

Stanford



Kay Giesecke

Professor of Management Science and Engineering

CONTACT INFORMATION

- **Administrator**

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Bio

BIO

Kay Giesecke is Professor of Management Science & Engineering at Stanford University and the Paul Pigott Faculty Scholar in the School of Engineering. He is the Director of the Advanced Financial Technologies Laboratory and the Director of the Mathematical and Computational Finance Program. Kay is a member of the Institute for Computational and Mathematical Engineering. He serves on the Governing Board and Scientific Advisory Board of the Consortium for Data Analytics in Risk.

Kay is a financial engineer. He develops stochastic financial models, designs statistical methods for analyzing financial data, examines simulation and other numerical algorithms for solving the associated computational problems, and performs empirical analyses. Much of Kay's work is driven by important applications in areas such as credit risk management, investment management, and, most recently, housing finance. His research has been funded by the National Science Foundation, JP Morgan, State Street, Morgan Stanley, American Express, and several other organizations.

Kay has published numerous articles in operations research, probability, and finance journals. He has coauthored five United States patents. He is an Editor of Management Science in the Finance Area and an Associate Editor for Mathematical Finance, Operations Research, SIAM Journal on Financial Mathematics, Finance & Stochastics, Mathematics and Financial Economics, Journal of Credit Risk, and Journal of Risk.

Kay's papers have won the SIAM Financial Mathematics and Engineering Conference Paper Prize (2014), the Fama/DFA Prize for the Best Asset Pricing Paper in the Journal of Financial Economics (2011), and the Gauss Prize of the Society for Actuarial and Financial Mathematics of Germany (2003). Kay is the recipient of the Management Science & Engineering Graduate Teaching Award (2007), a DFG Postdoctoral Fellowship (2002-03), and a Deutsche Bundesbank Fellowship (2002).

Kay advises several financial technology startups and has been a consultant to banks, investment and risk management firms, governmental agencies, and supranational organizations.

ACADEMIC APPOINTMENTS

- Professor, Management Science and Engineering

ADMINISTRATIVE APPOINTMENTS

- Director, Stanford Advanced Financial Technologies Laboratory (AFTLab), (2017- present)
- Director, Stanford Mathematical and Computational Finance Program, (2015- present)
- Scientific Advisory Board and Governing Board, Consortium for Data Analytics in Risk, (2014- present)

HONORS AND AWARDS

- SIAM Financial Mathematics and Engineering Conference Paper Prize, Society for Industrial and Applied Mathematics (2014)
- Paul Pigott Faculty Scholar, Stanford School of Engineering (2013)
- Fama/DFA Prize for the Best Asset Pricing Paper, Journal of Financial Economics (2011)
- Meritorious Service Award, Operations Research, INFORMS - Institute for Operations Research and the Management Sciences (2009, 2010, 2012)
- Graduate Teaching Award, Stanford University (2007)
- David Morgenthaler II Faculty Scholar, Stanford School of Engineering (2005)
- Gauss Prize, Society for Actuarial and Financial Mathematics of Germany (2003)
- Post-Doctoral Research Fellow, National Science Foundation of Germany (2002-2003)
- Deutsche Bundesbank Fellow, Deutsche Bundesbank (2002)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Department Editor, Management Science (2018 - present)
- Associate Editor, Operations Research (2008 - present)
- Associate Editor, Mathematical Finance (2013 - present)
- Associate Editor, SIAM Journal on Financial Mathematics (2013 - present)
- Associate Editor, Finance & Stochastics (2018 - present)
- Associate Editor, Mathematics and Financial Economics (2017 - present)
- Associate Editor, Journal of Risk (2015 - present)
- Associate Editor, Journal of Credit Risk (2016 - present)
- Editorial Board, SIAM Book Series on Financial Mathematics (2013 - present)
- Vice Chair, SIAM Activity Group on Financial Mathematics and Engineering (2013 - 2015)
- Associate Editor, IIE Transactions (2009 - 2015)
- Associate Editor, Journal of Banking and Finance (2011 - 2015)
- Associate Editor, Operations Research Letters (2009 - 2012)

