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# Michel Vellekoop

## PERSONALIA

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Amstelkade 137-3  
1078 AT Amsterdam  
+31 20 737 0900 (home)  
+31 20 525 4210 (work)  
M.H.Vellekoop@UvA.nl

Born September 16, 1971 in Haarlem  
Dutch nationality  
English (fluent), French (adequate)

## EDUCATION

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- 1994-1998 **Ph.D. Imperial College of Science, Technology and Medicine, London.**  
Thesis '*Rapid Detection & Estimation of Abrupt Changes by Nonlinear Filtering*', supervisor dr. J.M.C. Clark.
- 1989-1994 **M.Sc. Faculty of Applied Mathematics, University of Twente, Enschede.**  
Thesis '*Adaptive Identification using Stochastic Approximation*', supervisor prof.dr. A. Bagchi.

## WORK EXPERIENCE

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- 2009- **Full Professor**, Actuarial Sciences and Mathematical Finance, FEB, University of Amsterdam.
- 2004-2009 **Associate Professor**, Mathematical Finance, Faculty EWI, University of Twente.
- 2004-2013 **Director of Research**, *the Derivatives Technology Foundation*, Amsterdam.
- 1998-2003 **Assistant Professor**, Mathematical Finance, Faculty TW/EWI, University of Twente.

## EXPERIENCE: EDUCATION

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- 2009- **Member Management Team AEMAS** (Amsterdam Executive Master Programme in Actuarial Science).
- 2009- **Master of Science programme in Actuarial Sciences & Mathematical Finance.**  
Teaching and development of new curriculum (new courses: Financial Mathematics for Insurance, Stochastic Models in Life Insurance, Research Seminar Actuarial Science).
- 1998-2009 **Master of Science programme in Financial Engineering.**  
Teaching and development of new curriculum (new courses: Introduction to Investment Theory, Continuous-Time Finance, Interest Rates and Credit Derivatives, Modelling Project Financial Engineering).
- 2001-2009 **Minor Financial Engineering.**  
Developer of this minor, and minor project leader.
- 2000-2001 **MRI Masterclass in Finance.**  
Organisation and development of courses for joint international programme with universities of Utrecht, Groningen and Nijmegen.
- 1998- **Supervision** of more than 90 Master theses and practical traineeships.

## EXPERIENCE: RESEARCH

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- 2004- **Supervision of Ph.D. students** Arianto Wibowo, Vera Minina, Ove Göttsche, Jan de Kort, Frank van Berkum, Marko Petrov, Merrick Zhen Li (all finished) Jitze Hooijsma, Robert Verschuren (ongoing). Author of STW proposal *Optimization of Event-based Hedging Strategies for Derivatives*, which funded a Ph.D. position in 2004 (NWO).

- 2006 **SIGEST best paper award** of SIAM (Society for Industrial and Applied Mathematics), with co-author dr. J.M.C. Clark.
- 2003 **Sabbatical** at Imperial College, London on invitation of prof. M.H.A. Davis.

## EXPERIENCE: ORGANISATION

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- 2016-2017- **Head of Section** Quantitative Economics.  
**Organiser of Winterschool Mathematical Finance**, NWO-sponsored international workshop, jointly organised with Faculty FNWI.
- 2016- **Organiser of UvA Quants Career Event**, where representatives from financial companies meet B.Sc/M.Sc students, jointly organised with Faculty FNWI.
- 2015 **Organiser of the international conference "R in Insurance"**, 155 participants, jointly organised with K. Antonio and R. Laeven.
- 2014- **Scientific Member of the Mortality Research Committee** of the Dutch Actuarial Society (since 2018: vice-chairman).
- 2012-2016 **Head of Section** Actuarial Sciences.  
2013-2016 **Theme Coordinator** of the Netspar project *Risk Management for Funded Pension Systems*.
- 2013-2018 **Member of the Senate** of the University of Amsterdam.  
2009-2012 **Theme Coordinator** of the Netspar project *Reconciling Short Term Risks and Long Term Goals for Retirement Provisions*.
- 2009 **Chairman** of the Advisory Board for the University of Twente Scholarship Programme.  
2007-2009 **Member of Management Team** of Strategic Research Orientation (SRO) IE & ICT of the Centre for Telematics and Information Technology (CTIT).
- 2007-2008 **Organiser of SWI 2008**, the Studygroup Mathematics and Industry, a nationwide consultancy project for applied mathematicians.
- 2006- **Member of AMaMef**, the European Science Foundation's scientific programme for Advanced Mathematical Methods in Finance.
- 2003-2009 **Member of Management Team** of FELab (*Financial Engineering Laboratory*), Responsible for all education in Financial Engineering at the University of Twente.
- 2002-2013 **Organiser of The Derivatives Day**, a yearly joint scientific conference of the Derivatives Technology Foundation, Euronext and ING/ABN AMRO/FORTIS.
- 2001-2005 **Board Member**, Koninklijk Wiskundig Genootschap, the Dutch Mathematical Society.

