Jason E. Frank

Mathematical Institute, Utrecht University – P.O. Box 80010, 3508 TA Utrecht
📞 +31 62 440 7181   •   ☎ +31 35 253 2549   •   ✉ j.e.frank@uu.nl
🖥 www.staff.science.uu.nl/~frank011/

Personal details

titles, name: Prof.dr.ir. J.E. Frank

gender: male

birth: 21 Feb. 1970, Hutchinson, Kansas, U.S.A.

marital status: married, two children

nationalities: American, Dutch

Education

Technische Universiteit Delft	**Delft, the Netherlands**
Ph.D., Mathematics	*1996–2000*

Numerical analysis and scientific computing.

title: *Efficient Algorithms for the Numerical Solution of Differential Equations*

date: 17 Apr. 2000

promotors: P. Wesseling, P. J. van der Houwen, C. Vuik

University of Kansas	**Lawrence, Kansas, U.S.A.**
M.Sc., Aerospace Engineering	*1992–1994*

Aerodynamics of supersonic flows.

University of Kansas	**Lawrence, Kansas, U.S.A.**
B.Sc., Aerospace Engineering	*1988–1992*

Aerodynamics, airplane dynamics and control, aircraft design.

Appointments

Utrecht University	**Utrecht, the Netherlands**
Professor	*2013–present*

Professor of Numerical Analysis.

University of Kansas	**Lawrence, Kansas, USA**
Adjunct Professor	*2014*

Visiting scientist, Department of Mathematics, Aug.–Oct. 2014

University of Amsterdam	**Amsterdam, the Netherlands**
Professor	*2010–2013*

Adjunct professor (bijzonder hoogleraar) under the Stichting voor Hoger Onderwijs in de Toegepaste Wiskunde.

Centrum Wiskunde & Informatica	**Amsterdam, the Netherlands**
Group leader	*2002–2013*

Senior scientist and (from 2007) leader of the research group Computational and Stochastic Dynamics.
Responsibilities:

○ Leader of a research group of 2–5 tenured and 5–10 temporary scientific staff, including management of group budget.
○ Research on geometric numerical methods for Hamiltonian partial differential equations and atmosphere/ocean science, statistical mechanics of numerical processes, and stochastic modeling.
○ Ph.D. supervision.
○ Organizational committees: CWI Self-evaluation 2011 writing committee, Ph.D. training program committee.

Centrum Wiskunde & Informatica   **Amsterdam, the Netherlands**
Postdoc   *2000–2001*
Research on geometric numerical integration of large scale atmospheric flows.

Delft University of Technology   **Delft, the Netherlands**
Ph.D. Researcher   *1996–2000*
Research on numerical linear algebra and high-performance computing.

University of Kansas   **Lawrence, Kansas**
Research assistant   *1994–1995*
Research on numerical analysis, including a six-month research visit to Centrum Wiskunde & Informatica, Amsterdam.

Standing committees

○ Executive board, mathematics cluster NDNS+ (since 2010).

○ PWN Committee on Research (since 2016)

○ Steering committee, Utrecht University Focus Area on Foundations of Complex Systems (since 2013).

○ Director of Netherlands Mathematics Research School WONDER (since 2015).

○ Computational Science program board, Lorentz Center and NWO (since (2010).

○ Werkgemeenschap Scientific Computing, executive board (since 2010).

○ NWO Complexity Program board (2010–2016).

Ad hoc committees

○ Bachelor curriculum midterm recommendations, Mathematical Institute, Utrecht U, 2015 (chair).

○ UHD promotion committee, Mathematical Institute, Utrecht U, 2014 and 2015(chair).

○ Writing committee, Platform Wiskunde Nederland vision document for Dutch mathematics: *Formulas for Insight and Innovation*, 2013–2014.

Memberships

○ Society for Industrial and Applied Mathematics, since 1994.

○ Koninklijk Wiskundig Genootschap, since 2001.

○ Werkgemeenschap Scientific Computing, since 1995.

Grants and awards

○ NWO/EW Mathematics of Planet Earth program (with L.R.M. Maas), 2014, Ph.D. student, Vertical mixing and internal wave attractors.

