CV for Nils E M Svanstedt

Day of birth: August 8, 1958. **Citizenship:** Swedish.

1. PhD Mathematics, Luleå, Sweden, 1992. Title of Thesis: G-convergence and Homogenization of Sequences of Linear and Non-linear Partial Differential Operators, Supervisor: Lars-Erik Persson.

2. Postdoc, Mathematics, UC Santa Barbara, California, USA, 1993-95.

3. Docent (Associate Professor) in Mathematics, 1997.

4. Professor in Mathematics, Göteborg University 2002-.

5. Lecturer, Luleå University 1985-1992, Senior Lecturer University College of Gävle/Sandviken 1992-1995 (on leave Postdoc 1993-1995), Visiting Associate Professor, UC Santa Barbara. 1995-96, Senior Lecturer, Göteborg University 1996-2002, Visiting Professor, UC Santa Barbara 2002-2003.

Former graduate students:

- Anders Holmbom, PhD Thesis 1996, (co-advisor Lars-Erik Persson)
- Niklas Wellander, PhD Thesis 1998, (co-advisor Lars-Erik Persson)
- Giao Vu Tuan, Ph Lic Thesis 2001
- Jeanette Silfver, Ph Lic Thesis 2004, PhD June 7, 2007. (co-advisors A. Holmbom and M. Gulliksson)
- Marianne Olsson, Ph Lic Thesis 2005, PhD Febr 28 2008, (co-advisors A. Holmbom and M. Gulliksson)
- Lotta Floden, Ph Lic Thesis 2005, PhD June 3 2009 (co-advisors A. Holmbom and M. Gulliksson)
- Joan Gatari, MSc Engineering Mathematics, 2002, (Finite element computations in paper industry)
- Xuming Shen, MSc Engineering Mathematics, 2006 (Asymptotic methods in cardiovascular blood flow modeling)
- Hasan Almanasareh, MSc Engineering Mathematics, 2006 (Asymptotic methods in cardiovascular blood flow modeling)
- Imade Augustine, MSc Engineering Mathematics, 2007 (Asymptotic methods in cardiovascular blood flow modeling) par

- Lay Eng Yong, MSc Engineering Mathematics, 2007 (Computational methods for the eigenvalue problem for Dirac's equation)
- Bawfeh Kingsley Kometa, MSc Engineering Mathematics, 2007 (Computational methods for the eigenvalue problem for Dirac's equation)
- Kristoffer Selim, MSc Turbulence, 2007/08 (Drag reduction and rough surfaces)
- Andreas Karlsson, MSc Chemistry with Physics, 2007/08 (Moving mesh algorithms in aerodynamics)
- Zongyan Gu, MSc Engineering Mathematics 2009 (Adjoint Method in Advection Equation)
- Kristofer Othzen, MSc Engineering Mathematics 2010.
- Simona Oana Tamasoiu, MSc Engineering Mathematics 2010.
- Marcus Wahlsten, MSc Engineering Mathematics 2010.
- Fredrik Johansson, MSc Engineering Mathematics 2010.

Current graduate students:

- Hasan Almanasareh, Ph Lic October 2010, (co-advisor S. Salomonsson)
- Kristoffer Selim, (co-advisor A. Logg).
- Hermann Douanla Yonta, Ph Lic November 2010 (co-advisor J L Woukeng).

Current national and international commissions and memberships

- Member of the ECMI Council 2000- . ECMI stands for the European Consortium for Mathematics in Industry (http://www.ecmi-indmath.org/).
- Member of the International Advisory Board for SCOMA, Center for Scientific Computing and Optimization in Multidisciplinary Applications, www.jyu.fi/scoma/.
- Moderator of the new ECMI-Special Interest Group Flow in Porous Media and related things.
- Member of the OECD Global Science Forum Working Group: Mathematics in Industry.
- External reviewer for the Norwegian Research Council.
- External reviewer for the National Science Foundation (NSF) USA.

- Invited speaker and organizer of minisymposium at ICIAM07 in Zurich, July 2007.
- Invite speaker at the European Mathematical Society Spring Meeting in Copenhagen, February 2008.
- Invited speaker to the Workshop on Fluid-Structure Interaction problems, SIMULA research Laboratories, Oslo, June 4-5 2008.
- Invited speaker at the international symposium on Local Field Potentials in Computational Neuroscience, Ski, Norway, January 15-16, 2009.

