CURRICULUM VITAE

PERSONAL

Name:	Espen Robstad Jakobsen
Position:	Professor of Mathematics
Address:	Department of Mathematical Sciences (IMF), Norwegian University of Science and Technology (NTNU), Alfred Getz vei 1, NO–7491 Trondheim, Norway.
Email/URL:	`espen.jakobsen@ntnu.no`, `https://www.ntnu.edu/employees/erj`.
Born:	1972, Norwegian nationality.

EDUCATION

1998-2001 *Doktor ingeniør* (Dr.ing.) in applied mathematics, NTNU.

1991-1996 *Sivilingeniør* in applied mathematics, NTNU.

POSITIONS

2008– Professor of Mathematics, NTNU.

2005–2008 Associate professor (*førsteamanuensis*), NTNU.

2002–2005 Research Council of Norway personal PostDoc fellowship and Assistant Professor positions at NTNU and the University of Bergen.

1996–1997 Research assistant (military service) and Researcher at the Norwegian Defense Research Establishment (FFI).

VISITING POSITIONS

Semester and year long Predoc, PostDoc, and Sabbatical stays at the University of Tours (France) and Ecole Normale Superieur (rue d'Ulm, Paris). Semester and month long stays at Centre for Mathematics and Applications (CMA, University of Oslo), the Centre of Advanced Studies (CAS, Oslo), Institut Mittag-Leffler (Stockholm, Sweden).

PRIZES AND HONOURS

1. *Esso Prize 2002* for best Dr.ing. thesis in fundamental research at NTNU.
2. *Carl-Erik Fröberg Prize 2006* for best paper in *BIT Numerical Mathematics* by young nordic author in 2004-2006.
3. Elected member of the *Royal Norwegian Society of Sciences and Letters* as of 2018.

GRANTS

2016-2020 *Toppforsk project*, research excellence programme, Research Council of Norway, grant no. 250070: *Waves and Nonlinear Phenomena*.
(Budget 25 000 kNOK (2016), 6 PhD/PostDoc's, PI H. Holden).

2012-2016 *Research project,* FriNaTek, Research Council of Norway, grant no. 213638/BG: *DIMMA*. (Budget: 8 300 kNOK (2012), 3 PhD/PostDoc's, PI Y. Ljubarskii).

2006-2010 *Researcher project*, the eVITA programme, Research Council of Norway, grant no. 176877/V30: *Integro-PDEs: Numerical methods, Analysis, and Applications to Finance*. (Budget: 3 500 kNOK (2006), 2 PhD/PostDoc's, PI E. R. Jakobsen).

2003-2005 *Postdoctoral fellowship*, FriNat, Research Council of Norway.
(PI E. R. Jakobsen)

1998-2001 *Ph.D. fellowship*, FriNat, Research Council of Norway.

STUDENTS AND POSTDOCS

PostDoc's: Hilde Sande 2008-2010, Felix del Teso 2017-2018, Jørgen Endal 2017-2019, Indranil Chowdhury 2018-2020.

PhD students: Olav Ersland 2018-, Ola Mæhlen 2018- (co-advisor), Jørgen Endal 2013-2017, Linghua Chen 2012-2016 (co-advisor), Simone Cifani 2006-2011, co-advised 2 others.

20 master students (2 ongoing, 18 completed).

OTHER ACTIVITIES

Leader (2008-) of the Differential Equations and Numerical Analysis (DNA) research group (13 permanent staff, about 40 staff in total), member of the advisory board at the department, various committee work for the department and faculty.

Member of PhD Thesis and Professor evaluation commitees.

Associate editor of IMA Journal of Numerical Analysis.

Referee for research projects and over 30 international research journals.

62 talks given at seminars and international conferences, organisation of conferences.

