

**CURRICULUM VITAE
JOHAN TYSK**

- Date of Birth:** February 16, 1960
Place of Birth: Falun, Sweden
Children: Emma (born in 1995), Carl and Gustaf (born in 1996).
- Education:** Ph.D. December, 1986, University of California, Los Angeles
M.S. June, 1985, University of California, Los Angeles
B.S. September, 1981, Uppsala University, Uppsala, Sweden
- Thesis Title: Index and total curvature for minimal hypersurfaces in Euclidean and hyperbolic space
- Thesis Advisor: S.-Y. Cheng
- Positions:** Professor of Mathematics from April 1, 2006. Docent at Uppsala University from March 9, 1993. Ritt Assistant Professor at Columbia University, New York, New York, from July 1, 1987 to June 30 1991.
- Other appointments:** Adviser to the Vice-Chancellor on External Relations from July 1, 2023. Vice-rector of the Disciplinary Domain of Science and Technology from July 1, 2014 to June 30, 2023. Inspector of Västmanlands-Dala Nation from July 1, 2021. President of Nordtek from July 1, 2019 to July 1, 2021. Chairman of the Department of Mathematics from July 1, 2010 to July 1, 2014. Director of FMB, the Graduate School in Mathematics and Computing from May 1, 2006 to July 1, 2014. Dean of Undergraduate Education at the Faculty Science and Technology from July 1, 1996 to July 1, 2002. Vice Chairman of the Department of Mathematics from January 1, 1993 to January 1, 2002.
- Field of Interest:** Partial and stochastic differential equations in connection with problems in financial mathematics. Differential geometry.
- Awards:** Research Grants from the Swedish Research Council (VR), Swedish Natural Science Research Council (NFR) and a stipend from the Crafoord foundation (awards while in the USA: two Research Grants from the National Science Foundation).
- Professional memberships:** The Swedish Mathematical Society, the American Mathematical Society and the Bachelier Finance Society. Working member of the Royal Academy of Arts and Sciences of Uppsala. Member of the Royal Society of Sciences.
- Publications:**
- 1) "Comparison of two methods of multiplying distributions", Proc. Amer. Math. Soc. 93 (1985), 35–39.
 - 2) "Eigenvalue estimates with applications to minimal surfaces", Pac. J. of Math. 128 (2) (1987), 361–366.
 - 3) Appendix to "Isospectral sets for boundary value problems on the unit interval" by J. Ralston and E. Trubowitz, Ergod. Th. and Dynam. Sys. 8 (memorial issue)(1988), 301–358.

- 4) (with S.-Y. Cheng) "An index characterization of the catenoid and index bounds for minimal surfaces in R^4 ", *Pac. J. of Math.* 134 (1988), 251–260.
- 5) "Finiteness of index and total scalar curvature for minimal hypersurfaces", *Proc. Amer. Math. Soc.* 105 (1989), 429–435.
- 6) (with C. Hodgson) "Eigenvalue estimates and isoperimetric inequalities for cone-manifolds", *Bull. Australian Math. Soc.* 47 (1) (1993), 127–144.
- 7) "Eigenvalue problems for manifolds with singularities", *Proc. Symposia in Pure Math.* 54 (3) (1993), 673–677.
- 8) (with S. Frankel) "Behavior of the Poincaré metric near a fractal boundary", *Complex Variables*, 23 (1993), 257–267.
- 9) (with S.-Y. Cheng) "Schrödinger operators and index bounds for minimal submanifolds", *Rocky Mountain Journal of Math.* 24 (1994), 977–996.
- 10) (with S. Frankel) "Upper bounds for the Poincaré metric near a fractal boundary", *Progress in Inverse Spectral Geometry*, 51–62, *Trends Math. Birkhäuser*, Basel, 1997.
- 11) (with M. Klimek and G. Strandell) "Testing weak stationarity of stock returns", *Theory of Stochastic Proc.* 7 (23) (2001), 196–202
- 12) "Absence of arbitrage in markets with infinitely many assets", *Theory of Stochastic Proc.* 7 (23) (2001), 317–320.
- 13) (with S. Janson) "Volatility time and properties of options prices", *Ann. Appl. Probab.* 13 (3) (2003), 890–913.
- 14) (with E. Ekström) "Options written on stocks with known dividends", *Int. J. Theor. Appl. Finance* 7 (7) (2004), 901–907.
- 15) (with S. Janson) "Preservation of convexity of solutions to parabolic equations", *J. Diff. Eqs.* 206 (2004), 182–226.
- 16) (with E. Ekström and S. Janson) "Superreplication of options on several underlying assets", *J. Appl. Probab.* 42 (1) (2005), 27–38.
- 17) (with S. Janson) "Feynman-Kac formulas for Black-Scholes type operators", *Bull. London Math. Soc.* 38 (2006), 269–282.
- 18) (with E. Ekström) "The American put is log-concave in the log-price", *J. Math. Anal. Appl.* 314 (2) (2006), 710–723.
- 19) (with E. Ekström) "A boundary point lemma for Black-Scholes type operators" *Commun. Pur. Appl. Anal.* 5 (3) (2006), 505–514.
- 20) (with E. Ekström) "Convexity preserving jump diffusion models for option pricing", *J. Math. Anal. Appl.* 330 (2007), 715–728.
- 21) (with P. Lötstedt, J. Persson and L. von Sydow) "Space-time adaptive finite difference method for European multi-asset options", *Comput. Math. Appl.* 53 (8) (2007), 1159–1180.
- 22) (with E. Ekström) "Properties of option prices in models with jumps", *Math. Finance* 17 (3) (2007), 381–397.
- 23) (with E. Ekström) "Convexity theory for the term structure equation", *Finance Stoch.* 12 (2008), 117–147.
- 24) (with E. Ekström and P. Lötstedt) "Boundary values and finite difference methods for the single factor term structure equation", *Appl. Math. Finance* 16 (3) (2009), 253–259.