○ NWO/EW Mathematics of Planet Earth program (with S. Dubinkina), 2014, Ph.D. student, Geometric structure and data assimilation.

○ FOM/Shell/NWO program Computational Science for Energy Research, (with S. Dubinkina), 2014, Ph.D. student, Probabilistic uncertainty assessments in energy-related problems.

○ NWO Call for Ideas, 2013, program proposal "Mathematics of Planet Earth", provided funding for seven Ph.D. students via open call.

○ NWO Visitor grant, 2011.

○ NWO/EW Open competition, 2010, Ph.D. student, Thermostat closures for inviscid fluids.

○ CWI Internal Funding Competition, 2010, Ph.D. student, Uncertainty modeling of power distribution with decentralized production and storage.

○ NWO/ALW Climate Variability Program (with O. Bokhove U. Twente), 2005, Ph.D. student, Hamiltonian-based numerical methods for forced-dissipative climate prediction.

○ NWO/EW Open competition, 2005, Ph.D. student, Adaptive multisymplectic box schemes for Hamil-

tonian wave equations.

○ NWO/ALW Climate Variability Program, 2004, PhD. student, Symplectic integration of atmospheric dynamics: Long-term statistical accuracy for ensemble climate simulations.

○ NWO Vernieuwingsimpuls Veni, 2002, Geometric Numerical Methods for Continuum Mechanics.

○ NWO Visitor Grant, Sabbatical of B. Leimkuhler, Edinburgh, 2011.

○ Application for Royal Commendation of J. G. Verwer, 2011.

Editorial and Review

Editorial board: *SIAM Journal on Scientific Computing*, 2007–2019.

Guest editor: *Journal of Computational and Applied Mathematics*, special issue on the proceedings of the conference NUMDIFF 14, 2016.

Guest editor: *Journal of Computational Physics*, Special issue on physics-preserving numerical methods, 2013.

Guest editor: *Journal of Computational and Applied Mathematics*, special issue on the proceedings of the conference NUMDIFF 13, 2013.

Reviewer: *SIAM Review, SIAM Journal on Scientific Computing, SIAM Journal on Numerical Analysis, Philosophical Transactions of the Royal Society A, Journal of Fluid Mechanics, Journal of the Atmospheric Sciences, Physica D, Journal of Computational Physics, Journal of Physics A, Numerische Mathematik, Applied Numerical Mathematics, Journal of Computational and Applied Mathematics, Physics Letters A, Applied Mathematics Letters, Atmospheric Science Letters, Mathematical and Computer Modelling, The European Physical Journal, Computer Physics Communications, International Journal of Computer Mathematics, Journal of Applied Mathematics, Mathematics of Computation, Computers and Mathematics with Applications, Mathematics and Computers in Simulation, Numerical Methods for Partial Differential Equations.*

Ph.D. Thesis Committees

○ J. Dorrestijn, Technische Universiteit Delft, 8 Sep. 2016

○ A. Tantet, Universiteit Utrecht, 25 Apr. 2016

○ Q. Feng, Universiteit Utrecht, 7 Dec. 2015

○ P. Käufl, Universiteit Utrecht, 16 Oct. 2015

○ K.W. Myerscough, Utrecht University, 24 Aug. 2015 (promotor)

○ X. Li, Technische Universiteit Delft, Jul. 2015

○ W.S. Wadman, University of Amsterdam, 18 Jun. 2015 (co-promotor)

○ J. Maclean, University of Sydney, Jan. 2015 (foreign external)

○ G. Imran, University of Auckland, 20 Jun. 2014 (foreign external)

○ A. Palhas, Technische Universiteit Delft, 3 Sep. 2013

○ F. McDonald, Massey University New Zealand, 2013 (foreign external)

○ W. van Hoydonck, Technische Universiteit Delft, 11 Jun. 2013

○ J. Bajars, Universiteit van Amsterdam, 7 Dec. 2012 (promotor)

○ A. Mozartova, Radboud University Nijmegen, 2012

○ M. Dahlby, NTNU Trondheim, Norway, 25 Nov. 2011 (first opponent)

