Curriculum Vitae

Mats Ehrnström

Personal Data

Civil Born a Swedish citizen on August 2, 1976. Married to Birgitta Ehrnström, PhD, MD, St Olav University Hospital. Children: Noah, born 2007, and Aron, born 2011.

Contact Nordmyrvegen 32, NO-7089 Heimdal, Norway.
mats.ehrnstrom@ntnu.no

Positions

2014– Professor, Department of Mathematical Sciences, Norwegian University of Science and Technology.

2012–2014 Associate Professor (Førsteamanuensis), Department of Mathematical Sciences, Norwegian University of Science and Technology.

2008–2012 Assistant Professor (Akademischer Rat a.Z.), Department of Applied Mathematics, Leibniz Universität Hannover.

2007–2008 University Teacher for the mathematical profile programme at Lund Cathedral School.

2005–2008 PhD-position, Department of Mathematics, Lund University.

2004 Assistant teacher, Department of Mathematics, Lund University.

Education

2008 Doctor of Philosophy, Mathematics, Lund University. *On Steady Water Waves and Their Properties.* Under the supervision of A. Constantin.

2006 Licentiate of Philosophy, Mathematics, Lund University. *Asymptotic Behaviour of Solutions to Semi-linear Differential Equations.* Under the supervision of A. Constantin.

2004 Master of Science, Lund University. *Some Mathematical Aspects of the Water Wave Problem.* Under the supervision of A. Constantin.

2003 Teacher of Mathematics and Psychology, Malmo/Lund University. *On Differences Between Students and Teachers in Their Perception of Mathematics (in Swedish).*

Peer-reviewed publications

45. On the precise cusped behaviour of extreme solutions to Whitham-type equations. Accepted for publication in *Ann. Inst. H. Poincaré Anal. Non Linéaire*. With O.I.H Mæhlen and K. Varholm.

44. Smooth stationary water waves with exponentially localized vorticity. *J. Eur. Math. Soc. (JEMS)* 25 (2023), 1045–1090. With S. Walsh and C. Zeng.

43. A direct construction of a full family of Whitham solitary waves. *Proc. Amer. Math. Soc.* 151 (2023), 1247–1261. With K. Nik and C. Walker.

42. Existence of Davey–Stewartson type solitary waves for the fully dispersive Kadomtsev–Petviashvilii equation. *SIAM J. Math. Anal.* 54 (2022), 4954–4986. With M.D. Groves and D. Nilsson.

41. Enhanced existence time of solutions to evolution equations of Whitham type. *Discrete Contin. Dyn. Syst.* 42 (2022), 3841–3860. WIth Y. Wang.

40. On the bifurcation diagram of the capillary-gravity Whitham equation. *Water Waves* 1 (2019), 275–313. With M.A. Johnson, O.I.H. Maehlen and F. Remonato.

39. On Whitham's conjecture of a highest cusped wave for a nonlocal dispersive equation. *Ann. Inst. H. Poincaré Anal. Non Linéaire* 36 (2019), 1603–1637. With E. Wahlén.

38. Enhanced existence time of solutions to the fractional Korteweg–de Vries equation *SIAM J. Math. Anal.* 51 (2019), 3298–3323. With Y. Wang.

37. Existence of a highest wave in a fully dispersive two-way shallow water model. *Arch. Rational Mech. Anal.* (2019), 1635–1673. With M.A. Johnson and K.M. Claassen.

36. Small-amplitude fully localised solitary waves for the full-dispersion Kadomtsev–Petviashvili equation. *Nonlinearity* 31 (2018), 5351–5384. With. M. Groves.

35. Classical well-posedness in dispersive equations with nonlinearities of mild regularity, and a composition theorem in Besov spaces. *J. Evol. Equ.* 18 (2018), 1147–1171. With L. Pei.

34. Symmetric solutions of evolutionary partial differential equations. *Nonlinearity* 30 (2017), no. 10, 3932–3950. With G. Bruell, A. Geyer and L. Pei.

