Curriculum Vitae

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Jan Nordström
ORCID 0000-0002-7972-6183

date of birth: November 16, 1953
Married, 4 children

Degrees

1980	Master of Science in Aeronautics, The Royal Institute of Technology (KTH) Stockholm, Sweden
1993	PhD in Numerical Analysis, The Department of Scientific Computing Uppsala University (UU), Uppsala, Sweden
1999	Docent (Habilitation) in Numerical Analysis, UU

Current positions

2022 -	Professor (Emeritus) in Scientific Computing, Department of Mathematics, Linköping University (LiU), Sweden
2020 - 2025	Distinguished Visiting Professor, Department of Mathematics and Applied Mathematics, University of Johannesburg (UJ), South Africa

Honorary affiliations

2009 - 2010	Senior Research Fellow, Center for Turbulence Research (CTR), Stanford University (SU), USA
2010 - 2013	Honorary Professor, School of Computational and Applied Mathematics, University of the Witwatersrand (WITS), South Africa
2018 - 2023	Honorary Professor in Computational Mathematics, Department of Mechanical Engineering, University of Cape Town (UCT), South Africa

Board work

2012 - 2020	Member of the board of Linköping Institute of Technology (LiTH)
2012 - 2020	Member of Advisory group for research/graduate education LiTH
2013 -	Editorial board (associate editor) of BIT Numerical Mathematics
2014 - 2018	Member of the board of the National Supercomputer Centre (NSC)
2016 -	Editorial board (associate editor) of Journal of Computational Physics

Previous positions and affiliations

1980 - 1995	Research Scientist, The Aeronautical Research Institute of Sweden (FFA)
1986 - 1991	Acting head at the Viscous Flow Branch, FFA
1995 - 2001	Senior Scientist, FFA
1995 - 1999	Research leader for the Unsteady Aerodynamics group at FFA
1999 - 2001	Research leader for the Wave Propagation group at FFA
1999 - 2001	Research leader for the Numerical Methods group at FFA
2001 - 2002	Senior Scientist, The Swedish Defense Research Agency (FOI)
2001 - 2004	Adjunct Professor, Numerical Analysis (Adjungerad), UU
2002 - 2010	Director of Research (Forskningschef) in Numerical Analysis, FOI
2006 - 2009	Adjunct Professor, Numerical Analysis, UU
2007 - 2009	Visiting Professor, 6 months, Department of Mechanical Engineering, Stanford University (SU), USA
2009 - 2010	Adjunct Professor, Scientific Computing, UU
2009 - 2010	Professor in Aeronautical Engineering, School of Mechanical, Industrial and Aeronautical Engineering, University of the Witwatersrand (WITS), South Africa
2009 - 2010	Head of Division of Aeronautical Engineering, School of Mechanical, Industrial and Aeronautical Engineering, WITS, South Africa
2010 - 2013	Visiting Professor, School of Electrical and Information Technology, WITS, South Africa
2011 - 2011	Visiting Professor, 3 months, Department of Mechanical Engineering, Stanford University, USA
2012 - 2020	Head of Division in Computational Mathematics, LiU, Sweden
2020 - 2021	Professor in Scientific Computing, Department of Mathematics, Linköping University (LiU), Sweden

Research visits and Consultant positions

1987	Visiting Scientist, 3 months, NASA Ames, USA
1996 - 1997	Visiting Scientist, 2 months, ICASE, USA
1998 - 2002	7 months as ICASE (Institute of Computer Applications in Science and Engineering) Consultant
2003 - 2005	Visiting Scientist, 3 months, National Institute of Aerospace (NIA), USA
2003 - 2005	Consultant, 3 months, Appl. Math., Brown University, USA