PROGRAM AFFILIATIONS

- Institute for Computational and Mathematical Engineering (ICME)

PROFESSIONAL EDUCATION

- PhD, Humboldt University Berlin, Germany , Economics (2001)

PATENTS

- Kay Giesecke, Justin Sirignano. "United States Patent 15/331,825 Apparatus for Analyzing the Risk of a Large Loan Pool and Method of Using"
- Kay Giesecke, Justin Sirignano. "United States Patent 15/613,256 Apparatus for Optimizing a Loan Pool and Method of Using"
- Kay Giesecke, Randy Correll, Peter McMahon. "United States Patent 62/354,817 A quantum-annealing computer method for selecting the optimum bids in a combinatorial auction"

- Kay Giesecke, Randy Correll, Peter McMahon, Vincent Su. "United States Patent 62/354,818 A quantum-annealing computer method for financial portfolio optimization"
- Kay Giesecke. "United States Patent 7536329 Method and Apparatus for an Incomplete Information Model of Credit Risk", Nov 11, 2004

LINKS

- Kay's personal website: <https://people.stanford.edu/giesecke/>
- Advanced Financial Technologies Laboratory: <https://fintech.stanford.edu/>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Kay is a financial engineer. He develops stochastic financial models, designs statistical methods for analyzing financial data, examines simulation and other numerical algorithms for solving the associated computational problems, and performs empirical analyses. Much of Kay's work is driven by important applications in areas such as credit risk management, investment management, and, most recently, housing finance.

Teaching

COURSES

2018-19

- Credit Risk: Modeling and Management: MS&E 347 (Win)
- Financial Risk Analytics: MS&E 246 (Win)

2017-18

- Credit Risk: Modeling and Management: MS&E 347 (Win)
- Financial Risk Analytics: MS&E 246 (Win)

2016-17

- Artificial Intelligence in Financial Technology: CME 238, MS&E 446 (Aut)
- Credit Risk: Modeling and Management: MS&E 347 (Win)
- Financial Risk Analytics: MS&E 246 (Win)

2015-16

- Credit Risk: Modeling and Management: MS&E 347 (Win)
- Financial Risk Analytics: MS&E 246 (Win)
- Practical Training: MS&E 208A (Aut, Win)
- Practical Training: MS&E 208B (Aut, Win)
- Practical Training: MS&E 208C (Aut, Win)
- Practical Training: MS&E 208D (Aut, Win)
- Practical Training: MS&E 208E (Aut, Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Ruoxuan Xiong

Doctoral Dissertation Advisor (AC)

Guanting Chen, Enguerrand Horel, Xiaocheng Li, Bernardo Ramos

Master's Program Advisor

Stephanie Bader, Jimmy Chen, Fiona Fang, Cole Kiersznowski, Andrew Matangaidze, Art Paspanthong, Wyatt Pontius, Genevieve Selden, Muling Si, Dominic Waltz, Lewis Warne, Eline van den Haak

