen, M., Street, R. L.
  2003
- **Numerical Analysis and Design of Upwind Sails** *21st AIAA Applied Aerodynamics Conference*
  Sriram, A., Gerritsen, M.
  2003: 3531
- **Improving the Efficiency and Accuracy of Streamline Methods for Compositional Simulation** *24th Annual Workshop & Symposium, Collaborative Project on Enhanced Oil Recovery*
  Gerritsen, M., Mallison, B.
  2003
- **Review of "Computational Methods in Environmental Fluid Mechanics" by O. Kolditz** *Physics Today*
  Gerritsen, M.
  2003
- **Capturing Subgrid Effects in Coarse Scale Reservoir Models** *SIAM Conference on Mathematical and Computational Issues in the Geosciences*
  Chen, Y., Durlofsky, L., Gerritsen, M., Chen, X.
  2003
- **Higher-Order Upwind Schemes for Streamline-based Compositional Simulation** *SIAM Conference on Mathematical and Computational Issues in the Geosciences*
  Gerritsen, M.
  2003: 2003
- **The design of an efficient and reliable streamline method for compositional reservoir simulation** *United States National Congress on Computational Mechanics 7*
  Gerritsen, M., Jessen, K., Orr, F. M., Mallison, B.
  2003
- **Improving the design of yachts using CFD and optimization algorithms** *Proceedings of the High Performance Yacht Design Conference*
  Doyle, T., Shankaran, S., Gerritsen, M., Iaccarino, G., Jameson, A.
  2002
- **An experimental investigation of high aspect ratio 2D sails** *CTR Annual Research Brief*
  Crook, A., Gerritsen, M., Mansour, N. N.
  2002

- **Design of Two-Dimensional Downwind Sail Sections Using Computational Fluid Dynamics** *High Performance Yacht Design Conference*
  Collie, S., Gerritsen, M., Jackson, P.
  2002
- **Designing an efficient solution strategy for fluid flows, II. Stable high-order central finite difference schemes on composite adaptive grids with sharp shock resolution** *Journal of Computational Physics*
  Gerritsen, M., Olsson, P.
  1998; 147: 293
- **SCCM advice: Student-run math consulting at Stanford** *IEEE COMPUTATIONAL SCIENCE & ENGINEERING*
  Aczon, M., Gander, M., Gerritsen, M., Shardlow, T., Sircar, R.
  1997; 4 (1): 7-9
- **Designing an efficient solution strategy for fluid flows .1. A stable high order finite difference scheme and sharp shock resolution for the Euler equations** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Gerritsen, M., Olsson, P.
  1996; 129 (2): 245-262
- **Detecting shocks with wavelets: A tutorial** *SCCM-report*
  Gerritsen, M.
  Stanford University.1996
- **Designing an Efficient Solution Strategy for Fluid Flows** *Journal of Computational Physics*
  Gerritsen, M., Olsson, P.
  1996; 129 (2): 245-262
- **Designing an efficient solution strategy for fluid flows, PhD Thesis** *Scientific Computing and Computational Mathematics Program, Stanford University, December 1996*
  Gerritsen, M.
  1996
- **Ocean upwelling: observations, analytical modeling and numerical simulation** *SCCM-report*
  Gerritsen, M.
  Stanford University.1996
- **The conjugate gradient method for large sparse matrices on the iPSC/860 Hypercube** *SCCM-report*
  Gerritsen, M.
  Stanford University.1994
- **Geometrical modeling of three-dimensional aerodynamic configurations for numerical flow simulations** *MSc thesis and Technical Report NLR 4-90, National Aerospace Laboratory, Amsterdam*
  Gerritsen, M.
  1990
- **Giga Watt Arrays: How Many Tidal Turbines will it take?** *European Wave and Tidal Energy Conference*
  Vennell, R., Harang, A., Smeaton, M., Gerritsen, M.
  2015
- **MPEXS: A CUDA MonteCarlo of the Simulation of Electromagnetic Interactions** *International Conference on Computing in High Energy and Nuclear Physics*
  Dotti, A., Asai, M., Sasaki, T., Kimura, A., Murakami, K., Okada, S., Henderson, N., Gerritsen, M.
  2016
- **J70 Sail and Rig Tune Aerodynamic Study** *High Performance Yacht Design Conference*
  Anderson, C., Doyle, T., Swain, D., Gerritsen, M.