PUBLICATIONS

In refereed journals

1. *On the convergence rate of operator splitting for Hamilton-Jacobi equations with source terms.* (With K. H. Karlsen and N. H. Risebro). *SIAM J. Numer. Anal.* 39(2):499-518, 2001.
2. *Continuous dependence estimates for viscosity solutions of fully nonlinear degenerate parabolic equations.* (With K. H. Karlsen). *J. Differential Equations* 183:497-525, 2002.
3. *Continuous dependence estimates for viscosity solutions of fully nonlinear degenerate elliptic equations.* (With K. H. Karlsen). *Electron. J. Diff. Eqns.* Vol. 2002(39):1-10, 2002.
4. *On the convergence rate of approximation schemes for Hamilton-Jacobi-Bellman equations.* (With G. Barles). *M2AN Math. Model. Numer. Anal.* Vol. 36(1):33-54, 2002.
5. *On the rate of convergence of approximation schemes for Bellman equations associated with optimal stopping time problems. Math. Models Methods Appl. Sci. (M3AS)* 13(5):613-644, 2003.
6. *$W^{2,\infty}$ regularizing effect in a nonlinear degenerate parabolic equation in one space dimension. Proc. Amer. Math. Soc.* 132(11): 3203-3213, 2004.
7. *On error bounds for approximation schemes for non-convex degenerate elliptic equations. BIT* 44(2): 269-285, 2004.
8. *Convergence rates for semi-discrete splitting approximations for degenerate parabolic equations with source terms.* (With K. H. Karlsen). *BIT* 45(1): 37-67, 2005.
9. *Continuous dependence estimates for viscosity solutions of integro-PDEs.* (With K. H. Karlsen). *J. Differential Equations* 212(2): 278-318, 2005.
10. *Error bounds for monotone approximation schemes for Hamilton-Jacobi-Bellman equations.* (With G. Barles). *SIAM J. Numer. Anal.* 43(2):540-558, 2005.
11. *A "maximum principle for semicontinuous functions"applicable to integro-partial differential equations.* (With K. H. Karlsen). *NoDEA Nonlinear Differential Equations Appl.* 13:137-165, 2006.
12. *On error bounds for monotone approximation schemes for multi-dimensional Isaacs equations. Asymptotic Analysis* 49(3,4):249-273, 2006.
13. *Error bounds for monotone approximation schemes for parabolic Hamilton-Jacobi-Bellman equations.* (With G. Barles). *Math. Comp.* 76(240):1861-1893, 2007.
14. *Error estimates for a class of finite difference-quadrature schemes for fully nonlinear degenerate parabolic integro-PDEs.* (With I. H. Biswas and K. H. Karlsen) *J. Hyperbolic Differ. Equ.* 5(1): 187-219, 2008.
15. *Continuous dependence results for non-linear Neumann type boundary value problems.* (With C. A. Georgelin) *J. Differential Equations* 245(9): 2355-2704, 2008.
16. *Error estimates for approximate solutions to Bellman equations associated with controlled jump-diffusions.* (With K. H. Karlsen and C. La Chioma). *Numer. Math.* 110(2): 221-255, 2008.
17. *A Finite Element like Scheme for Integro-Partial Differential Hamilton-Jacobi-Bellman Equations.* (With F. Camilli). *SIAM J. Numer. Anal.* 47(4): 2407-2431, 2009.

18. *Viscosity solutions for a system of integro-PDEs and connections to optimal switching and control of jump-diffusion processes.* (With I. H. Biswas and K. H. Karlsen) *Appl. Math. Optim.* 62(1): 47-80, 2010.

19. *Difference-quadrature schemes for nonlinear degenerate parabolic integro-PDE.* (With I. H. Biswas and K. H. Karlsen) *SIAM J. Numer. Anal.* 48(3): 1110-1135, 2010.

20. *Entropy solution theory for fractional degenerate convection-diffusion equations.* (With S. Cifani) *Ann. Inst. H. Poincare Anal. Non Lineaire* 28(3):413-441, 2011.

21. *The discontinuous Galerkin method for fractal conservation laws.* (With S. Cifani and K. H. Karlsen) *IMA J. Numer. Anal.* 31(3):1090-1122, 2011.

22. *The discontinuous Galerkin method for fractional degenerate convection-diffusion equations.* (With S. Cifani and K. H. Karlsen) *BIT*51(4): 809-844, 2011.

23. N. Alibaud, S. Cifani, and E. R. Jakobsen. *Continuous dependence estimates for nonlinear fractional convection-diffusion equations.* (With N. Alibaud and S. Cifani) *SIAM J. Math. Anal.* 44(2): 603-632, 2012.

24. *Semi-Lagrangian schemes for linear and fully non-linear diffusion equations.* (With K. Debrabant) *Math. Comp.* 82: 1433-1462, 2013.

25. *On the spectral vanishing viscosity method for periodic fractional conservation laws.* (With S. Cifani) *Math. Comp.* 82: 1489-1514, 2013.