2005 - 2007	Senior Visiting Fellow, 3 months, Center for Turbulence Research, SU, USA
2006 - 2008	Consultant 2 months/year for the Dept. of Vehicle and Aeronautical Engineering, KTH, Sweden
2010	Visiting Scientist, 1 month, NIA, USA
2011	Visiting Scientist, 1 week, Caltech, USA
2013	Visiting Scientist, 1 week, Caltech, USA
2014	Seniour Visiting Fellow, 1 week, CTR, Stanford University, USA
2014	Visiting Scientist, 1 week, University of Zurich, Switzerland
2015	Visiting Scientist, 1 week, Florida State University, USA
2015	Visiting Scientist, 1 month, NIA, USA
2015	Seniour Visiting Fellow, 1 week, CTR, Stanford University, USA
2015	Visiting Scientist, 1 week, University of Zurich, Switzerland
2016	Visiting Scholar, 1 month, Department of Mechanical Engineering, Stanford University, USA
2017	Visiting Scholar, 1 month, Department of Mechanical Engineering, Stanford University, USA
2017	Visiting Academic, 2 weeks, Department of Mechanical Engineering, University of Cape Town, South Africa
2018	Visiting Scientist, 1 week, Caltech, USA
2018	Visiting Scientist, 1 week, Department of Mechanical Engineering, Technion - Israel Institute of Technology, Israel
2018	Visiting Scientist, 1 week, National Institute of Aerospace (NIA), USA
2018	Visiting Academic, 2 weeks, Department of Mechanical Engineering, University of Cape Town, South Africa
2019	Visiting Scientist, 1 week, Department of Computing + Mathematical Sciences (CMS), Caltech, USA
2019	Visiting Scientist, 1 week, National Institute of Aerospace (NIA), USA
2019	Visiting Scholar, 2 weeks, Department of Mechanical Engineering, Technion - Israel Institute of Technology, Israel
2019	Visiting Academic, 3 weeks, Department of Mechanical Engineering, University of Cape Town, South Africa
2020	Visiting Academic, 2 weeks, Department of Mathematics and Applied Mathematics, University of Johannesburg, South Africa
2021	Visiting Academic, 4 weeks, Department of Mechanical Engineering, University of Cape Town, South Africa
2021	Visiting Academic, 4 weeks, Department of Mathematics and Applied Mathematics, University of Johannesburg, South Africa

2022	Visiting Academic, 8 weeks, Department of Mathematics and Applied Mathematics, University of Johannesburg, South Africa
2022	Visiting Academic, 4 weeks, Department of Mechanical Engineering, University of Cape Town, South Africa
2023	Visiting Academic, 8 weeks, Department of Mathematics and Applied Mathematics, University of Johannesburg, South Africa
2023	Visiting Academic, 6 weeks, Department of Mechanical Engineering, University of Cape Town, South Africa
2023	Visiting Academic, 2 weeks, INRIA Bordeaux, Bordeaux, France
2024	Visiting Academic, 5 weeks, Department of Mathematics and Applied Mathematics, University of Johannesburg, South Africa
2024	Visiting Academic, 8 weeks, Department of Mechanical Engineering, University of Cape Town, South Africa
2024	Visiting Academic, 1 week, Department of Mathematics Stellenbosch University, South Africa

Evaluation and committee work

2004	Independent Expert, EU 6th framework program, EST
2004	Independent Expert, EU 6th framework program, OIF
2004	Independent Expert, EU 6th framework program, IIF
2004	Member PhD Thesis evaluation committee
2004	Scientific reviewer for the Swedish Research Council
2005	Member PhD Thesis evaluation committee
2006	Independent Expert, EU 6th framework program, TOK
2007 - 2009	Scientific reviewer for the Georgian Research Council
2008	Member International Scientific Committee for Africomp2009
2009	Expert opinion for a succesful promotion at Stanford University
2009	Expert opinion for a succesfull application for the PECASE (Presidential Early Career Award for Scientists and Engineers) award
2010	Member International Scientific Committee for Africomp2011
2011	Scientific evaluator for the Cyprus Research Promotion Foundation
2011	Member PhD Thesis evaluation committee
2011	Scientific reviewer for National Science Foundation, Georgia
2011	Expert opinion for a succesful application to a faculty position at the U.S. Naval Post Graduate School in Monterey
2012	Member of two Docent evaluation committees
2012	Member International Scientific Committee for Africomp2013