PRESENTATIONS

- Invited Semi-Plenary Speaker - US National Congress on Computational Mechanics, Montreal, July 2017 (7/1/2017)
- Invited Plenary Speaker - SIAM Conference on Computational Science and Engineering, Atlanta, February 2017 (2/1/2017)

- Invited Plenary Speaker - SIAM Conference on Applied Mathematics Education, Philadelphia, September 2016
- Invited Plenary Speaker - Improved OIl Recovery Conference, Stavanger, Norway, April 2016
- Invited Plenary Speaker - 40th Woudschoten Conference on Numerical Analysis and Computational Sciences, Zeist, The Netherlands, October 2015
- Invited Plenary Speaker - Tekna Conference, Oslo, Norway, October 2015
- Invited Plenary Speaker - MNT Conference on Education, Bergen, Norway, April 2015
- Keynote - Horizon Lecture, University of Bergen, Norway, October 2014
- Keynote - 2015 Kieval Lecture, Humboldt State University, April 2015
- Keynote - Science Sundays, Ohio State University, Columbus Ohio, August 2014
- Keynote - First Lecture on Liberal Education, Stanford, September 2014
- Keynote - First Lecture on Liberal Education, Stanford, September 2015
- TedX Stanford, The Beauty of Linear Algebra, May 2014
- Invited Speaker - Stanford Connects+, Seattle, November 2014
- Invited Speaker - Stanford in the Wild, Fallen Leaf Lake, March 2105
- Invited Speaker - Applied Mathematics, Colorado School of Mines, April 2014
- Keynote - Mathematics of Planet Earth, Vancouver, January 2013
- Invited Speaker - Mathematics, Oregon State, Corvallis, April 2014
- Keynote - Mathematics of Planet Earth, Calgary, January 2013
- Invited Plenary Speaker - XIX International Conference on Computational Methods in Water Resources, Urbana-Champaign, June 2012
- Invited Speaker - IMA Workshop on Societally Relevant Computing, Minneapolis, April 2011
- Invited Speaker - Stanford Leading Matters, Chicago, April 2010
- Invited Plenary Speaker - Symposium Huli 'ia ka honua, Geothermal Development in Hawaii, Volcano, May 2010
- Keynote - UPMARC Inauguration, Uppsala, Sweden, 2009
- Invited Plenary Speaker - Energy, Wind and Water Conference, New Zealand Institute of Mathematics and its Applications, February 2009
- Invited Speaker - MAMERN Conference, Pau, France, June 2009
- Speaker/organizer, SIAM Minisymposium on Mathematical and Computational Challenges in Global Climate and Energy Processes. Joint Mathematics Meeting, Washington DC, January 2009
- Invited Speaker - Lockheed Martin ATC Colloquium, Palo Alto, May 2009
- Invited Speaker - Environmental Seminar, UC Berkeley, 2009
- Invited Speaker - Summer Science Series, Stanford, June 2009
- Keynote - Joint Distinguished UBC SCAIM-SFU CSC Seminar, Vancouver, March 2008
- Speaker - Mini-symposium Foundations of Computational Mathematics, Hong Kong, June 2008
- Invited Speaker - Eurotherm 2007, Thermal and Compositional Simulation, Albi, France, 2007
- Invited Plenary Speaker - SIAM Conference on Mathematical and Computational Issues in the Geosciences, Santa Fe, March 2007
- Invited Plenary Speaker - Marie Curie Workshop on Flow and Transport in Porous Media, Utrech, the Netherlands, November 2007
- Invited Plenary Speaker - Gordon Research Conference on Flow and Transport in Porous Media, Andover, NH, August 2006
- Invited Speaker - Technical University of Denmark, Copenhagen, 2006
- Invited Speaker - Heriot-Watt University, Edinburgh, Scotland, 2006
- Invited Speaker - Petroleum Institute, University of Bergen, Norway, 2006
- Invited Speaker - End of Oil, Public Seminar Series, Stanford University, 2006
- Faculty Speaker, Stanford Summer Sierra Camp, August 2006

- Faculty Speaker, Stanford Summer Sierra Camp, August 2011
- Faculty Speaker, Stanford Summer Sierra Camp, August 2015
- Faculty Speaker, Stanford Winter Sierra Camp, February 2008
- Speaker - Mini-symposium Modeling of Multiphase, Multicomponent Compositional Flow, SIAM Conference on Mathematical and Computational Challenges in the Geosciences, Avignon, France, June 2005
- Invited Speaker - Workshop on Hyperbolic Problems, American Institute of Mathematics, Palo Alto, May 2005
- Invited Speaker - Petroleum Engineering, Texas A&M University, April 2004
- invited Speaker - Petroleum and Geosystems Engineering, UT Austin, 2003
- Keynote - Chalmers Yacht Research Inauguration, Gothenburg, Sweden, 2003
- Invited Speaker - Applied Earth Sciences, Delft University of Technology, 2003
- Invited Speaker - Scientific Computing, Uppsala University, 2003
- Invited Speaker - Scientific Computing, Uppsala University, 2012
- Invited Speaker - Bay Area Scientific Computing Day, Berkeley, 2002
- Annual Excellence in Dialogue Lecture, University of Stuttgart - University of Stuttgart (2020)
- Invited Plenary - INTERPORE conference, Valencia - INTERPORE Conference (5/6/2019 - 5/10/2019)
- Invited Plenary Speaker - Women in Numerical Analysis Conference, BIRS, Canada - Women in Numerical Analysis Conference (2019)
- Invited Keynote Speaker - MATHIAS Conference, Paris - MATHIAS Conference (2019)
- Invited Keynote Speaker - Perspektywy Women in Tech Summit, Warsaw - Perspektywy Women in Tech Summit (2019)