Professional invitations of one Month or more:

- Invited matematician at the SISSA, International School for Advanced Studies in Trieste, Italy. December 1989-February, 1990.
- Invited mathematician at the SISSA, International School for Advanced Studies in Trieste, Italy. The academic year 1991-92.
- Invited mathematician at the MSRI, Berkeley, California, USA, May 1994.
- Invited guest Professor at the Science Institute, Reykjavik, Iceland, November 1999.
- Invited matematician at the Mittag-Leffler Institute, Djursholm, Sweden. Participation in the Fall 2005 program Wave Motion. (www.ml.kva.se/program/0506f/).
- Invited matematician at the University of Yaoundé, Cameroon, November 2006.

Recent events:

- Organizer MP2-Workshop on Mathematical Topis in Quantum Physics, March 25-27, 2009. Speakers: Gregoire Allaire, Andrey Piatnitski, John A Wyller, Sten Salomonsson, Niklas Wellander.
- Invited to Workshop on Computational and modeling issues of Nonlinear Hyperbolic PDE's, Oslo, May 27-28, 2009.
- Organizer of the Midnight Sun Conference on the occation of Lars-Erik Persson's 65th birthday, Luleå, June 8-11, 2009.
- Opponent at PhD defense of Iryna Pankratova, Luleå University, December 2009.
- Organizer MP2-Workshop on Mathematical Topis in Quantum Physics, May, 2010.
- Opponent at PhD defense of Anna Machina, University of Life Sciences, Ås, Norway, October 2010.
- Co-organizer of Invited Thematic Minisymposium, "Homogenization and its applications" at ICIAM 2011, Vancouver, Canada, July 18-22, 2011.

Current Grants:

- Research grant from The Swedish Research Council (VR) 2008-2010, 2 MSEK.

Publications

Theses

1. Homogenization of some scales of partial differential equations. Licentiate Thesis no. 1990:02 L, Luleå Technical University, (1990).

2. G-convergence and homogenization of sequences of linear and nonlinear partial differential operators. Thesis no. 1992:105 D, Luleå (1992).

Books

1. The Homogenization Method. An Introduction, together with L. E. Persson, L. Persson and J. Wyller. Studentlitteratur Publ., 1993.

Articles

1. A Homogenization Procedure for Computing Effective Moduli and Micro Stresses in Composite materials, together with A. Holmbom and L. E. Persson. Composites Engineering, 2, no. 4, 249-259, (1992).

2. A Numerical Algorithm for The Solution of the Homogenized p-Poisson Equation, together with J. Wyller. In proceedings from the First European Conference on Elliptic and Parabolic Problems. Pitman Research Notes in Mathematics no. 266, Longman Publ., (1992), 240-250.

3. On the ill-posedness of the IVP for the generalized Korteweg-de Vries and nonlinear Schrodinger equations, Together with B. Birnir, C. E Kenig, G. Ponce and L. Vega, J. London Math. Soc. (2) 53 (1996), no 3, 551-559.

4. The local ill-posedness of the modified KdV equation, Together with B. Birnir and G. Ponce, Ann. Inst. H. Poincare, Anal. Non Lineare, vol. B, no 4, (1996), 529-535.

5. A numerical algorithm for nonlinear parabolic problems with highly oscillating coefficients. (Together with N. Wellander and J. Wyller), Numerical Methods in Partial Differential Equations, Vol. 12, 1996, 423-440.

6. A note on bounds for non-linear multivalued homogenized operators. Applications of Mathematics, Vol. 43, no. 2, (1998), 81-92.

7. G-convergence of parabolic operators, Nonlinear Analysis TMA, Vol. 36, no. 7, (1999), 807-843.

8. Two-scale limits and mean fields in turbulence and finance, in Miniproceedings: Workshop on Finance and Turbulence, eds. Ole E. Barndorff-Nielsen, Bent Jesper Christensen, Henning Bunzel and Michael Sorensen. MaPhySto Lecture Notes Series 1999-14 , Aarhus, 1999.

9. Existence and Homogenization of the Rayleigh-Benard problem, Together with B. Birnir, J. Nonlinear Mathematical Physics, 7, no. 2, (2000), 136-169.

10. Correctors for the homogenization of monotone parabolic operators, J. Nonlinear Mathematical Physics, 7, no. 3, (2000), 268-283.