2012	Member PhD Thesis evaluation committee
2013	Chairman, Numerical Treatment of Boundary Conditions, 21st AIAA CFD conference, San Diego, USA.
2013	Member PhD Thesis evaluation committee
2014	Member Evaluation Panel, Mathematical Sciences, Swedish Research Council
2014	Chairman for the Applied Mathematics panel, Academy of Finland
2014	Reviewer for the Mathematics panel, Swiss National Science Foundation
2014	Member PhD Thesis evaluation committee
2014	Member of three Docent evaluation committees
2014	Member International Scientific Committee for Africomp2015
2014	Member Organizing Committee for 3rd International Workshop on High-Order CFD Methods
2014	Expert opinion for a succesful promotion at Stanford University
2015	Member PhD Thesis evaluation committee
2015	Member of two Docent evaluation committees
2015	Member Organizing Committee for 4th International Workshop on High-Order CFD Methods
2016	Member PhD Thesis evaluation committee
2016	Member of Docent evaluation committee
2016	Member Scientific Committee for 6th EASN International Conference on Innovation in European Aeronautics Research
2017	Member Organizing Committee for 5th International Workshop on High-Order CFD Methods
2017	Member PhD Thesis evaluation committee
2017	Member Scientific Committee for 7th EASN International Conference on Innovation in European Aeronautics Research
2017	Expert opinion for a succesful promotion at Rensselaer Polytechnic Institute
2018	Member PhD Thesis evaluation committee
2019	Member PhD Thesis evaluation committee
2020	Organizer of Workshop Swedcomp2020, Motala, Sweden
2023	Member International Scientific Committee for Africomp 6

Grants

1995	VINNOVA-NFFP project: Unsteady aerodynamics of compressible flow, colaboration between FFA and SAAB, 1500.000 SEK in two years

1999	FFA internal funds: Stable High Order Finite Difference Methods for Aerodynamics, colaboration with UU, 1000.000 SEK in two years
2004	The Swedish Research Council: Unsteady aerodynamics of compressible flow, colaboration with WITS South Africa, planning grant, 75.000 SEK
2005	The Swedish Research Council: Generation and propagation of vortices in aerodynamic applications, colaboration with WITS South Africa, 450.000 SEK in 3 years
2007	The Swedish Governmental Agency for Innovation Systems: Numerical methods for micromechanical systems in space, colaboration with Nanospace AB, 1600.000 SEK in 4 years
2009	The Swedish Research Council: Nonlinear generation of internal waves in the deep ocean by tides, collaboration with MISU, Stockholm University, 1600.000 SEK in 3 years
2010	Professor Career Contract for research, 2200.000 SEK/year in 5 years issued by Linköping University
2010	Financing of 3 PHD students from Linköping University
2010	Startup Grant, 500.000 SEK from Linköping University
2010	The European Union, FP7: IDIHOM Industrialisation of High-Order Methods, 181564 euro in 3 years
2012	The SeRC FLOW Community. Stable High-Order Boundary Conditions for In- and Outgoing Waves for Fluid Flow Problems, 2400.000 SEK in 4 years
2012	Swedish Meteorological and Hydrological Institute (SMHI). Numerical methods for Climate Problems, 1900.000 SEK in 4 years
2012	The Swedish Research Council: Summation-By-Parts Operators and Weak Initial Conditions for Time Discretisation of Initial Boundary Value Problems, 1800.000 SEK in 3 years
2013	The European Union, FP7: UMRIDA Uncertainty Management for Robust Industrial Design in Aeronautics, 200000 euro in 3 years
2013	VINNOVA-NFFP project: Methods for Improved Accuracy in Unsteady CFD (MIAU), 1800.000 SEK in 3 years
2014	The research school in interdisciplinary mathematics at MAI, Linköping University, Duality Based Boundary Conditions for the Navier-Stokes and Elastic Wave Equations, 1300.000 SEK in 5 years
2015	Professor Career Contract for research, 2000.000 SEK/year in 5 years issued by Linköping University
2019	The Swedish Research Council: Artificial Neural Networks, Thin Layers and Approximate Solutions to Partial

Differential Equations, 2475.000 SEK in 3 years

2019 The SeRC FLOW Community: ABL, Atmospheric Boundary Layers for Climate Simulations, 1600.000 SEK in 4 years

2021 The Swedish Foundation for International Cooperation in Research and Higher Education (STINT), Synergistic Linköping University - Washington State University Exchange Program Integrating Scientific Computing Research and Multinational Corporations, 1950.000 SEK in 3 years

2021 The Swedish Research Council: Neural Network Trained Schemes for Efficient Simulation of Complex Physics using Adaptive Mesh Refinement, 1700.000 SEK in 2 years.