○ R. Reis da Silva, University of Amsterdam, 10 Apr. 2011

○ P. Lucas, Technische Universiteit Delft, 24 Jun. 2010

○ S. Dubinkina, University of Amsterdam, 28 May 2010 (promotor)

Appointment Committees

○ Utrecht University, tenure-track position, Westerdijk Fellowship in Mathematical Modelling 2015 (committee chair)

○ Utrecht University, tenure-track position, NDNS+ cluster, 2013

○ T.U. Eindhoven, tenure-track position, NDNS+ cluster, 2013

○ Groningen University, tenure-track position, NDNS+ cluster, 2013

○ University of Antwerp, tenure-track position, 2013

○ Centrum Wiskunde en Informatica, tenure-track position, 2012

○ Centrum Wiskunde en Informatica, two tenure-track positions, 2005

Teaching

Utrecht University, Science Faculty, Department of Mathematics

2016: Mathematical Modelling with ODEs and PDEs.

2015–2016: Introduction to Complex Systems.

2015: Seminar course Mathematics of Complex Systems.

2014–2016: Models & Simulations, 1st year bachelor.

University of Amsterdam, Science Faculty, Korteweg-de Vries Institute for Mathematics

2009–2012: Mathematical Modelling, 3rd year bachelor.

2008: Geometric integration of PDEs, master course.

2005–2008: Numerical Analysis 2 - Initial value problems, 3rd year bachelor.

Postdoc Supervision

○ S. Zhuk, ERCIM Fellow, Apr. 2011–Jan. 2012, Data assimilation for energy applications.

Ph.D. Students

○ X. Liu, Oct. 2016–Sep. 2020, Complex dynamics of financial systems.

○ F. Witteveen, Oct. 2016–Sep. 2020, (2nd promotor, co-supervision with H. Heesterbeek and R. de Boer), Complex dynamics of immune and ecosystems

○ T. Gomez, Sep. 2016–Aug. 2020, (2nd promotor, co-supervision with G. Piccillo and U. Weitzel) Complex dynamics of financial systems.

○ H. Zhang, 2015–2019, (formal promotor, daily supervisor is P. Zegeling).

○ A. Kadu, Jul. 2015–Jul. 2019 (formal 2nd promotor, daily supervisor is T. van Leeuwen).

○ F. Beckebanze, Jul. 2015–Jun. 2019 (promotor, co-supervision with L.R.M. Maas) analysis of viscous transport by internal wave attractors.

○ S. Ruchi, Sep. 2015–Aug. 2019 (promotor, co-supervision with S. Dubinkina, CWI) data assimilation for subsurface reservoirs.

○ B. M. de Leeuw, Mar. 2015–Feb. 2019 (promotor, co-supervision with S. Dubinkina, CWI) data assimilation methods for atmosphere/ocean flow.

○ H. Zhou, Nov. 2013–Oct. 2017 (formal promotor, supervisor is P. Zegeling).

○ W. Wadman, Feb. 2011–Jun. 2015 (2nd promotor, co-supervision with D. Crommelin, CWI/UvA), Electric power grid integrity under decentralized generation and storage.

○ K. Myerscough, Nov. 2010–Aug. 2015, Thermostat subgrid scale modelling of atmospheric fluids.

○ B. W. I. Peeters, Oct. 2006–Sep. 2010 (terminated), (2nd promotor, co-supervision with O. Bokhove, U. Twente), Symplectic discretization of a hydrostatic atmospheric model; the role of dissipative perturbations and forcing.

○ J. Bajars, U. Amsterdam, Jan. 2007–Apr. 2012, Geometric integrators for wave equations, thermostat methods.

○ S. Dubinkina, U. Amsterdam, Aug. 2005–Jan. 2009, Statistical mechanics of symplectic and energy-conserving discretizations for geophysical fluid models.

Master Thesis Supervision

○ R. de Haas, U. Utrecht, Sep. 2016–Jun. 2017 (with R. van Roij), Kinetic theory of self-propelled particles.

○ A. van Dam, U. Utrecht, Dec. 2015–Oct. 2016 (with K. Frenken), Economic diversification as a percolation process.

○ J. de Groot, U. Utrecht, Feb.–Sep. 2016 (with D. Fokkema, Ernst & Young), Credit risk modeling using a weighted support vector machine.