Publications

PUBLICATIONS

- **Large-Scale Loan Portfolio Selection** *OPERATIONS RESEARCH*
Sirignano, J. A., Tsoukalas, G., Giesecke, K.
2016; 64 (6): 1239-1255
- **Variation-based tests for volatility misspecification** *JOURNAL OF ECONOMETRICS*
Papanicolaou, A., Giesecke, K.
2016; 191 (1): 217-230
- **Affine Point Processes: Approximation and Efficient Simulation** *MATHEMATICS OF OPERATIONS RESEARCH*
Zhang, X., Blanchet, J., Giesecke, K., Glynn, P. W.
2015; 40 (4): 797-819
- **LARGE PORTFOLIO ASYMPTOTICS FOR LOSS FROM DEFAULT** *MATHEMATICAL FINANCE*
Giesecke, K., Spiliopoulos, K., Sowers, R. B., Sirignano, J. A.
2015; 25 (1): 77-114
- **Optimal Credit Swap Portfolios** *MANAGEMENT SCIENCE*
Giesecke, K., Kim, B., Kim, J., Tsoukalas, G.
2014; 60 (9): 2291-2307
- **Fluctuation analysis for the loss from default** *STOCHASTIC PROCESSES AND THEIR APPLICATIONS*
Spiliopoulos, K., Sirignano, J. A., Giesecke, K.
2014; 124 (7): 2322-2362
- **Macroeconomic effects of corporate default crisis: A long-term perspective** *JOURNAL OF FINANCIAL ECONOMICS*
Giesecke, K., Longstaff, F. A., Schaefer, S., Strebulaev, I. A.
2014; 111 (2): 297-310
- **TRANSFORM ANALYSIS FOR POINT PROCESSES AND APPLICATIONS IN CREDIT RISK** *MATHEMATICAL FINANCE*
Giesecke, K., Zhu, S.
2013; 23 (4): 742-762
- **Exact Sampling of Jump Diffusions** *OPERATIONS RESEARCH*
Giesecke, K., Smelov, D.
2013; 61 (4): 894-907
- **DEFAULT CLUSTERING IN LARGE PORTFOLIOS: TYPICAL EVENTS** *ANNALS OF APPLIED PROBABILITY*
Giesecke, K., Spiliopoulos, K., Sowers, R. B.
2013; 23 (1): 348-385
- **Exact Sampling of Jump-Diffusions , e-companion** *Operations Research*
Giesecke, K., Smelov, D.
2013; 4 (61): 894-907
- **Sequential Importance Sampling and Resampling for Dynamic Portfolio Credit Risk** *OPERATIONS RESEARCH*
Deng, S., Giesecke, K., Lai, T. L.
2012; 60 (1): 78-91
- **Monte Carlo Algorithms for Default Timing Problems** *MANAGEMENT SCIENCE*
Giesecke, K., Kim, B., Zhu, S.

2011; 57 (12): 2115-2129

- **Corporate bond default risk: A 150-year perspective** *JOURNAL OF FINANCIAL ECONOMICS*
Giesecke, K., Longstaff, F. A., Schaefer, S., Strebulaev, I.
2011; 102 (2): 233-250
- **Exact Simulation of Point Processes with Stochastic Intensities** *OPERATIONS RESEARCH*
Giesecke, K., Kakavand, H., Mousavi, M.
2011; 59 (5): 1233-1245
- **Premia for correlated default risk** *JOURNAL OF ECONOMIC DYNAMICS & CONTROL*
Azizpour, S., Giesecke, K., Kim, B.
2011; 35 (8): 1340-1357
- **Systemic Risk: What Defaults Are Telling Us** *MANAGEMENT SCIENCE*
Giesecke, K., Kim, B.
2011; 57 (8): 1387-1405
- **A Top-Down Approach to Multiname Credit** *OPERATIONS RESEARCH*
Giesecke, K., Goldberg, L. R., Ding, X.
2011; 59 (2): 283-300
- **Risk Analysis of Collateralized Debt Obligations** *OPERATIONS RESEARCH*
Giesecke, K., Kim, B.
2011; 59 (1): 32-49
- **Affine Point Processes and Portfolio Credit Risk** *SIAM JOURNAL ON FINANCIAL MATHEMATICS*
Errais, E., Giesecke, K., Goldberg, L. R.
2010; 1 (1): 642-665
- **IMPORTANCE SAMPLING FOR INDICATOR MARKOV CHAINS** *2010 Winter Simulation Conference*
Giesecke, K., Shkolnik, A. D.
IEEE.2010: 2742–2750
- **Exact and Efficient Simulation of Correlated Defaults** *SIAM JOURNAL ON FINANCIAL MATHEMATICS*
Giesecke, K., Kakavand, H., Mousavi, M., Takada, H.
2010; 1 (1): 868-896
- **Time-Changed Birth Processes and Multiname Credit Derivatives** *OPERATIONS RESEARCH*
Ding, X., Giesecke, K., Tomecek, P. I.
2009; 57 (4): 990-1005
- **RARE EVENT SIMULATION FOR A GENERALIZED HAWKES PROCESS** *Winter Simulation Conference 2009*
Zhang, X., Glynn, P. W., Giesecke, K., Blanchet, J.
IEEE.2009: 1271–1278
- **Assessing the Systemic Implications of Financial Linkages** *Global Financial Stability Report, International Monetary Fund*
Giesecke, K., Chan-Lau, J., Chan-Lau, J., Espinosa-Vega, M., Sole, J.
2009
- **Rare-Event Simulation For a Generalized Hawkes Process**
Giesecke, K., Blanchet, J., Glynn, P., Zhang, X.
2009
- **An Overview of Credit Derivatives, Presentation Slides** *Jahresbericht der Deutschen Mathematiker-Vereinigung*
Giesecke, K.
2009; 111
- **SIMULATING POINT PROCESSES BY INTENSITY PROJECTION** *2008 Winter Simulation Conference*
Giesecke, K., Kakavand, H., Mousavi, M.