- 25) (with E. Ekström) "Bubbles, convexity and the Black-Scholes equation", *Ann. Appl. Probab.* 19 (4) (2009), 1369-1384.
- 26) (with E. Ekström, Carl Lindberg and Henrik Wanntorp) "Optimal liquidation of a call spread", *J. Appl. Probab.* 47 (2010), 586-593 .
- 27) (with E. Ekström) "The Black-Scholes equation for stochastic volatility models", *J. Math. Anal. Appl.* 368 (2010), 498-507.
- 28) (with E. Ekström) "Boundary conditions for the single-factor term structure equation", *Ann. Appl. Probab.* 21 (1) (2011), 332-350 .
- 29) (with E. Ekström, P. Lötstedt and L. von Sydow) "Numerical option pricing in the presence of bubbles", *Quant. Finance* 11 (8) (2011), 1125-1128.
- 30) (with E. Ekström and Carl Lindberg) "Optimal liquidation of a pairs trade", *Advanced Mathematical Methods in Finance*, Di Nunno, Øksendal (eds.), 247-255, Springer Verlag 2011.
- 31) (with E. Ekström) "Comparison of two methods for superreplication", *Appl. Math. Finance* 19 (2) (2012), 181-193.
- 32) (with E. Ekström) "Dupire's equation for bubbles", *Int. J. Theor. Appl. Finance* 15 (6) (2012).
- 33) (with E. Ekström, D. Hobson and S. Janson) "Can time-homogeneous diffusions produce any distribution?", *Probab. Theory Relat. Fields* 155 (2013), 493-520.
- 34) (with E. Ekström and S. Janson) "Feynman-Kac theorems for generalized diffusions". To appear in the *Transactions of the AMS*.
- 35) (with H. Dyrssen and E. Ekström) "Pricing equations in jump-to-default models", *Int. J. Theor. Appl. Finance* 17 (3) (2014).

Submitted:

- 36) (with E. Ekström) "Boundary behaviour of densities for non-negative diffusions".

Preprints:

- 37) "Index and geometry of minimal submanifolds", (this article, through a clerical error, failed to appear in the appropriate issue of *Contemporary Mathematics*).
- 38) "Minimal hypersurfaces of finite total relative curvature in hyperbolic space," UUDM Report 1991:18.

Popular Science:

- 39) "Ett förvånande pris" (Swedish), article in "Problemlösningar #1", Liber 2005.
- 40) "Hur dyr är optionen?" (Swedish), article in "Människor och Matematik - läsebok för nyfikna", NCM 2008.
- 41) "Varför Karl Marx skulle ha gillat finansiell matematik?" (Swedish), *Annales Academiæ Regiæ Scientiarum Upsaliensis.* 37 (2007-2008), 51-57.

Presentations:

- "Eigenvalue estimates with applications to minimal hypersurfaces," paper presented at the 828th meeting of the American Mathematical Society, Logan, Utah, 1986.
- "An index characterization of the catenoid and index bounds for minimal surfaces in \mathbb{R}^4 ," joint work with S.-Y. Cheng, presented at the 838th meeting of the American Mathematical Society, Los Angeles, CA, 1987.

"Index bounds for minimal surfaces in R^n and S^n ," presented at the Workshop on Harmonic Maps and Minimal Surfaces at the Mathematical Sciences Research Institute, Berkeley, CA, 1988.

"Eigenvalue estimate for singular metrics," J. Clarence Karcher Lecture in Mathematics, University of Oklahoma, Oklahoma, January, 1989.

"Eigenvalue problems for manifolds with singularities," paper presented at the AMS Summer Research Institute on Differential Geometry, UCLA, CA, 1990.