○ S. Korenberg, U. Utrecht, Dec. 2015–Aug. 2016 (with H. Stoof), Stochastic modelling of evolutionary processes.

○ F. Schevenhoven, U. Utrecht, Sep. 2015–Jun. 2016 (with F. Selten KNMI), Improving weather predictions by cross pollination in time.

○ E. Visee, U. Utrecht, Sep. 2015–Jun. 2016 (with F. Platzek & M. Borsboom, Deltares), Accurate discretization of convection terms on unstructured grids.

○ H. van den Pol, Utrecht U., Jan. 2015–Oct. 2015, Development of complex network based early warning indicators of bifurcations using reduced (stochastic) models.

○ A. Kruseman, Utrecht U., Oct. 2014–Sep. 2015, A fast Chebyshev method for rotating incompressible fluids.

○ L. Stoel, Utrecht U., Feb. 2014–Jan. 2015, The numerical solution of the Vlasov-Poisson-Fokker-Planck equation in the context of accelerator physics.

○ B. de Leeuw, Utrecht U., Feb. 2014–Jan. 2015 (with L. Fritz), On the numerical computation of electron transport through topological crystalline insulators.

○ H. Thórsdóttir, U. Amsterdam, Oct. 2010–Oct. 2011, Hamiltonian particle-mesh method for the quasi-geostrophic equation on a sphere.

○ S. Kopecz, Kassel U., Aug.–Dec. 2005, Wave attractors for a stratified fluid in a tilted square domain.

Bachelor Thesis Supervision

○ E. van der Heijden, U. Utrecht. Jan.–Jun. 2017, Unstable periodic orbits of a chaotic economic model.

○ M. Veldhuizen, U. Utrecht. Jan.–Jun. 2016, Unstable space of discretized partial differential equations.

○ L. Kattenbroek, U. College Utrecht. Jan.–Jun. 2016, Strang splitting of stochastic differential equations.

○ A. van Dam, U. Amsterdam. Nov. 2012–Jun. 2013, Symmetric, volume and energy conserving methods for equilibrium statistical mechanics.

○ A. Vonk, U. Amsterdam. May–Aug. 2007, Statistics of projection methods for ideal fluids.

Promotion of mathematics/science

○ Annual Symposium Wiskundig Studiegenootschap Abacus, Twente U., 2 June 2017, speaker.

○ Nationale Wiskunde Symposium, Leiden, 3 April 2017, speaker.

○ SIAM Student Chapter, Utrecht University (chartered 2017), faculty advisor.

○ Inaugural lecture *More on the nature of prediction*, Utrecht University, 9 Nov. 2016.

○ Science in the City, Utrecht, 3 April 2016, speaker.

○ 106th European Study Group Mathematics with Industry, Utrecht, 28 26–30 Jan. 2015, organizing committee.

○ Kaleidoscoopdag, Twente U., 23 May 2014, speaker.

○ Vakantiecursus wiskunde, 2013, organizing committee.

○ 86th European Study Group Mathematics with Industry, Lorentz Center, Leiden, 28 Jan.–1 Feb. 2013, participant.

○ Workshop on Fractals, elementary school Laterna Magica, Amsterdam, 25 Jun. 2012.

○ Leve de Wiskunde!, University of Amsterdam, 13 Apr. 2012, speaker.

○ Inaugural lecture *The nature of prediction (and the prediction of nature)*, University of Amsterdam, 21 Apr. 2011.

○ Vakantiecursus wiskunde, CWI (27–28 Aug. 2010) and TU/e (3–4 Sep. 2010), speaker.

○ Coordinator, Dynamical Systems Tour of the Science Park Amsterdam, Don Bosco College, Volendam, 2010–2012.

○ 72nd European Study Group Mathematics with Industry, CWI, Amsterdam, 25–29 Jan. 2010, co-organizer.

○ Popular research summaries in ERCIM News, 2003, 2005 and 2010.

○ Demonstrations at CWI Open Dag (Wetenschapsdag), 2001 and 2007.

Conference organization

○ EQUADIFF, Leiden, 2019 (organizing committee).