33. Symmetry and decay of traveling wave solutions to the Whitham equation. *J. Differential Equations* 262 (2017), no. 8, 4232–4254. With G. Bruell and L. Pei.

32. A note on the local well-posedness for the Whitham equation. Elliptic and parabolic equations, 63–75, *Springer Proc. Math. Stat.*, 119, Springer, Cham, 2015. With J. Escher and L. Pei.

31. Trimodal steady water waves. *Arch. Ration. Mech. Anal.*, 216 (2015), no. 2, 449–471. With E. Wahlén.

30. Steady-state fingering patterns for a periodic Muskat problem, *Methods Appl. Anal.*, 20 (2013), 33–46. With J. Escher and B.-V. Matioc.

29. Global bifurcation for the Whitham equation, *Math. Model. Nat. Phenom.*, 7 (2013), 32–49. With H. Kalisch.

28. On the existence and stability of solitary-wave solutions to a class of evolution equations of Whitham type, *Nonlinearity*, 25 (2012), 1–34. With M. Groves and E. Wahlén.

27. Steady water waves with multiple critical layers: interior dynamics, *J. Math. Fluid Mech.*, 14 (2012), 407–419. With J. Escher and G. Villari.

26. Steady water waves with multiple critical layers, *SIAM J. Math. Anal.*, 43 (2011), 1436–1256. With J. Escher and E. Wahlén.

25. Well-posedness, instabilities, and bifurcation results for the flow in a rotating Hele–Shaw cell, *J. Math. Fluid Mech.*, 13 (2011), 271–293. With J. Escher and B.-V. Matioc.

24. Asymptotic integration of second order nonlinear difference equations, *Glasgow Math. J.*, 53 (2011), 223–243. With C.C. Tisdell and E. Wahlén.

23. Symmetric waves are traveling waves, *Int. Math. Res. Not.*, (2009), 4578–4596. With H. Holden and X. Raynaud.

22. Recent progress on particle trajectories in steady water waves, *Discrete Contin. Dyn. Syst. Ser. B*, 12 (2009), 539–559. With G. Villari.

21. Traveling waves for the Whitham equation, *Differential Integral Equations*, 22 (2009), 1193–1210. With H. Kalisch.

20. Two-dimensional steady edge waves. Part I: periodic waves, *Wave Motion*, 46 (2009), 363–371. With J. Escher and B.-V. Matioc.

19. Two-dimensional steady edge waves. Part II: solitary waves, *Wave Motion*, 46 (2009), 372–378. With J. Escher and B.-V. Matioc.

18. Existence of global positive solutions of semilinear elliptic equations, *Nonlinear Anal.*, 71 (2009), 1606–1610.

17. On the fluid motion within standing waves, *J. Nonlinear Math. Phys.*, Suppl. 2, 15 (2008), 74–86. With E. Wahlén.

16. On the streamlines and particle paths of gravitational water waves, *Nonlinearity*, 21 (2008), 1–16.

15. Linear water waves with vorticity: rotational features and particle paths, *Journal of Differential Equations*, 244 (2008), 1888–1909. With G. Villari.

14. Particle trajectories in linear deep-water waves, *Nonlinear Anal. Real World Appl.*, 9 (2008), 1336–1344. With A. Constantin and G. Villari.

13. A new formulation of the water wave problem for Stokes waves of constant vorticity, *J. Math Anal. Appl.*, 339 (2008), 636–643.

12. Symmetry of steady periodic gravity water waves with vorticity, *Duke Math. J.*, 140 (2007), 591–603. With A. Constantin and E. Wahlén.

11. Deep-water waves with vorticity: symmetry and rotational behaviour, *Discrete Contin. Dyn. Syst.*, 19 (2007), 483–491.

10. A uniqueness result for steady symmetric water waves with affine vorticity, *Dyn. Contin. Discrete Impuls. Syst. Ser. A Math. Anal.*, 14 (2007), 609–614.

