

PUBLICATIONS AND PATENTS

Book Chapters

- “Efficient Monte Carlo Methods for Value-at-Risk”. In **Mastering Risk Volume 2: Applications**, Ed: C. Alexander, pps 7-20, 2001, Financial Times Mastering Risk Series, Prentice Hall.
- “Rare Event Simulation”. In **Performability Modeling: Techniques and Tools**, Eds: B.R. Haverkort, R. Marie, K. Trivedi, and G. Rubino, pps 163-178, 2001, Wiley. Earlier version in Proceedings of the 1995 Winter Simulation Conference (see below).
- “Importance Sampling and Stratification for Value-at-Risk” (with P. Glasserman and P. Heidelberger). In **Computational Finance 1999**, Eds: Y.S. Abu Mostafa, B. LeBaron, A.W. Lo, and A.S. Weigend, pps. 7-24, 2000, MIT Press.
- “A Look at Multilevel Splitting” (with P. Glasserman, P. Heidelberger and T. Zajic). In **Monte Carlo and Quasi-Monte Carlo Methods 1996**, Eds: H. Niederreiter, P. Hellekalek, G. Larcher, and P. Zinterhof, pps. 98-108, 1998, Springer Verlag.
- “Bounded Relative Error in Estimating Transient Measures of Highly Dependable Non-Markovian Systems” (with P. Heidelberger and V.F. Nicola). In **Reliability and Maintenance of Complex Systems**, Ed: Suleyman Ozekici, NATO ASI Series F: Computer and Systems Sciences, Vol 154, pps. 487-515, 1996, Springer Verlag. Reprinted with permission from ACM Transactions on Modeling and Computer Simulation (see below).

Papers submitted to journals

- “Exploiting regenerative structure to estimate finite time averages in simulation” (with Wanmo Kang and Ward Whitt). In review at **ACM Transactions on Modeling and Computer Simulation**.
- “Large deviations in multifactor portfolio credit risk” (with Wanmo Kang and Paul Glasserman). In review at **Mathematical Finance**.
- “Tail asymptotes and fast Simulation in stochastic PERT networks using the hazard rate twisting approach” (with S. Juneja and R.L. Karandikar). In review at **ACM Transactions on Modeling and Computer Simulation**.
- “Simulating tail probabilities in GI/GI/1 queues and insurance risk Processes with sub-exponential distributions” (with N.K. Boots). In review at **Operations Research**.

Journal Articles: Surveys

- “Techniques for Fast Simulation of Highly Dependable Systems” (with V.F. Nicola and M.K. Nakayama). **IEEE Transactions on Reliability**, 2001, Vol 50, No. 3, 246-264.

Journal Articles

- “Quick simulation methods for estimating the unreliability of regenerative models of large highly reliable systems” (with M.K. Nakayama). **Probability in the Engineering and Informational Sciences**, 2004 (July), Vol 18, Issue 03, 339-368.
- “On finite exponential moments for branching processes and busy periods for queues” (with M.K. Nakayama and K. Sigman). **Journal of Applied Probability**, Vol 41a, 2004. Special Volume on “Stochastic Methods and their Applications”, Eds., G. Gani and E. Seneta.
- “Portfolio Value-at-Risk with Heavy-Tailed Risk Factors” (with P. Glasserman and P. Heidelberger). **Mathematical Finance**, 2002 (July), Vol 12, No. 3, 239-269.
- “Simulating Heavy Tailed Processes using Delayed Hazard Rate Twisting” (with S. Juneja). **ACM Transactions on Modeling and Computer Simulation**, 2002, Vol 12, No. 2, pps 94-118.
- “Efficient Simulation of Markov Chains with Small Transition Probabilities” (with S. Juneja). **Management Science**, 2001, Vol 47, No. 4, pps 547-562.
- “A Statistical Approach to Predictive Detection” (with J.L. Hellerstein, F. Zhang). **Computer Networks**, 2001, Vol 35, pps 77-95.
- “A Splitting Based Importance Sampling Algorithm for the Fast Simulation of Markov Chains with Small Transition Probabilities” (with S. Juneja). **IEEE Transactions on Reliability** 2001, Vol 50, No. 3, 235-245. *Special Section: Recent Advances in Simulation Methodology for Highly Reliable Systems*, Ed: C. Alexopoulos.
- Variance Reduction Techniques for Estimating Value-at-risk” (with P. Glasserman and P. Heidelberger). **Management Science**, 2000, Vol 46, No. 10, pps 1349-1364.
- “Importance Sampling in the Heath-Jarrow-Morton Framework” (with P. Glasserman and P. Heidelberger). **Journal of Derivatives**, 1999, Vol 7, No. 1, pps. 32-50.
- “Asymptotically Optimal Importance Sampling and Stratification for Pricing Path Dependent Options,” (with P. Glasserman and P. Heidelberger). **Mathematical Finance**, 1999, Vol 9, No.2, pps 117-152.
- “Multilevel splitting for estimating probabilities of rare events” (with P. Glasserman, P. Heidelberger and T. Zajic). **Operations Research**, 1999, Vol 47, No. 4, pps. 585-600.
- “Likelihood Ratio Derivative Estimation for Generalized Semi-Markov Processes” (with M. K. Nakayama). **Management Science**, 1998, Vol 44, No. 10, pps 1426-1441.
- “A large deviations perspective on the efficiency of multilevel splitting” (with P. Glasserman, P. Heidelberger and T. Zajic). **IEEE Transactions on Automatic Control**, 1998, Vol 43, No. 12, pps 1666-1679.
- “Approximating Dependability Measures of Computer Networks: An FDDI Case Study” (with M. Willebeek-LeMair), **IEEE/ACM Transactions on Networking**, 1997, Vol 4, pps. 311-327. Earlier version in IEEE INFOCOM Proceedings 1994 (see below).