○ NUMDIFF-15 Numerical Solution of Differential and Differential-Algebraic Equations, Halle, Germany, Sep. 2018 (organizing committee).

○ NUMDIFF-14 Numerical Solution of Differential and Differential-Algebraic Equations, Halle, Germany, 7–11 Sep. 2015 (organizing committee).

○ 106th European Study Group Mathematics with Industry, Utrecht, 28 26–30 Jan. 2015, (organizing committee).

○ NDNS+ Workshop Stochastic Modelling of Multiscale Systems, Eindhoven, the Netherlands, 2–6 Dec. 2013 (co-organizer).

○ NUMDIFF-13 Numerical Solution of Differential and Differential-Algebraic Equations, Halle, Germany, 10–14 Sep. 2012 (organizing committee).

○ 36th Woudschoten Conference of the Werkgemeenschap Scientific Computing, Zeist, 5–7 Oct. 2011 (program committee).

○ Workshop on Time Integration of ODEs and PDEs, Amsterdam, 17–19 Jan. 2011 (co-organizer).

○ 72nd European Study Group Mathematics with Industry, Amsterdam, 25–29 Jan. 2010 (co-organizer).

○ Afternoon Symposium on Energy, Uncertainty & Computation, Amsterdam, 25 Aug. 2009 (co-organizer).

○ Numerical Modelling of Complex Dynamical Systems, Lorentz Center, Leiden, 6–9 May 2008 (co-organizer).

○ Geometric and stochastic methods in geophysical fluid dynamics, Jacobs University, Bremen, Germany, 7–11 Jan. 2008 (program committee).

○ Workshop on Geometric and Multiscale Methods for Geophysical Fluid Dynamics, Lorentz Center, Leiden, 2–6 Oct. 2006 (co-organizer).

○ Innovative Time Integrators for PDEs, Amsterdam, 25–27 Nov. 2002 (co-organizer).

Invited lectures

○ Transport in Unsteady Flows: from Deterministic Structures to Stochasitc Models and Back Again, Banff, Canada 16–20 Jan. 2017, Preserving structure (and coherent structures) under discretization.

○ Geometric Integration and Its Applications, La Trobe University, Melbourne, 5–7 Dec. 2016, Shadowing, Synchronization and Data Assimilation.

○ Mathematics of Planet Earth Wednesdays Seminar, University of Reading, 30 Nov. 2016, A tangent space splitting method for data assimilation: shadowing and synchronization.

○ Mathematical and Algorithmic Aspects of Data Assimilation in the Geosciences, Oberwolfach, Germany, 2–8 Oct. 2016.

○ Multiscale Interactions in Geophysical Fluids, Oberwolfach, Germany, 14–20 Aug. 2016.

○ Simulation of Rare Events, EURANDOM, Eindhoven, 29 Mar.–1 Apr. 2016, Dynamical sampling methods with applications.

○ SciCADE 2015, Potsdam, Germany, 14–18 Sep. 2015.

○ Foundations of Computational Mathematics, Workshop on Geometric Integration and Computational Mechanics, Montevideo, 17–19 Dec. 2014.

○ Workshop Climate Variability: from Data and Models to Decisions, Lorentz Center, Leiden, 1–5 Dec. 2014.

○ Foundations of Computational Mathematics, Workshop on Geometric Integration and Computational Mechanics, Montevideo, 17–19 Dec. 2014.

○ Complexity Symposium, Utrecht University, 3 July 2014, Complexity in fluid dynamics.

○ General Mathematics Colloquium, Vrije Universiteit, 14 May 2014, Application of Thermostats to Discretized Fluid Models.

○ General Mathematics Colloquium, Leiden University, 8 May 2014, Application of Thermostats to Discretized Fluid Models.

○ Port Hamiltonian Systems Workshop, Lorentz Center, Leiden, 24–28 Mar. 2014, Symplectic RK methods for PDEs and controls.

○ NDNS+ Workshop Stochastic Modelling of Multiscale Systems, Eindhoven, the Netherlands, 2–6 Dec. 2013 (co-organizer), Application of Thermostats to Discretized Fluid Models.

○ Staff Colloquium, Mathematical Institute, Utrecht University, 14 Nov. 2013, (Towards) geometric numerical integration of inviscid fluids.