9. On positive solutions of a class of nonlinear elliptic equations, *Nonlinear Anal.*, 67 (2007), 1147–1154. With O. G. Mustafa.

8. Linear asymptotic behaviour of second order ordinary differential equations, *Glasgow Math. J.*, 49 (2007), 105–120.

7. Prescribed asymptotic behaviour of solutions to semilinear ordinary differential equations, *Appl. Math. Lett.*, 20 (2007), 800–805.

6. A unique continuation principle for steady symmetric water waves with vorticity, *J. Nonlinear Math. Phys.* 13 (2006), 484–491.

5. Positive solutions for second-order nonlinear differential equations, *Nonlinear Anal.*, 64 (2006), 1608–1620.

4. On radial solutions of certain semi-linear elliptic equations, *Nonlinear Anal.* 64 (2006), 1578–1586.

3. A note on surface profiles for symmetric gravity waves with vorticity, *J. Nonlinear Math. Phys.*, 13 (2006), 1–8.

2. Uniqueness for steady periodic water waves with vorticity, *Int. Math. Res. Not.*, (2005), 3721–3726.

1. Uniqueness of steady symmetric deep-water waves with vorticity, *J. Nonl. Math. Phys.*, 12 (2004), 27–30.

— Conferences and programmes

2023 — *Workshop on Nonlinear Waves and Related Topics*, Shonan Village Center, Kanagawa. Invited speaker.

— Program on *Order and Randomness in Partial Differential Equations*, Institut Mittag-Leffler, Stockholm.

— *Aspects of Nonlinear Evolution. Conference in Honor of the 60th Birthday of Joachim Escher*, Leibniz Universität Hannover. Invited speaker.

2022 — Program on *Geometric Aspects of Nonlinear Partial Differential Equations*, Institut Mittag-Leffler, Stockholm.

— *Two Days on Qualitative Theory of Differential Equations A conference in honor of Gabriele Villari*, University of Firenze. Invited speaker.

— *2nd Norwegian meeting on PDEs*, University of Bergen. Invited speaker.

— Workshop on *Numerical and analytical approaches for nonlinear dispersive PDEs*, University of Burgundy, Dijon. Invited speaker.

2021 — Program on *Mathematical Problems in Fluid Dynamics*, MSRI, Berkeley.

2020 — *Workshop on Free Surface Hydrodynamics*, part of the Thematic Program on Mathematical Hydrodynamics, Fields Institute, Toronto. Invited speaker.

— *PDEs in Fluid Dynamics*, mini-symposium in DMV Annual Meeting 2020, Chemnitz. Invited speaker.

2019 — *20th Anniversary of the Centre for Mathematical Sciences*, Lund University. Invited speaker.

— *International Workshop on Analysis and PDE*, Leibniz Universität Hannover. Invited speaker.

— Conference on *Dispersive Waves and Related Topics*, University of Bergen. Invited speaker.

— Workshop on *Mathematical Theory of Water Waves*, Oberwolfach Research Institute. Invited speaker.

— *Functions Spaces and Applications*, mini-symposium in International Conference on Elliptic and Parabolic Equations, Gaeta. Invited speaker.

2018 — *One-day seminar on Geometry, Analysis, and PDE*, University of Bergen. Invited speaker.

— *National Mathematicians' Meeting*, Radisson Blu Royal Hotel, Bergen. Invited speaker.

— *The 12th AIMS Conference on Dynamical Systems, Differential Equations and Applications*, National Taiwan University, Taipei. Invited speaker (session).

2017 — Workshop on *Nonlinear water waves — an interdisciplinary interface*, Erwin Schrödinger Institute, Vienna. Invited speaker.

— Lecture series *Solitary and periodic waves of the Whitham equation*, given at the Yau Mathematical Sciences Center, Tsinghua University, Beijing.