26. *On Neumann and oblique derivatives boundary conditions for nonlocal elliptic equations.* (G. Barles and C. Georgelin) *J. Differential Equations.* 256(4): 1368–1394, 2014.

27. *On numerical methods and error estimates for degenerate fractional convection-diffusion equations.* (With Cifani) *Numer. Math.* Online first November 2013, DOI:10.1007/s00211-013-0590-0.

28. *On Neumann type problems for non-local equations set in a half space.* (With G. Barles, E. Chasseigne, and C. Georgelin) *Trans. Amer. Math. Soc.* Electronically published March 2014, DOI: 10.1090/S0002-9947-2014-06181-3.

29. *Optimal continuous dependence estimates for fractional degenerate parabolic equations.* (With N. Alibaud and S. Cifani). *Arch. Ration. Mech. Anal.* Online first April 2014, DOI: 10.1007/s00205-014-0737-x.

30. *L1 contraction for bounded (non-integrable) solutions of degenerate parabolic equations.* (With J. Endal) *SIAM J. Math. Anal.* 46(6): 3957-3982, 2014.

31. *Uniqueness and properties of distributional solutions of nonlocal equations of porous medium type.* (With F. del Teso and J. Endal) *Advances in Mathematics* 305: 78-143, 2017.

32. *On nonlocal quasilinear equations and their local limits.* (With E. Chasseigne) *J. Differential Equations* 262(6): 3759-3804, 2017.

33. *On distributional solutions of local and nonlocal problems of porous medium type.* (With F. del Teso and J. Endal) *C. R. Math. Acad. Sci. Paris* 355(11): 1154-1160, 2017.

34. *On numerical density approximations of solutions of SDEs with unbounded coefficients.* (With L. Chen and A. Næss) *Adv. Comput. Math.*, 44(3): 693-721, 2018.

35. *L1 semigroup generation for Fokker-Planck operators associated with general Levy driven SDEs.* (With L. Chen) *Discrete Contin. Dyn. Syst.* 38(11): 5735-5763, 2018.

36. *Robust numerical methods for nonlocal (and local) equations of porous medium type. Part II: Schemes and experiments.* (With F. del Teso and J. Endal) To appear in SIAM J. Numer. Anal.

Refereed conference proceedings and book chapters

37. *On the convergence rate of operator splitting for weakly coupled systems of Hamilton-Jacobi equations.* (With K. H. Karlsen and N. H. Risebro). In *Proceedings HYP2000*, Birkhäuser 2001.

38. *Error estimates for finite difference-quadrature schemes for a class of nonlocal Bellman equations with variable diffusion.* (With I. H. Biswas and K. H. Karlsen) In G.-Q. Chen, E. Hsu, and M. Pinsky (eds.), *Stochastic Analysis and Partial Differential Equations*, AMS, 2007.

39. *Monotone schemes.* In *Encyclopedia of Quantitative Finance*, pp. 1253-1263, John Wiley & Sons Ltd., 2010.

40. *Semi-Lagrangian schemes for linear and fully non-linear Hamilton-Jacobi-Bellman equations.* (With K. Debrabant) In AIMS: Proceedings of HYP2012 The 14th International Conference on Hyperbolic Problems held in Padova, Italy, 2013.

41. *Semi-Lagrangian schemes for parabolic equations.* (With K. Debrabant). In *Recent Developments in Computational Finance*, pp. 279–298, World Scientific/Imperial College Press, 2013.

42. *A uniformly converging scheme for fractal conservation laws.* (W. J. Droniou) In Proceedings of FVAC7 - The International Symposium of Finite Volumes for Complex Applications VII held in Berlin, Germany, 2014, Spinger Proceedings in Mathematics.

43. *On the well-posedness of solutions with finite energy for nonlocal equations of porous medium type.* (With F. del Teso and J. Endal) In *Volume in honor of Helge Holden's 60th birthday*, EMS Series on Congress Reports, 2018.

Theses

1. *The Stochastic Wave Equation.* Diploma Thesis, NTNU, 1996. Advisor: Prof. Helge Holden.

2. *On the Theory and Numerical Analysis of Viscosity Solutions.* Doktor Ingeniør Thesis 2001:95, NTNU, 2001. Advisor: Prof. Helge Holden.