## EXPERIENCE: EXTERNAL EDUCATION

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- 2015-2016 **Commercial course** *Modeling and Validating Mortality under Solvency II* for the European Actuarial Academy (twice: Stockholm 2015, Madrid 2016).
- 2004 **Commercial in-house courses** *Equity Derivatives, Interest Rate Derivatives*, and *Credit Risk* for NIB Capital N.V.
- 2001-2002 **Commercial in-house course** *Financial Engineering in Insurance* for ING Actuaries (Nationale-Nederlanden), twice: in 2001 and 2002.
- 2001 **Commercial Course** Finance for Control Engineers (Porto).
- 2000- **Initiatives for VWO** including writing of a module *Aandelen en Opties* for the VWO course Wiskunde D, yearly masterclasses for talented pupils, supervision of NWO-project *Leraar-in-Opleiding* and the yearly *Twentse Wiskunde Estafette*.

## PUBLICATIONS

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### Journal Publications

Dependent microstructure noise and integrated volatility estimation from high-frequency data, *Journal of Econometrics* (2019), in press (with M. Zhen Li and R. Laeven)

Producing the Dutch and Belgian mortality projections: a stochastic multi-population standard, *European Actuarial Journal* 7 (2017), 297-336 (with K. Antonio, S. Devriendt, W. de Boer, R. de Vries, A. De Waegenaere, and H.K. Kan)

A Bayesian joint model for population and portfolio-specific mortality,  
*ASTIN Bulletin* 47 (2017), 681-713. (with F. van Berkum and K. Antonio)

Optimal investment and consumption when allowing terminal debt,  
*European Journal of Operational Research* 258 (2017), 385-397. (with A. Chen).

Existence of optimal consumption strategies in markets with longevity risk,  
*Insurance: Mathematics and Economics* 72 (2017), 107-121. (with J. de Kort)

The impact of multiple structural changes on mortality predictions,  
*Scandinavian Actuarial Journal* 2016(7), 581-603. (with F. van Berkum and K. Antonio)

Term structure extrapolation and asymptotic forward rates,  
*Insurance: Mathematics and Economics* 67 (2015), 107-119. (with J. de Kort)

The minimal entropy martingale measure in a market of traded financial and actuarial risks,  
*Journal of Computational and Applied Mathematics*, 282 (2015), pp. 111-113. (with J. Dhaene, B. Stassen and P. Devolder)

When do derivatives add value in asset allocation problems for pension funds?  
*Rotman International Journal of Pension Management*, 6 (2013), pp. 46-57 (with J. Cui and B. Oldenkamp)

Regularity of the Exercise Boundary for American Put options on assets with discrete dividends,  
*SIAM Journal of Financial Mathematics* 2(1), (2011), pp. 538-561 (with B. Jourdain)

The Early Exercise Premium for the American Put under Discrete Dividends,  
*Mathematical Finance* 21 (2011), pp. 335-354 (with O. Götttsche)

Modeling non-monotone risk aversion using SAHARA utility functions,  
*Journal of Economic Theory* 146(5), (2011), pp. 2075-2092 (with A. Pelsser and A. Chen)

An integral equation for American put options on assets with general dividend processes,  
*Stochastics* 83 (2011), pp. 555-567 (with J.W. Nieuwenhuis)

A Risk Reserve model for hedging in incomplete markets,  
*Journal of Economic Dynamics and Control* 34 (2010), pp. 1233-1247 (with V. Minina)

A Tree-based Method to price American Options in the Heston Model,  
*Journal of Computational Finance*, 13 (2009), pp. 1-21. (with J.W. Nieuwenhuis)

The Structure of Bias in Peer Voting Systems: Lessons from the Eurovision Song Contest,  
*Empirical Economics*, 37 (2009) pp. 403-425. (with L. Spierdijk)

On Option Pricing Models in the Presence of Heavy Tails,  
*Quantitative Finance*, 7 (2007), pp. 563-573. (with J.W. Nieuwenhuis)