— Workshop on *Recent progress on surface and internal waves models*, Wolfgang Pauli Institute, Vienna. Invited speaker.

— Programme on *Nonlinear Water Waves*, Isaac Newton Institute for Mathematical Sciences, Cambridge.

— *Workshop on Inverse Scattering and Dispersive PDEs in One Space Dimension*, Fields Institute, Toronto. Invited speaker.

— *Meeting of the Catalan, Spanish, Swedish Mathematical Societies*, Umeå, Sweden. Invited speaker (session).

— *Workshop on Water Waves*, ICERM, Brown University. Invited speaker.

— *The Tenth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory*, Athens, Georgia. Invited speaker (session).

2016 — Workshop on *Theoretical and Computational Aspects of Nonlinear Surface Waves*, Banff International Research Station, Banff, Canada. Invited speaker.

— Workshop on *Recent progress on the qualitative properties of nonlinear dispersive equations and systems*, Wolfgang Pauli Institute, Vienna. Invited speaker.

— Programme and workshop on *Interactions between Partial Differential Equations and Functional Inequalities*, Mittag–Leffler Institute, Stockholm. Workshop. Invited speaker.

— *The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications*, Orlando, Florida. Invited speaker (cancelled due to sickness).

2015 — *SIAM Conference on Analysis of Partial Differential Equations*, Scottsdale, Arizona. Invited speaker (session).

— *EquaDiff*, Lyon. Invited speaker (session).

— *The Ninth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory*, Athens, Georgia. Invited speaker (session).

— *Workshop on the Mathematical Theory of Water Waves*, Oberwolfach Institute. Invited speaker.

2014 — *Workshop on Dispersive Equations with Nonlocal Dispersion*, Wolfgang Pauli Institute, Vienna. Invited speaker.

— *SIAM Conference on Nonlinear Waves and Coherent Structures*, Cambridge, England. Invited speaker (session).

— *The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications*, Madrid. Invited speaker (session).

2013 — Programme on *Evolutionary problems*, Institut Mittag-Leffler, Stockholm.

— *Workshop on Elliptic and Parabolic Equations*, Hannover. Invited speaker.

— *Equadiff*, Prague. Invited speaker (session).

— *Chinese–Norwegian Mathematics Workshop*, Trondheim. Invited speaker.

— *Workshop within the 16th Internet Seminar on Evolution Equations: Operator Semigroups and Dispersive Equations*, Heinrich Fabri Institute, Blaubeuren. Group Coordinator.

— *The Eighth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, Georgia*. Invited talk (session).

— *SIAM Conference on Applications of Dynamical Systems*, Snowbird, Utah. Invited talk (session).

2012 — *Norwegian–Italian workshop in PDEs*, Trondheim. Invited speaker.

— *The Abel Symposium*, Oslo.

— *Days on Diffraction*, Steklov Mathematical Institute, St. Petersburg. Invited speaker (session).

2011 — *DMV (German Mathematical Society) annual meeting*, Cologne. Invited speaker (session).

— *Equadiff*, Loughborough. Invited speaker (session).

— *Nonlinear Water Waves* (programme), Erwin Schrödinger Institute, Vienna.

— *The Seventh IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory*, Athens, Georgia. Invited speaker (session).

2010 — *AMS sectional Meeting: Special Session on Nonlinear Evolution Equations*, Notre Dame. Invited speaker (session).

— *8th AIMS International Conference on Dynamical Systems*, Differential Equations and Applications, Dresden. Invited speaker (session).

2009 — *Elliptic and Parabolic Equations*, Weierstrass Institute, Berlin. Invited speaker.

— Workshop on *Wave Motion*, Mathematisches Forschungsinstitut Oberwolfach. Invited speaker.

— Workshop on *Recent advances in integrable systems of hydrodynamic type*, Erwin Schrödinger Institute, Vienna. Invited speaker.