Invited talks

2007 American Mathematical Society, Mathematical and Computational aspects of Compressible Flow, Albuquerque, USA

2008 SIAM Annual meeting, Computational Methods for Compressible Flow, San Diego, USA

2010 SACAM10, Keynote talk, Weak Boundary and Interface Conditions with Multi-physics Applications, Pretoria, South Africa

2010 SIAM Annual Meeting, Nonlinear Boundary Conditions for Wave Propagation Problems, Pittsburgh, USA

2011 Africomp2011, Keynote talk, Initial Boundary Value Problems, Summation-by-parts Operators and Weak Boundary Conditions, Cape Town, South Africa

2011 The Popular Applied Mathematics seminar (PAM), Initial Boundary Value Problems, Summation-by-parts Operators and Weak Boundary Conditions, Uppsala, Sweden

2011 ICIAM 2011, Initial Boundary Value Problems, Summation-by-parts Operators and Weak Boundary Conditions, Vancouver, Canada

2012 Linear and Nonlinear Boundary and Interface Problems, Oberwolfach workshop, Germany

2012 Initial Boundary Value Problems and Boundary/Interface Conditions with Multi-Physics Applications, AIM workshop, Palo Alto, USA

2012 CTR Seminar: New Developments for Finite Difference Approximations of Initial Boundary Value Problems: Time Integration and Dual Consistency, Stanford, USA

2013 Stable High Order Finite Difference Methods for Wave Propagation Problems, SIAM CSE Meeting, Boston, USA

2013 SANUM 2013, Plenary talk, Initial Boundary Value Problems,

	Summation-by-parts Operators and Weak Boundary Conditions, Stellenbosch, South Africa
2013	Flamengro conference 2013, Initial Boundary Value Problems and Boundary/Interface Conditions with Multi-Physics Applications, Pretoria, South Africa
2014	SANUM 2014, Plenary talk, High Order Finite Difference Approximations of Multi-Physics Problems, Johannesburg, South Africa
2015	Well Posed Problems and Boundary Conditions in Computational Fluid Dynamics, Aviation 2015, Dallas Texas, USA.
2015	Well Posed Problems and Boundary Conditions in Computational Fluid Dynamics, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany.
2015	Plenary talk at 28th Nordic Seminar on Computational Mechanics: New Developments for Initial Boundary Value Problems involving Multi-physics at Linköping University, Tallin, Estonia.
2016	An Investigation of Uncertainty Effects in Mixed Hyperbolic-Parabolic Problems due to Stochastically Varying Geometry, SIAM UQ 2016, Lausanne, Switzerland.
2016	A Roadmap to Well Posed and Stable Problems in Computational Physics, Stanford University, Stanford, USA
2016	New Developments for Initial Boundary Value Problems involving Multi-physics at Linköping University, 6th EASN International Conference, Porto, Portugal
2017	Improved Numerical Performance Using the SBP-SAT Technique As the Main Building Block, SIAM CSE 17, Atlanta, USA
2018	Energy Stable Boundary Conditions for the Nonlinear Incompressible Navier-Stokes Equations, CFD IMPACT 2018, Haifa, Israel
2018	Energy Stable Boundary Conditions for the Nonlinear Incompressible Navier-Stokes Equations, NASA Langley Research Center, Hampton, USA
2018	Energy Stable Boundary Conditions for the Nonlinear Incompressible Navier-Stokes Equations, Old Dominion University, Norfolk, USA
2018	Energy Stable Boundary Conditions for the Nonlinear Incompressible Navier-Stokes Equations, BCAM - Basque Center for Applied Mathematics, Bilbao, Spain
2019	New Developments for Initial Boundary Value Problems