11. On Gamma-convergence in anisotropic Orlicz-Sobolev spaces. Together with D. Lukkassen, Rendiconti dell'Istituto di Matematica dell'Università di Trieste, 33, 281-297, 2001 .

12. Imbeddings of anisotropic Orlicz-Sobolev spaces and applications. Together with P. Jain, D. Lukkassen and L. E. Persson, Math. Ineq. and Appl., **5**, 2, 181-195, 2002 .

13. On homogenization based methods for large eddy simulation, Together with C. Fureby and L. Persson, Journal of Fluids Engineering, 124, 892-903, 2002.

14. Two-scale asymptotics for stochastic volatility models, Proceedings from ECMI-2000, Palermo Sept. in Mathematics in Industry, Vol 1, editors A.M.Anile, V. Capasso and A. Greco, Springer Verlag 2002.

15. Existence theory and strong attractors for the Rayleigh-Benard problem with a large aspect ratio. Together with B. Birnir, Discrete and Continuous Dynamical Systems, Vol. 10, No. 1-2, (2004), 53-74.

16. On large eddy simulation of high Reynolds number wall bounded flows. Together with C. Fureby, N. Alin, S. Menon and L. Persson, AIAA Journal, Vol. 42, No 3, (2004), 457-467.

17. Multiscale homogenization of the Navier-Stokes equation, Together with N. Wellander, Proceedings from the conference Multiscale Methods in Science and Engineering, Uppsala, January 26-28, 2004, Engquist B., Lötstedt P., and Runborg O., eds., Lecture Notes in Computational Science and Engineering 44, Springer Verlag, 2005, 265-276.

18. Multiscale convergence and reiterated homogenization of parabolic problems. Together with A. Holmbom and N. Wellander, Appl. Math., Vol. 50, 2005, 131-151.

19. On twoscale convergence and related sequential compactness topics, A, Together with A. Holmbom, J. Silfver and N. Wellander, Appl. Math., 51, 3,(2006), 247-262

20. Multiscale stochastic homogenization of monotone operators, Networks and Heterogeneous Media, Vol. 2, No. 1, (2007), 181-192.

21. Reiterated Homogenization of Monotone Parabolic Problems, Together with L. Floden, A. Holmbom and M. Olsson, Annali dell'Universita' di Ferrara, Sez. VII Sci. Mat., 53, 2, (2007), 217-232.

22. Multiscale Stochastic Homogenization of Convection-Diffusion Equations, Appl. Math., 53, 2, (2008), 143-155.

23. Convergence of quasilinear hyperbolic equations, Journal of Hyperbolic Differential Equations, 4, 2, (2007), 655-677.

24. Stochastic homogenization of a class of eigenvalue problems, Appl. Math., (to appear).

25. G-convergence and homogenization of monotone damped hyperbolic equations, Jointly with G. Nguetseng and H. Nnang, Banach Journal of Mathematical Analysis (to appear).

26. Asymptotic analysis for a weakly damped wave equation with application to a problem arising in elasticity, Jointly with G. Nguetseng and H. Nnang, Journal of Function Spaces and Applications (to appear).

27. A note on conservation laws for the singularly Chi(2)-model and the corresponding nonlocal Chi(2)-approximation. Jointly with J. Wyller and H. Nnang, Electronic Journal of Differential Equations, (to appear).

28. Two-scale Asymptotics and Modulational Instability for the Chi(2)-system in Nonlinear Optics, Jointly with J. Wyller and H. Nnang, Electronic Journal of Differential Equations, (to appear).

29. Sigma-convergence, Jointly with G. Nguetseng, Banach J. Math. Anal. (to appear).

30. Generalized Besicovitch spaces and application to deterministic homogenization, Jointly with M. Sango and J. L. Woukeng, Nonlinear Analysis TMA,

31. Deterministic homogenization of quasilinear damped hyperbolic equations, Jointly with G. Nguetseng and H. Nnang, Acta Math. Sci.,(accepted for publication)

32. Reiterated homogenization of linear eigenvalue problems in multiscale perforated domains beyond the periodic setting, Jointly woth H. Douanla, Comm. Math. Anal., (to appear).

33. Stabilized finite element method for the radial Dirac equation, Jointly with H. Almanasreh and S. Salomonson, (submitted).

34. Asymptotic analysis of two-population neural models, Jointly with J. Wyller, (submitted).

35. Some remarks on two-scale convergence and periodic unfolding, Jointly with J. Francu, (submitted).