2008 — *SIAM Conference on Nonlinear Waves and Coherent Structures*, La Sapienza University, Rome. Invited speaker (session).

— *7th AIMS International Conference on Dynamical Systems*, Differential Equations and Applications, Arlington, Texas. Invited speaker (session).

2007 — *Geometrical Mechanics*, CIRM, Marseille. Invited speaker.

— *Workshop on Analysis and Geometry*, Leibniz Universität Hannover. Invited speaker.

— *New Trends in Complex and Harmonic Analysis: an international conference on Analysis and Mathematical Physics*, Voss, Norway. Invited speaker (session).

2006 — *Operator Theory, Analysis and Mathematical Physics*, Lund. Invited speaker (session).

2005 — Programme on *Wave Motion*, Institut Mittag-Leffler, Stockholm.

— Other research visits and talks

Linköping University ('23), Universität Wien ('23), Universität Bonn (Hausdorff Colloquium '21), Ibaraki University (online '21), Lanzhou University (online '21), Warsaw University ('18), Yau Mathematical Sciences Centre, Tsinghua University ('17), Lund University ('17, '11), Leibniz Universität Hannover ('17, '16, '06), Université de Bordeaux ('18, '16, '14), Universität des Saarlandes ('16, '09), Georgia Institute of Technology ('15), University of Missouri ('21,'15,'14), Kansas University ('14), University of Bergen ('13,'10,'07), École polytechnique fédérale de Lausanne ('23, '12), Università degli Studi di Firenze ('12, '09' 07, '06), Technische Universität Darmstadt ('11), Jacobs University ('10), Norwegian University of Science and Technology ('11,'11, '08,), McMaster University ('08), University of New South Wales ('07).

— Popular talks/talks aimed at a wider audience

2023 — *On Euler's musical function and other topics in the mathematical theory of music*, Mathematical Pearls, Trondheim.

— *Top-down and bottom-up: how the measure-prone can meet the principle-driven.* IE Friday Talk at the Faculty of Information Technology and Electrical Engineering, Trondheim.

2021 — *The Hardy-Weinberg Principle and Evolutionary Genetics*, Mathematical Pearls, Trondheim.

2016 — *Societal impact of 'Young Research Talents': Nonlinear Water Waves*, a presentation at the annual meeting of the Research Council of Norway 'Young Research Talents' grantees, Oslo.

— *Presentation of the Wallenberg prize*, Swedish Mathematical Society, Uppsala.

2015 — *A Mathematician's Apology for Dispersive Equations*, Mathematical Pearls, Trondheim.

2014 — *Quality, Accessibility and Differentiation in Undergraduate Studies in Mathematics*, held at departmental seminar in Bergen; and at the 'Inspirational Seminar on the Pedagogical Development in Mathematics and Technology', Britannia, Trondheim.

2013 — *Rogue Waves, Tsunamis and Solitons*, Researchers' Night, Trondheim.

2009 — *Solitons, Tsunami and Mobile Phone Radiation*, Autumn Academy for Teachers, Hannover.

2008 — *Riding on a Water Molecule*, Science Days, Lund.

— Organised events

2023 — *The Abel Symposium 2023. Partial Differential Equations: Waves, Nonlinearities and Nonlocalities.* Orkanger Mansion, Orkanger. Head of committee. Co-organised with H Holden, E Jakobsen, NH Risebro, S Selberg, I Gallagher, D Lannes, E Tadmor and E Wahlén.

— *Nonlinear Dispersive Equations*. Mini-symposium at the 29th Nordic Congress of Mathematicians, Aalborg, Denmark. Co-organised with F. Hildrum and D. Nilsson.

2022 — *Waves and Nonlinear Phenomena*, closing conference of the NFR project WaNP, Trondheim. Co-organised with H. Holden, P. Lindqvist, E. Jakobsen and K. Grunert.

2019 — *Norwegian meeting on PDEs*, First national meeting on partial differential equations in Norway. Trondheim. Co-organised with E Jakobsen, D Pilod and NH Risebro.