	involving Multi-physics at Linköping University, SDSU, San Diego, USA
2019	New Developments for Initial Boundary Value Problems involving Multi-physics at Linköping University, Caltech, Pasadena, USA
2019	Stable and accurate filtering procedures, NASA Langley Research Center, Hampton, USA
2019	The spatial operator in the incompressible Navier-Stokes, Oseen and Stokes equations, CFD IMPACT 2019, Haifa, Israel
2019	The spatial operator in the incompressible Navier-Stokes, Oseen and Stokes equations, ICIAM 2019, Valencia, Spain
2019	New Developments for Initial Boundary Value Problems involving Multi-physics at Linköping University, Lawrence Livermore National Lab, Livermore, USA
2019	Stable and accurate filtering procedures, Center for Turbulence Research, Stanford University, Stanford, USA
2019	New Developments for Initial Boundary Value Problems involving Multi-physics at Linköping University, University of Cape Town, Cape Town, South Africa
2020	New Developments for Initial Boundary Value Problems at Linköping University, University of Stavanger, Norway
2020	New Developments for Initial Boundary Value Problems at Linköping University, University of Johannesburg, South Africa
2020	Combining Machine Learning and Computational Mathematics for Increased Prediction Capability: two recent examples, Workshop: Remaking the World with Machine Learning, University of Johannesburg, South Africa
2022	Provably Energy Stable Approximations of Linear and Nonlinear Hyperbolic Problems, THE 2ND NORTH AMERICAN HIGH ORDER METHODS CONFERENCE (NAHOMCON) San Diego, USA
2022	Provably Energy Stable Approximations of Linear and Nonlinear Hyperbolic Problems, Africomp 2022, Cape Town, South Africa
2022	New provably energy stable formulations for hyperbolic problems: application to the Euler and shallow water equations, 65TH SAMS CONGRESS, Stellenbosch, South Africa
2023	Nonlinear Boundary Conditions for Energy and Entropy Stable Initial Boundary Value Problems in Computational Fluid Dynamics,

	SIAM Conference on Computational Science and Engineering Amsterdam, Netherlands
2023	Nonlinear Boundary Conditions for Energy and Entropy Stable Initial Boundary Value Problems in Computational Fluid Dynamics, SANUM 2023, Plenary talk, Johannesburg, South Africa
2023	Nonlinear Boundary Conditions for Initial Boundary Value Problems with Applications in Computational Fluid Dynamics, University of Bordeaux, Bordeaux, France
2024	Computational Mathematics: What is it? What is it good for? University of 3rd Age (U3A) Cape Town, South Africa
2024	Nonlinear Energy Stable Schemes for Incompressible Multi-phase Flows in the Volume of Fluid (VOF) Formulation, SANUM 2024, Stellenbosch, South Africa
2024	Nonlinear Energy Stable Schemes for Incompressible Multi-phase Flows in the Volume of Fluid (VOF) Formulation, Stanford University, Palo Alto, USA

Invited to the following workshops and programs

2012	Mathematisches Forschungsinstitut Oberwolfach: Recent Developments in the Numerics of Nonlinear Hyperbolic Conservation Laws and their Use in Science and Engineering
2012	American Institute of Mathematic (AIM): Nonlinear solvers for high-intensity focused ultrasound with application to cancer treatment.
2015	Mathematisches Forschungsinstitut Oberwolfach: Recent Developments in the Numerics of Nonlinear Hyperbolic Conservation Laws and their Use in Science and Engineering
2016	The Center for Turbulence Research, CTR summer program, Stanford University
2018	Institut de Mathématiques de Toulouse: NABUCO (NumericAl BoUndaries and COupling)
2018	Advances in PDEs: Theory, Computation and Application to CFD ICERM, Brown University
2019	The CFDLAB summer scholar-in-residence program, Technion - Israel Institute of Technology, Haifa, Israel
2020	The Center for Turbulence Research, CTR summer program, postponed to 2021, Stanford University, USA
2020	Remaking the World with Machine Learning,

	University of Johannesburg, South Africa
2022	Holistic Design of Time-Dependent PDE Discretizations, ICERM, Brown University
2022	Mathematisches Forschungsinstitut Oberwolfach: Beyond polynomials: Multi-dimensional summation-by-parts operators for general function spaces
2024	The Center for Turbulence Research, CTR summer program, Stanford University