IEEE.2008: 560–568

- **Measuring the Risk of Large Losses** *Journal of Investment Management*
Giesecke, K., Schmidt, T., Weber, S.
2008; 4 (6): 1-15
- **Portfolio Credit Risk: Top-Down vs. Bottom-Up Approaches** *Frontiers in Quantitative Finance: Credit Risk and Volatility Modeling*
Giesecke, K.
edited by Cont, R.
Wiley.2008: 1
- **Estimating tranche spreads by loss process simulation** *2007 Winter Simulation Conference*
Giesecke, K., Kim, B.
IEEE.2007: 946–954
- **Estimating Tranche Spreads by Loss Process Simulation**
Giesecke, K., Kim, B.
2007
- **Default and information** *JOURNAL OF ECONOMIC DYNAMICS & CONTROL*
Giesecke, K.
2006; 30 (11): 2281-2303
- **Credit contagion and aggregate losses** *JOURNAL OF ECONOMIC DYNAMICS & CONTROL*
Giesecke, K., Weber, S.
2006; 30 (5): 741-767
- **Cyclical correlations, credit contagion, and portfolio losses** *JOURNAL OF BANKING & FINANCE*
Giesecke, K., Weber, S.
2004; 28 (12): 3009-3036
- **Correlated default with incomplete information** *JOURNAL OF BANKING & FINANCE*
Giesecke, K.
2004; 28 (7): 1521-1545
- **Credit Risk Modeling and Valuation: An Introduction** *Credit Risk: Models and Management*
Giesecke, K.
edited by Shimko, D.
Risk Books.2004 : 1
- **Forecasting Extreme Financial Risk** *Risk Management: A Modern Perspective*
Giesecke, K., Goldberg, L.
edited by Ong, M.
Wiley.2004 : 1
- **Sequential Defaults and Incomplete Information** *Journal of Risk*
Giesecke, K., Goldberg, L., Goldberg, L.
2004 ; 1 (7): 1-26
- **Forecasting Default in the Face of Uncertainty** *Journal of Derivatives*
Giesecke, K., Goldberg, L., Goldberg, L.
2004 ; 1 (12): 14-25
- **In Search of a Modigliani-Miller Economy** *Journal of Investment Management*
Giesecke, K., Goldberg, L.
2004 ; 3 (2): 1-6
- **Credit Risk Modeling** *Handbook of Fixed Income Securities*
Giesecke, K.
edited by Fabozzi, F.

Wiley, 2004 : 1

- **A Simple Exponential Model for Dependent Defaults** *Journal of Fixed Income*
Giesecke, K.
2003; 3 (13): 74-83