2018 — *NTNU workshop on PDEs*, Trondheim. Co-organised with H. Holden, P. Lindqvist, E. Jakobsen and K. Grunert.

— Workshop on *Fluid Dynamics and Dispersive Equations*, Lund. Co-organised with E. Wahlén.

2016 — *Nonlinear Partial Differential Equations: Boundary Value Problems and Equations arising in Fluid Mechanics*, session at the 27th Nordic Congress of Mathematicians, Stockholm. Co-organised with J. Lenells and E. Wahlén.

2015 — *Water Waves*, session at the SIAM conference on Analysis of PDEs, Scottsdale, Arizona. Co-organised with S. Walsh.

— *Mini-Workshop on Nonlocal Dispersive Equations*, Trondheim. Co-organised with H. Kalisch.

2013 — *PDEs, Nonlinear Waves and Dispersive Equations*, session at the 26th Nordic and 1st European-Nordic Congress of Mathematicians, Lund. Co-organised with M. Groves.

2012 — *Waves and patterns in nonlinear PDEs*, session at the DMV (German Mathematical Society) annual meeting, Saarbrücken. Co-organised with E. Wahlén.

— Workshop on *Nonlinear waves and interface problems*, Lund. Co-organised with E. Wahlén.

2011 — *Nonlinear Water Waves*, session at the XXXI Dynamics Days Europe, Oldenburg. Co-organised with E. Wahlén.

2010 — *Patterns in Fluid Dynamics*, session at New trends in Harmonic and Complex Analysis: With Applications in Fluid Dynamics and Partial Differential Equations, Bremen. Co-organised with J. Escher.

— Supervision

Postdocs — D. Svensson Seth ('21–), K. Varholm ('20–), H. Le ('19–'20), D. Nilsson ('18–'20), M. N. Arnesen ('18–'21) R. Dhara ('17–'18), Y. Wang ('16–19), G. Brüll ('15–'18).

PhDs — J. Xue ('23). *Solutions in Dispersive Equations and Steady Waves with Vorticity*.

F. Hildrum ('22). *Nonlocal and Monotone Techniques in Dispersive Equations and Inverse Problems*.

O. I. H. Maehlen ('21). *Travelling and Global-in-Time Solutions of Water Wave Equations with Mild and Nonlocal Dispersion*.

K. Varholm ('19). *On Steady Water Waves with Stagnation Points*.

F. Remonato ('18). *Analytical and Numerical Bifurcation Methods for Nonlocal Wave Equations*.

M. N. Arnesen ('18). *On Nonlocal Dispersive Equations and Water Waves*.

L. Pei ('17). *Nonlocal Dispersive Models for Water Waves: Existence, Symmetry and Related A Priori Properties*.

Masters — L. Evje ('23). *Solitary Waves for Equations with Fully Nonlocal Nonlinearities.*

R. Østern Lien ('23). *Higher-Order Estimates of Highest Waves of the Whitham Equation.*

J. Pedersen Vean ('22). *Global Bifurcation of a Nonlocal Equation.*

J. Ulvedal Marstrander ('22). *Solitary Waves in Equations with Fully Mixed Nonlocal and Nonlinear Terms.*

M. C. Ørke ('21). *Traveling Waves for a Fractional Korteweg–De Vries and a Fractional Degasperis–Procesi Equation with an Inhomogeneous Symbol.*

O. I. Mæhlen ('17). *Solitary Waves for Dispersive Equations with Inhomogeneous Nonlinearities.*

O. O. Aftam ('17). *On Steady Solutions of a Generalized Whitham Equation*.

O. Willumsen Haugå ('16). *Existence of Solitary-Wave Solutions to a class of Pseudodifferential Evolution Equations*.

F. Hildrum ('15). *On the Existence of Periodic Traveling Waves to the Whitham Equation.*

H. Fiskerstrand Gjørtz ('15). *On the Well-Posedness of a Class of Whitham-like Nonlocal Equations with Weak Dispersion*.