○ Isaac Newton Institute Program "Mathematics fo the Fluid Earth", Cambridge University, 28 Oct.– 8 Nov. 2013, Thermostats for bias correction and statistically consistent model reduction.

○ Geoturb: Numerical modeling and theoretical challenges in atmosphere and ocean turbulence, Lyon, 2–4 Oct. 2013, Towards a simple stochastic correction of kinetic energy spectra in fluids.

○ SciCADE 2013, Valladolid, 16–20 Sep. 2013, Stochastic correction of kinetic energy spectra in fluids (contributed).

○ CASA Colloquium, T.U. Eindhoven, 15 May 2013, Application of Thermostats to Discretized Fluid Models.

○ Modelling the Dynamics of Complex Molecular Systems, Lorentz Center, Leiden, 13 Aug.–7 Sep. 2012, Application of MD sampling techniques in Geophysical Fluid Dynamics.

○ Seminar LSEC/AMSS, Beijing, China, 6 Jun. 2012, Geometric integration of phase flows: Preservation of invariant-measures of discretized Hamiltonian PDEs.

○ Symposium on Physics, Mathematics & Climate, Utrecht, 31 Jan. 2012, Stochastic multiscale methods for climate science.

○ Differential Equations and Numerical Analysis Seminar, NTNU, Trondheim, Norway, 24 Nov. 2011, Statistical measure correction for discretized geophysical fluids.

○ SciCADE 2011, International Conference on Scientific Computation and Differential Equations, Toronto, 11–15 Jul. 2011, Plenary lecture: Statistical measure correction for discretized geophysical fluids.

○ Foundations of Computational Mathematics, Workshop on Geometric Integration and Computational Mechanics, Budapest, 4–6 Jul. 2011, Statistical mechanics of the Hamiltonian particle-mesh method.

○ Nederlands Mathematisch Congres 2011, Twente University, Enschede. 14–15 Apr. 2011, Optimal distributed power generation under network load constraints.

○ Geometric Numerical Integration Oberwolfach, Germany. 20–26 Mar. 2011.

○ Mathematical and Statistical Approaches to Climate Modelling and Prediction Isaac Newton Institute, Cambridge, UK. 10–31 Oct. 2010, Prediction of the 2nd kind: numerical discretizations and their climatic response.

○ Mathematical Theory and Modelling in Atmosphere-Ocean-Science Oberwolfach, Germany. 8–14 Aug. 2010, Thermostats for point vortices.

○ General Mathematics Colloquium, University of Amsterdam, 28 Apr 2010, A thermostat model for unresolved dynamics.

○ Numerical Hierarchies for Climate Modeling Institute for Pure and Applied Mathematics, UCLA. 12–16 Apr 2010, A thermostat model for unresolved dynamics.

○ Computational Multiscale Methods, U. Twente. 26–27 Nov. 2009, A thermostat closure for point vortices.

○ Numdiff-12 Numerical Solution of Differential and Differential-Algebraic Equations, Halle, DE. 14–18 September 2009, (impromptu lecture) A thermostat closure for point vortices.

○ 2009 SIAM Conference on Mathematical and Computational Issues in the Geosciences Leipzig 15–18 June 2009, Statistical Model for an Incompressible Particle-mesh Method

○ Deltares Lunch Lecture, Delft, 5 Mar. 2009, Statistical accuracy in numerical discretization of geophysical fluids.

○ Dynamical Analysis Seminar, Vrije Universiteit, Amsterdam, 9 Apr. 2008, Statistical mechanics of Arakawa's Jacobian.

○ PGEF - Netherlands Platform for Geophysical and Environmental Fluid Mechanics. U. Twente, 28 Sep. 2007, Statistical mechanics of Arakawa's Jacobian.

○ ICMS Workshop Applying Geometric Integrators, Edinburgh, 24–27 Apr. 2007, Statistical mechanics of Arakawa's Jacobian: numerical experiments.

○ Applied Mathematics Seminar, Edinburgh University, 27 Feb. 2007, Numerical Conservation of Hamiltonian Structure in Atmospheric Dynamics.