"Some Applications of Analysis on Manifolds with Singularities," presented at the winter meeting of the Swedish Mathematical Society, Gothenburg, January 1992.

"Behavior of the Poincaré metric near a fractal boundary," presented at the conference on Inverse Spectral Geometry, Stockholm, 1994.

"Absence of arbitrage in markets with infinitely many assets," presented at the International School on Mathematical and Statistical Applications in Economics, Västerås 2001.

"Properties of options on several underlying assets," presented at the Second World Congress of the Bachelier Finance Society, Crete, June 12-15, 2002.

"Superreplication of options on several underlying assets," presented at the Third World Congress of the Bachelier Finance Society, Chicago, July 20-25, 2004.

"Methods for superreplication," presented at the Second IASTED International Conference on Financial Engineering and Applications, MIT, Cambridge, MA, November 8-10, 2004.

"Feynman-Kac formulas for Black-Scholes type operators," presented at the Isaac Newton Institute, Cambridge, UK, February 2005.

"Properties of options prices in a jump diffusion model," presented at the Conference on PDE and Finance, KTH, Stockholm, August 2005, and at the First AMAMEF Conference, Side, Turkey, April 2006.

"Convexity preserving jump diffusion models for option pricing," presented at the Fourth World Congress of the Bachelier Finance Society, Tokyo, August, 2006, and at the Workshop on Financial Modeling with Jump Processes, Ecole Polytechnique, Paris, September 2006.

"Convexity theory for the term structure equation," presented at the Second AMAMEF Conference, Bedlewo, Poland, April 2007 and at the Conference on PDE and Finance, KTH, Stockholm, August 2007 .

"Existence and uniqueness theory for the term structure equation," presented at the Third AMAMEF Conference, Pitesti, Romania, May 2008 and at the Fifth World Congress of the Bachelier Finance Society, London, July 2008 .

"Can time homogeneous volatilities produce any call prices?" presented at the Fourth AMAMEF conference, Aalesund, Norway, May 2009.

"Dupire's equation for bubbles" presented at the Fifth AMAMEF Conference, Bled, Slovenia, May 2010, at the Fields Institute, May 2010, and at the Annual Meeting of the Institute of Mathematical Statistics, Gothenburg, Sweden, August 2010.

"Forwards is backwards in dimension one" presented at the Sixth World Congress of the Bachelier Finance Society, Toronto, June 2010.

Miscellaneous:

”Boundary behaviour of densities for non-negative diffusions” presented at Rutgers University, December 2010 and at the Winter School on Mathematical Finance, Lunteren, the Netherlands, January 2011.

Opponent for Sadna Sajadini, Royal Institute of Technology (KTH), December 2013.

Opponent for Kristoffer Lindensjö, Stockholm School of Economics, November 2013.

Expert for the appointment of a lecturer in mathematics at Luleå Technical University, Fall 2013.

Member of the grading committee for Linus Kaisajuntti, Stockholm School of Economics, November 2011.

Member of the grading committee for Patrik Andersson, Stockholm University, August 2011.

Expert for the appointment of a lecturer in mathematics at Luleå Technical University, Spring 2011.

Opponent for Robin Lundgren, Mälardalen University, November 2010.

Member of the grading committee for Mats Brodén, Lund University, November 2010.

Member of the grading committee for Jonas Kiessling, October 2010.

Opponent for Thomas Önskog, Umeå University, September 2009.

Member of the grading committee for Agatha Murgoci, Stockholm School of Economics, June 2009.

Member of the grading committee for Liselott Flodén, Mid Sweden University, June 2009.

Opponent for Mikael Elhour, Department of Finance, Stockholm School of Economics, September 2008.

Member of the grading committee for Marianne Olsson, Mid Sweden University, February 2008.

Member of the International program committee, Third IASTED conference on Financial Engineering and Applications, Berkeley, 2007.

Member of the grading committee for Irina Slinko, Department of Finance, Stockholm School of Economics, September 2006.

Member of the grading committee for Raquel Gaspar, Department of Finance, Stockholm School of Economics, January 2006.

Member of the grading committee for Henrik Jönsson, Department of Mathematics and Physics, Mälardalen University, December 2005. Invited participant at the Isaac Newton Institute, February 2005. Opponent for Martin Dahlgren, Department of Mathematics, LTH, 2005. Discussant for Mats Kjaer, Department of Mathematics, Chalmers, 2004. Discussant for Henrik Jönsson, Department of Mathematics, Mälardalen University, 2004.

Member of the grading committee for Aram Karakhanyan, Department of Mathematics, KTH, 2004.

Member of the grading committee for Ann Öberg, Department of Economics, Uppsala University, 2004.

Member of the International program committee, Second IASTED conference on Financial Engineering and Applications, MIT, 2004.

Winner of the Swedish national school competition "Vi i femman", 1972.
Honorary member of Västmanlands-Dala nation since May 20, 2017.