H. Debach ('15). *A Study of Dispersive Evolution Equations with Nonlocal Nonlinearities.*

A. Aasen ('14). *A Study of Rotational Water Waves using Bifurcation Theory*.

K. Varholm ('14). *Water Waves with Compactly Supported Vorticity: A Functional-Analytic Approach to Bifurcation Theory and the Mathematical Theory of Traveling Water Waves*.

A. Perlin ('14). *Steady water waves with multiple critical layers*. At the chair of J. Escher, Leibniz Universität Hannover.

M. N. Arnesen ('13). *An Introduction to Distributions and Sobolev Spaces, and a Study of the Fractional Partial Differential Operator* $1 + (-\Delta)^{s/2}$.

F. J. Gjestland ('13). *Distributions, Schwartz Space and Fractional Sobolev Spaces*.

G. Brüll ('11). *The Krein–Rutman Theorem and an Application on Population Models*. At the chair of C. Walker, Leibniz Universität Hannover.

Bachelors

N. Mathiak ('12). *Qualitative Theorie dynamischer Systeme*. At the chair of J. Escher, Leibniz Universität Hannover.

S. Kanca ('12). *Asymptotische Integration — oder asymptotisches Verhalten von gewöhnlichen Differentialgleichungen 2. Ordnung*. At the chair of J. Escher, Leibniz Universität Hannover.

A. Perlin ('11). *Über die Grundlagen der Bifurkationstheorie der gewöhnlichen Differentialgleichungen*. At the chair of J. Escher, Leibniz Universität Hannover.

G. Brüll ('09). *Stabilität von Equilibria in Chemostatmodellen*. At the chair of C. Walker, Leibniz Universität Hannover.

— Teaching/pedagogical leadership

2022
Analysis 2: analysis in several variables, second semester.

2021
Analysis 1: real analysis, first semester.
Analysis 2: analysis in several variables, second semester.

2019
Analysis 1: real analysis, first semester.

2018
Analysis 1: real analysis, first semester.
Analysis 2: analysis in several variables, second semester. Shared with G. Brüll.

2017
Mini-course held at the Yau Mathematical Center, Tsinghua University: Solitary and periodic waves of the Whitham equation.

2014–2018
Leader of the *KTDiM* educational project.

2014
Calculus 2: analysis in several variables, second semester. Coordinator (five parallels).

2013
Linear methods: introductory functional analysis, fifth semester.
Calculus 2: analysis in several variables, second semester. Coordinator (five parallels).

2012
Linear methods: introductory functional analysis, fifth semester (lecture notes in English).
Calculus 2: analysis in several variables, second semester.

2011
Ordinary differential equations: mainly dynamical systems, advanced bachelor and master course. Complete course organization including content and teaching material (lecture notes in German).

2010
Ordinary differential equations: mainly dynamical systems, advanced bachelor and master course. Joint with J. Lenells.
Seminar on ordinary differential equations and dynamical systems.
Semigroups and evolution equations: tutorials.

2009
Waves and solitons: specialized course on master/PhD level. Complete course organization including content and teaching material (lecture notes in English).
Partial differential equations: tutorials.

2008
Ordinary differential equations: tutorials.

Grants

2022–2028 25 million NOK from the Research Council of Norway as project leader of the 'Large Inter-Disciplinary Research Project' project *IMod – Partial differential equations, statistics and data: An interdisciplinary approach to data-based modelling*. With H. Holden, E. Jakobsen, I. Steinsland, G.A. Fuglstad, B.A. Dunn and S.A. Ellingsen.

2020–2022 3 million NOK as project manager of the project *Data-driven Models in Neuroscience* from NTNU Enabling Technologies. Shared with T. Bonnevie.