A Nonlinear Filtering Approach to Changepoint Detection Problems: Direct and Differential-Geometric Methods,  
*SIAM Review*, 48 (2006), pp. 329 - 356. (with J.M.C. Clark, SIGEST award for 2003 paper)

Efficient Pricing of Derivatives on Assets with Discrete Dividends,  
*Applied Mathematical Finance*, 13 (2006), pp. 265-284. (with J.W. Nieuwenhuis)

Pricing and Hedging Guaranteed Returns on Mix Funds,  
*Insurance: Mathematics and Economics*, 38 (2006), pp. 585-598. (with A.A. vd Kamp and B.A. Post)

Weak Convergence of Tree Methods to price Options on Defaultable Assets,  
*Decisions in Economics and Finance*, 27 (2004), pp. 87-107. (with J.W. Nieuwenhuis)

Symmetries in Jump-Diffusion models with Applications in Option Pricing and Credit Risk,  
*Int. Journal of Theoretical and Applied Finance*, 6 (2003), pp. 135-172. (with J.K. Hoogland and C.D. Neumann)

A Nonlinear Filtering Approach to Changepoint Detection Problems: Direct and Differential-Geometric Methods,  
*SIAM Journal on Control and Optimization*, 42 (2003), pp. 469 - 494. (with J.M.C. Clark)

Optimal Speed of Detection in generalized Wiener Disorder Problems,  
*Stochastic Processes and Their Applications*, 95 (2001), pp. 25-54. (with J.M.C. Clark)

Adaptive Identification of Continuous Time Systems in the Presence of Noise,  
*International Journal of Control*, 68 (1997), pp. 171-196. (with A. Bagchi)

A Unifying Framework for Chaos and Stochastic Stability in Population Models,  
*Journal of Mathematical Biology*, 35 (1997), pp. 557-588. (with G. Högnäs)

Stability of Stochastic Population Models,  
*Studia Scientiarum Mathematicarum Hungarica*, 33 (1996), pp. 459-476. (with G. Högnäs)

Permanent Health Insurance: a Case Study in Piecewise Deterministic Markov Modelling,  
*Mitteilungen der Schweiz. Vereinigung der Versicherungsmathematiker*, 2 (1995), pp. 177-212. (with M.H.A. Davis)

On Intervals, Transitivity = Chaos,  
*American Mathematical Monthly*, 101 (1994), pp. 353-355. (with R. Berglund)

### Chapters in Books

Vellekoop, M.H., Forwards and Futures.  
Entry in Springer's *Encyclopedia of Quantitative Finance* (2010).

### Conference Proceedings

Pricing American Options with the SABR Model,  
*Workshop on Parallel and Distributed Computing in Finance* (2009). (with G. Vlaming)

Path-Dependent Dividends and the American Option,  
*Conference on Numerical Methods in Finance* (2009). (with J.W. Nieuwenhuis)

An Optimal Investment Problem with Randomly Terminating Income,  
*Proceedings of the IEEE Conference on Decision and Control* (2009). (with M.H.A. Davis)

Increasing detection performance of surveillance sensor networks,  
*Proceedings of the 63rd European Study Group Mathematics with Industry* (2009). (with Litvak, N., Altaf, M., Barbu, A., Jain, S., Miretskiy, D., Mohamaddi, L., Onur, E., in 't Panhuis, J., Sumihar, J., van Wijk, S. and Bisseling, R.)

Modeling a Heart Pump,  
*Proceedings of the 58th European Study Group Mathematics with Industry* (2008). (with Creigen, V., Feracina, C., Hlod, A., Van Mourik, S., Sjauw, K., Rottschäffer, V. and Zegeling, P.)

Modelling of Tradeable Securities with Dividends,  
*Proceedings of the Conference on Quantitative Methods in Finance, Sydney*, (2006). (with J.W. Nieuwenhuis)

Modified Kalman Filters for Discrete Time Jump Detection,  
*Proceedings of the International Conference on Stochastic Processes and their Applications*, Cochin, India, (1999).

Changepoint Detection using Nonlinear Filters,  
*Proceedings of the European Control Conference*, Brussels, (1997). (with J.M.C. Clark)

Asymptotic Behaviour of the Optimal Filter of Jump and Slope Jump Processes,  
*Proceedings of the 35th Conference on Decision and Control, Kobe, Japan*, (1996), pp. 1163-1168. (with J.M.C. Clark)

Adaptive Identification by Stochastic Approximation,  
*Proceedings of the 34th Conference on Decision and Control*, New Orleans, (1995), pp. 3865-3867. (with A. Bagchi)