PhD Student supervision

1997 - 2003	Ken Mattsson, Thesis title: Summation-by-Parts Operators for High Order Finite Difference Methods
1999 - 2004	Magnus Svärd, Thesis title: Stable High Order Finite Difference Methods for Aerodynamics
2003 - 2007	Jing Gong, Thesis title: Hybrid Methods for Unsteady Fluid Flow Problems in Complex Geometries
2006 - 2011	Qaiser Abbas, Thesis title: Weak Boundary and Interface Procedures for Wave and Flow Problems
2006 - 2016	Sven-Erik Ekström, (Licenciate) Project: ADIGMA, A Vertex-Centered Dual Discontinuous Galerkin Method for Hyperbolic Problems, Martin Berggren UMU 1st advisor
2007 - 2012	Sofia Eriksson, Project: Stable Numerical Methods with Boundary and Interface Treatment for Applications in Aerodynamics
2007 - 2012	Kenneth Duru, Thesis title: Perfectly Matched Layers and High Order Difference Methods for Wave Equations, Gunilla Kreiss UU 1st advisor
2008 - 2013	Jens Berg, Project: Stable and High-Order Finite Difference Methods for Multiphysics Flow Problems
2008 - 2013	Per Pettersson, Project: Uncertainty Quantification and Numerical Methods for Conservation Laws, jointly with Gianluca Iaccarino, SU
2011 - 2016	Tomas Lundquist, Project: High Order Summation-by-Parts Methods in Time and Space
2011 - 2016	Samira Nikkar, Project: Stable High Order Finite Difference Methods for Wave Propagation and Flow Problems on Deforming Domains
2011 - 2016	Ossian O'Reilly, Project: High Order Accurate Numerical Methods in Geophysics, jointly with Eric Dunham SU

2012 - 2017	Hannes Frenander, Project: High-order finite difference approximations for hyperbolic problems: multiple penalties and non-reflecting boundary conditions
2012 - 2017	Cristina La Cognata, Project: High order summation-by-parts based approximations for discontinuous and nonlinear problems
2012 - 2017	Viktor Linders, Project: Error analysis of summation-by-parts formulations: Dispersion, transmission and accuracy
2013 - 2018	Markus Wahlsten, Project: Uncertainty quantification for wave propagation and flow problems with random data
2014 - 2019	Fatemeh Ghasemi, Project: Stability, dual consistency and conservation of summation-by-parts formulations for multi-physics problems
2014 - 2019	Andrea Ruggio, Project: Eigenvalue analysis and convergence acceleration techniques for summation-by-parts approximations
2016 - 2021	Oskar Ålund, Project: Applications of summation-by-parts operators
2017 - 2022	Fredrik Lauren, Project: Summation-by-parts formulations for flow problems

Postdoc supervision

2011 - 2014	Marco Kupiainen, Project: InDustrIalisation of Higher Order Methods (IDIHOM)

Teaching experience

2001	Graduate course in Computational Aeroacoustics (UU)
2004	Graduate course in Artificial Boundary Conditions (UU)
2007	Undergraduate course in Scientific Computing (UU)
2007	Undergraduate course in Analysis of Numerical Methods (UU)
2008	Undergraduate course in Computational Fluid Dynamics (KTH)
2008	Graduate course in Initial Boundary Value Problems (UU)
2009	Graduate course in Numerical Methods for Initial Boundary Value Problems, Institute of Computational Mathematics in Engineering (iCME), Stanford University
2011	Graduate course in Numerical Methods for Initial Boundary Value Problems, Institute of Computational Mathematics in Engineering (iCME), Stanford University
2011	Graduate course in Numerical Methods for Initial Boundary Value Problems, Linköping University (LiU)
2013	Short course in Numerical Solution of Initial Boundary

	Value Problems, Council for Scientific and Industrial Research (CSIR), Pretoria, South Africa
2013	SeSE Graduate course in Numerical Solution of Initial Boundary Value Problems, (LiU)
2014	Graduate course, Selected articles on well posed problems and numerical approximations, (LiU)
2016	SeSE Graduate course in Stochastic Galerkin Methods for Partial Differential Equations, (LiU)
2017	SeSE Graduate course in Numerical Solution of Initial Boundary Value Problems, (LiU)
2017	SeSE Graduate course in Numerical Solution of Initial Boundary Value Problems, University of Cape Town
2019	SeSE Graduate course: Combining Partial Differential Equations, Machine Learning and Measurements for Increased Prediction Capability, (LiU)
2023	Undergraduate project course in Scientific Computing for visiting Washington State University students in Exchange Program Integrating Scientific Computing Research and Multinational Corporations