2016–2022 25 million NOK (shared) from the Research Council of Norway as one of six investigators in the 'Excellence in Science' project *Waves and Nonlinear Phenomena*. PI: H. Holden.

2014–2018 6 million NOK from the Research Council of Norway as principal investigator of the research project *Nonlinear Water Waves*.

2014–2017 8 million NOK from the Norwegian University of Science and Technology as principal investigator for the educational research project KTDiM (on quality, availability, and differentiation in basic math education).

2014 800 000 NOK from the Norwegian University of Science and Technology as electee of the Outstanding Research Fellows programme.

2013 150 000 NOK from the Department of Mathematical Sciences, Norwegian University of Science and Technology, for scientific purposes.

2012–2014 3 million NOK for a PhD position granted from the Norwegian University of Science and Technology for an application to the Norwegian Research Council receiving the mark *excellent*, but granted no money from the council.

2011 50 000 SEK from the Swedish Royal Physiographical Society for a workshop in nonlinear partial differential equations.

2006–2008 In total 70 000 SEK and nine grants from the Swedish Royal Physographical Society, the Thorild Dahlgren, the Bokelund, and the Folke Lannér funds.

— Honorary appointments, commissions of trust, review activities ——————————

2023
Member of the PhD committee for Malte litsgård, Uppsala University. Thesis: *On parabolic equations of Kolmogorov–Fokker–Planck type*.

2021
Member of the PhD committee for Louis Emerald, University of Rennes. Thesis: *Modèles de type dispersion complète en océanographie côtière*.

2020
Member of the PhD committee and *rapporteur* for Bashar Elkhorbatly, University of Tours and University of Lebanon. Thesis: *Modélisation, Justification et Analyse Mathématique de Modéles en Océanographie*.

2018–
Elected member of the *The Royal Norwegian Society of Sciences and Letters*, NTNU.

2018
Honorary member of the PhD committee for Krisztián Benyó, University of Bordeaux. Thesis: *Analyse mathématique de l'interaction d'un fluide nonvisqueux avec des structures immergées*.

2014–2018
Electee of the *Outstanding Academic Fellows* research programme of excellence, NTNU.

2013
The IE Faculty prize for *Teacher and Teaching Environment of the Year*.

2012–2013
Editor for *ISRN Mathematical Analysis*.
Editor for *International Journal of Analysis*.

2011–2012
Editor for *ISRN Mathematical Physics*.

2007–2016
Reviewer, Mathematical Reviews, American Mathematical Society.

2007–2015
Reviewer, Zentralblatt MATH, European Mathematical Society.

2007–2008
Board member, Teacher Appointment Committee, Faculty of Science, Lund University.

2006–2007
Board member, Institutional board, Centre for Mathematical Sciences, Lund University.

2002
The Carl Hyltén–Cavallius prize, awarded by the Lund Mathematical Society.

Refereeing assignments for Abstr. Appl. Anal., Adv. Difference Equ., Anal. PDE, Appl. Anal., Appl. Math. Lett., Compex Var. Elliptic Equ., Discrete Contin. Dyn. Syst. A, European J. Appl. Math., Eur. J. Mech. B Fluids, E. J. Qualitative Theory of Diff. Equ., Fluids, IMA J. Appl. Math., Int. Math. Res. Not. IMRN, J. Appl. Anal., J. Differential Equations, J. Appl. Math. Comput., J. Fluid Mech., J. Math. Anal. Appl., J. Math. Fluid Mech., J. Nonlinear Sci., J. Phys. A, Math. Methods Appl. Sci., Math. Nachr., Monatsh. Math., Nonlinear Analysis, Nonlinear Anal. Real World Appl., Nonlinearity, Philos. Trans. R. Soc. Lond, Proc. Roy. Soc. Edinburgh Sect. A, SIAM J. Math. Anal., SIAM J. Numer. Anal., Stud. Appl. Math., Water Waves, Wave Motion, Quart. J. Mech. Appl. Math., and Z. Angew. Math. Phys.