○ NDNS+ Cluster Workshop Mathematics of Earth Sciences, Groningen, 27 Nov.–1 Dec. 2006, Overview lecture: Conservation of Hamiltonian structure in numerical models of geophysical flows.

○ Geometric and Multiscale Methods for Geophysical Fluid Dynamics, Lorentz Center, Leiden, 2–6 Oct. 2006, Wave action conservation by multisymplectic integrators.

○ Castellón Conference on Geometric Integration, Castellón, Spain, 18–22 Sep. 2006, Local conservation and multisymplectic discretizations for PDEs.

○ NUMDIFF 11 Numerical Solution of Differential and Differential Algebraic Equations, Halle, Germany, 4–8 Sep. 2006, Plenary lecture: Local conservation and multisymplectic discretizations for Hamiltonian PDEs.

○ Nederlands Mathematisch Congres, Delft, 27–28 Mar. 2006, Conservation and coarse-grained dynamics in climate simulations.

○ Geometry, Fluids and Numerical Seminar, Surrey University, 2 Mar. 2006, Some recent developments in multi-symplectic discretization.

○ Seminar of the Computational Laboratory for Analysis, Modeling and Visualization, Bremen, 6 Dec. 2005, Symplectic discretization of atmospheric flows.

○ Potsdam Workshop on Numerical Methods in Climate and Weather Prediction, Potsdam, 28 Sep.–1 Oct. 2005, Some really exotic conservation laws, a method that preserves them all, and considerations for nonuniform grids.

○ Foundations of Computational Mathematics (FoCM), Minisymposium on Geometric Integration, Santander, Spain, 30 Jun.–9 Jul. 2005, Dispersion properties of conservative discretizations for wave equations.

○ SciCADE 05 International Conference on Scientific Computation and Differential Equations, Nagoya,

Japan, 23–27 May 2005, Conservative discretizations of wave equations: group velocity signature and nonphysical reflections.

○ UvA Numerica Seminar, U. Amsterdam, 8 Dec. 2004, Dispersion and grid-induced spurious reflections in finite difference methods for wave equations.

○ Nonlinearity in Amsterdam (Combined UvA, VU, CWI Nonlinear Dynamics Colloquium), 27 Oct. 2004, Symplectic Integration of Atmospheric Fluids.

○ Geometric Methods in Geophysical Fluid Dynamics Network Meeting, Pitlochry, Scotland, 20–23 Apr. 2004, The box scheme: Nonexistence of nonphysical reflections on nonuniform grids.

○ Nederlands-Belgisch Mathematisch Congres, Tilburg, 16–17 Apr. 2004, Symplectic Integration of Atmospheric Fluids.

○ Mathematics Institute Colloquium, Utrecht University, 18 Mar. 2004, Symplectic Integration of Atmospheric Fluids.

○ NUMDIFF 10 Numerical Solution of Differential and Differential Algebraic Equations. Halle, Germany, 8–11 Sep. 2003, Discretization of wave equations and grid-induced reflections.

○ SciCADE '03 International Conference on Scientific Computation and Differential Equations, Trondheim, Norway, 30 Jun.–4 Jul. 2003, A Hamiltonian Particle-Mesh Methods for Geophysical Fluid Dynamics.

○ SIAM Conference on Applications of Dynamical Systems, Snowbird, USA, 27–31 May 2003, A Hamiltonian Particle-Mesh Methods for Geophysical Fluid Dynamics.

○ Geometric and Structure-Preserving Algorithms for PDEs, Oslo, 12–15 May 2003, The Box-scheme Applied…to Micromagnetics.

○ UvA Numerica Seminar, University of Amsterdam, 13 Jan. 2003, Multisymplectic numerical treatment of ferromagnetic materials.

○ Invariant and Symmetry-Preserving Algorithms for N-Body Simulation, Leicester, 25–26 Apr. 2002, The Hamiltonian Particle-Mesh Method and Numerical Results.

○ Mathematical Modelling Centre Colloquium, University of Leicester, U.K., 16 Mar. 2001, A Potential Vorticity Conserving Particle-Mesh Method for the Shallow Water Equations.