Editorial work

2008 - 2011	Editorial board of International Journal of Mechanics and MEMS
2013 -	Editorial board of BIT Numerical Mathematics
2016 -	Editorial board of Journal of Computational Physics (JCP)

Recent projects

1996 - 2010	High order finite difference approximations, collaboration with ICASE, NIA and NASA, USA
1998 - 2010	Accelerating coordinate systems, collaboration with CSIR, South Africa
2004 - 2010	Unsteady Supersonic Aerodynamics, collaboration with WITS, South Africa
2005 - 2009	Hybrid Methods for Unsteady Aerodynamics, collaboration with CTR, the Centre for Turbulence Research, SU, USA
2007 - 2013	Uncertainties in Aerodynamics, collaboration with the Department of Mechanical Engineering, SU, USA

2008 - 2012	Computational methods for heat transfer in micro-mechanical systems, collaboration with Nanospace AB, Swedish Space Corporation Group, Sweden
2009 - 2011	Nonlinear generation of internal waves in the deep ocean by tides, collaboration with MISU, Stockholm University
2009 - 2016	Computational Methods for Earthquake Simulations, collaboration with the Department of Geophysics, SU, USA
2010 - 2013	The European Union, FP7: IDIHOM Industrialisation of High-Order Methods, 181564 euro in 3 years
2012 - 2017	The SeRC FLOW Community. Stable High-Order Boundary Conditions for In- and Outgoing Waves for Fluid Flow Problems
2012 - 2017	Swedish Meterological and Hydrological Institute (SMHI). Numerical methods for Climate Problems
2012 - 2015	The Swedish Research Council: Summation-By-Parts Operators and Weak Initial Conditions for Time Discretisation of Initial Boundary Value Problems
2013 - 2016	The European Union, FP7: UMRIDA Uncertainty Management for Robust Industrial Design in Aeronautics
2013 - 2017	VINNOVA-NFFP project: Methods for Improved Accuracy in Unsteady CFD (MIAU)
2014 - 2019	The research school in interdisciplinary mathematics at MAI, Linköping University, Duality Based Boundary Conditions for the Navier-Stokes and Elastic Wave Equations
2019 - 2021	The Swedish Research Council: Artificial Neural Networks, Thin Layers and Approximate Solutions to Partial Differential Equations
2019 - 2022	The SeRC FLOW Community: ABL, Atmospheric Boundary Layers for Climate Simulations
2021- 2023	The Swedish Research Council: Neural Network Trained Schemes for Efficient Simulation of Complex Physics using Adaptive Mesh Refinement

Main advisor for the following PhD thesis

1. K. Mattsson, Summation-by-Parts Operators for High Order Finite Difference Methods, Acta Univ. Ups. Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology 828. 23 pp. Uppsala ISBN 91-554-5596-4. 2003.

2. M. Svärd, Stable High Order Finite Difference Methods for Aerodynamics, Acta Univ. Ups. Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology 1026. 25 pp. Uppsala ISBN 91-554-6063-1. 2004.

3. J. Gong, Hybrid Methods for Unsteady Fluid Flow Problems in Complex Geometries, Acta Univ. Ups. Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology 374. 28 pp. Uppsala ISBN 978-91-554-7046-3, 2007.

4. Q. Abbas, Weak Boundary and Interface Procedures for Wave and Flow Problems, Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology, ISSN 1651-6214; 862, 2011.

5. S. Eriksson, Stable Numerical Methods with Boundary and Interface Treatment for Applications in Aerodynamics, Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology, ISSN 1651-6214; 985 2012.

6. J. Berg, Stable and High-Order Finite Difference Methods for Multiphysics Flow Problems, Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology, ISSN 1651-6214; 1004, 2013.

7. P. Pettersson, Uncertainty Quantification and Numerical Methods for Conservation Laws, Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology, ISSN 1651-6214; 1008, 2013.

8. T. Lundquist, High order summation-by-parts methods in time and space, Linköping Studies in Science and Technology. Dissertations, ISSN 0345-7524; 1740, 2016.

9. S. Nikkar, Stable High Order Finite Difference Methods for Wave Propagation and Flow Problems on Deforming Domains, Linköping Studies in Science and Technology. Dissertations, ISSN 0345-7524, 1774, 2016.