○ Mathematical Physics and Computational Mechanics Department Colloquium, University of Twente, Netherlands, 9 Nov. 2000, A Potential Vorticity Conserving Geometric Integrator for Rotating Shallow Water Equations.

Publications

1. K. Myerscough, J. Frank and B. Leimkuhler, Least-biased correction of extended dynamical systems using observational data. *Proc. R. Soc. A*, to appear, 2017.

2. H. Dijkstra, A. Tantet, J. Viebahn, E. Mulder, M. Hebbink, D. Castellana, H. van den Pol, J. Frank, S. Baars, F. Wubs, M. Chekroun & C. Kuehn, A numerical framework to understand transitions in high-dimensional stochastic dynamical systems, *Dynamics and Statistics of the Climate System*, to appear 2017.

3. K. Myerscough and J. Frank, Explicit, parallel Poisson integration of point vortices on the sphere. *J. Comput. Appl. Math.*, 304:100–119, 2016.

4. J. Frank, K. Myerscough and B. Leimkuhler. Direct control of the small-scale energy balance in 2D fluid dynamics. *J. Fluid Mechanics* 782:240–259, 2015.

5. S. Zhuk, J. Frank, I. Herlin, and R. Shorten. State estimation for linear parabolic equations: minimax projection method. *SIAM Journal on Scientific Computing* 37:A1174–A1196, 2015.

6. J. Frank and S. Zhuk. Symplectic Möbius integrators for LQ optimal control problems. IEEE 53rd Annual Conference on Decision and Control 2014, 15–17 Dec 2014, pp. 6377?6382.

7. W. Wadman, D. Crommelin, and J. Frank. A separated splitting technique for disconnected rare event sets. Proceedings of the 2014 Winter Simulation Conference, IEEE Press, p. 522–532, 2014.

8. W. Wadman, D. Crommelin, and J. Frank. Applying a splitting technique to estimate electrical grid reliability. Proceedings of the 13th Winter Simulation Conference (WSC 2013), IEEE Press, pp. 577–588, 2013.

9. J. Bajars, J. Frank, and B. Leimkuhler. Weakly coupled heat bath models for Gibbs-like invariant states in nonlinear wave equations. *Nonlinearity*, 26:1945–1973, 2013.

10. J. Frank and G. A. Gottwald. Stochastic homogenization for an energy conserving multi-scale toy model of the atmosphere, *Physica D: Nonlinear Analysis*, 254:45–56, 2013.

11. J. Bajars, J. Frank, and L. R. M. Maas. On the appearance of internal wave attractors due to an initial or parametrically excited disturbance. *Journal of Fluid Mechanics*, 714:283–311, 2013.

12. W. Wadman, G. Bloemhof, D. Crommelin, and J. Frank. Probablistic power flow simulations allowing temporary current overloading. In *Probablistic Methods Applied to Power Systems*, volume to appear, 2012.

13. S. Shin, S. Reich, and J. Frank. Hydrostatic Hamiltonian particle-mesh (HPM) methods for atmospheric modeling. *Quarterly Journal of the Royal Meteorological Society*, 138:1388–1399, 2012.

14. J. Frank. The nature of prediction (and the prediction of nature). *Nieuw Archief voor Wiskunde*, 13(1):18–24, 2012.

15. J. Bajars, J. Frank, and B. Leimkuhler. Stochastic-dynamical thermostats for constraints and stiff restraints. *The European Physics Journal Special Topics*, 200:131–152, 2011.

16. J. Frank and G. A. Gottwald. The Langevin limit of the Nosé-Hoover-Langevin thermostat. *Journal of Statistical Physics*, 143(4):715–724, 2011.

17. S. Dubinkina and J. Frank. Statistical relevance of vorticity conservation in the Hamiltonian particle-mesh method. *Journal of Computational Physics*, 229(7):2634–2648, 2010.

18. S. Dubinkina, J. Frank, and B. Leimkuhler. Simplified modelling of a thermal bath, with application to a fluid vortex system. *Multiscale Modeling and Simulation*, 8(5):1882–1901, 2010.

19. C. Cotter, J. Frank, and S. Reich. A remapped particle-mesh semi-Lagrangian advection scheme. *Quarterly Journal of the Royal Meteorological Society*, 133(251–260), 2007.

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