10. O. O'reilly, Numerical methods for wave propagation in solids containing faults and fluid-filled fractures, Linköping Studies in

Science and Technology. Dissertations, ISSN 0345-7524, 1806, 2016.

11. H. Frenander, High-order finite difference approximations for hyperbolic problems: multiple penalties and non-reflecting boundary conditions, Linköping Studies in Science and Technology. Dissertations, ISSN 0345-7524, 1824, 2017.

12. C. La Cognata, High order summation-by-parts based approximations for discontinuous and nonlinear problems, Linköping Studies in Science and Technology. Dissertations, ISSN 0345-7524, 1880, 2017.

13. V. Linders, Error analysis of summation-by-parts formulations: Dispersion, transmission and accuracy, Linköping Studies in Science and Technology. Dissertations, ISSN 0345-7524, 1886, 2017.

14. M. Wahlsten, Uncertainty quantification for wave propagation and flow problems with random data, Linköping Studies in Science and Technology. Dissertations, ISSN 0345-7524, 1921, 2018.

15. F. Ghasemi, Stability, dual consistency and conservation of summation-by-parts formulations for multiphysics problems, Linköping Studies in Science and Technology. Dissertations, ISSN 0345-7524, 1988, 2019.

16. A. A. Ruggiu, Eigenvalue analysis and convergence acceleration techniques for summation-by-parts approximations, Linköping Studies in Science and Technology. Dissertations, ISSN 0345-7524, 2002, 2019.

17. O. Ålund, Applications of summation-by-parts operators, Linköping Studies in Science and Technology. Dissertations, ISSN 0345-7524, 2106, 2021.

18. F. Lauren, Summation-by-parts formulations for flow problems, Linköping Studies in Science and Technology. Dissertations, ISSN 0345-7524, 2022.

Currently co-supervising the following PhD students

1. M.P. Nchupang, with Professor A. Malan, at Department of Mechanical Engineering, University of Cape Town, South Africa.

2. T. Jagutpal, with Professor A. Malan, at Department of Mechanical Engineering, University of Cape Town, South Africa.

3. S. Rametse, with Professor B. Jacobs, at Department of Mathematics and Applied Mathematics, University of Johannesburg, South Africa.

4. P. Ersing, with Professor A. R. Winters, at Department of Mathematics, Applied Mathematics, Linköping University, Sweden.

Main advisor for the following Masters thesis

1. A. Bengtsson & E. Ziakouli, The Influence of Open Boundary Conditions and Difference Operators on the Time-integration of the Burgers Equation, FFA TN 1988-57, Stockholm 1988.

2. N. Nordin, The Fringe Region Technique Used in the Direct Numerical Simulation of the Incompressible Navier-Stokes Equations, FFA TN 1995-04, Stockholm 1995.

3. F. Jansson, Boundary Conditions for the Compressible Navier-Stokes Equations at a Subsonic Outflow Boundary, FFA TN 1995-05, Stockholm 1995.

4. N. Lindberg, (jointly with Gunilla Efraimsson, FFA) Numerical Investigation of Extrapolation Boundary Conditions for the Euler Equations, FFA TN 1998-03, Stockholm 1998.

5. I. Karlsson, Boundary Conditions in the $\kappa-\omega$ and $\kappa-\epsilon$ Turbulence Models, FFA TN 1998-49, Stockholm 1998.

6. E. Petrini, (jointly with Gunilla Efraimsson, FFA) A Numerical Study of the Introduction and Propagation of a 2-D Vortex, FFA TN 1998-66, Stockholm 1998.

7. Rickard Lindkvist, Boundary Conditions for the Euler Equations, FFA TN 1999-31, Stockholm 1999.

8. Martin Björck, Finite Volume Approximations and Strict Stability for Hyperbolic Problems, FFA TN 2000-35, Stockholm 2000.

9. Björn Bretz, (jointly with Karl Forsberg, FFA) High Order Finite Difference Approximations of Hyperbolic Problems, FFA TN 2000-09, Stockholm 2000.

10. J. Persson, Discrete Approximations of Electromagnetic Problems, Scientific Report FOI-R–0119-SE, Stockholm 2001.

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