- “Dynamic Batching Policies for an On-Demand Video Server” (with A. Dan and D. Sitaram), **Multimedia Systems**, 1996, Vol 4, pps. 112-121. Earlier version in ACM Multimedia 1994 Proceedings (see below).
- “Fast Simulation of Packet Loss Rates in a Shared Buffer Communications Switch” (with C. S. Chang and P. Heidelberger), **ACM Transactions on Modeling and Computer Simulation**, 1995, Vol 5, No. 4, pps 306-325.
- “Channel Allocation for Batching and VCR Control in Video-on-Demand Systems” (with A. Dan, D. Sitaram and D. Towsley), **Journal of Parallel and Distributed Computing**, 1995, Vol 30, pps 168-179.
- “Effective Bandwidth and Fast Simulation of ATM Intree Networks” (with C.S. Chang, P. Heidelberger and S. Juneja), **Performance Evaluation**, May 1994, Vol 20, No 1-3, pps 45-66. Earlier version in Proceedings of the PERFORMANCE’93 Conference (see below).
- “Importance Sampling for the Simulation of Highly Reliable Markovian Systems,” **Management Science**, March 1994, Vol 40, No. 3, pps 333-352.
- “Fast Transient Simulation of Markovian Models of Highly Dependable Systems”, **Performance Evaluation**, May 1994, Vol 20, No 1-3, pps 267-286. Earlier version in Proceedings of the PERFORMANCE’93 Conference (see below).
- “Bounded Relative Error in Estimating Transient Measures of Highly Dependable Non-Markovian Systems” (with P. Heidelberger and V. F. Nicola), **ACM Transactions on Modeling and Computer Simulation**, April 1994, Vol 4, No.2, pps 137-164 (also as book chapter; see above).
- “A Unified Framework for Simulating Markovian Models of Highly Dependable Systems” (with A. Goyal, P. Heidelberger, V.F. Nicola and P.W. Glynn), **IEEE Transactions on Computers**, January 1992, Vol 41, No. 1, pps 36-51.
- “A M/G/1 Queueing Model in which the First Two Customers of Each Busy Period Get Exceptional Service ” (with K. Seth), **Systems and Cybernetics in Management (SCIMA)**, December 1990, Vol 19, No. 3, pps 93-97.
- “Optimization of M/G/1 Queueing Systems with Set-up Considerations” (with K. Seth), **Systems and Cybernetics in Management (SCIMA)**, October 1989, Vol 18, No. 1-2, pps 41-60.

Competitively Refereed Conference Proceedings Papers

- “An Approach to Predictive Detection for Service Management” (with J.L. Hellerstein and F. Zhang). **Proceedings of the Sixth IFIP/IEEE International Symposium on Integrated Network Management**, 1999, IEEE Press, pps 309-322.
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- “Approximations for Steady State Measures in Highly Dependable Systems with Generally Distributed Component Failure and Repair Times” (with P.W. Glynn). **Proceedings of the 1998 IEEE International Performance and Dependability Symposium (IPDS’98)**, IEEE Computer Society Press, pps 238-248.
- “Approximating Dependability Measures of FDDI Networks” (with M. Willebeek-LeMair), **IEEE INFOCOM Proceedings 1994**, IEEE Press, pps 1372-1381.
- “Scheduling Policies for an On-Demand Video Server with Batching” (with A. Dan and D. Sitaram), **Proceedings of the 1994 ACM Multimedia Conference, San-Francisco**, ACM Press, pps 15-23.
- “Modeling and Analysis of System Dependability Using the System Availability Estimator” (with A. M. Blum, A. Goyal, P. Heidelberger, S. S. Lavenberg, M.K. Nakayama). **Digest of Papers, The Twenty-Fourth Annual International Symposium on Fault Tolerant Computing, Austin, Texas, 1994**, IEEE Press, pps 137-141.
- “Effective Bandwidth and Fast Simulation of ATM Intree Networks” (with C.S. Chang, P. Heidelberger and S. Juneja), **Proceedings of the PERFORMANCE’93 Conference, Rome, Italy**, pps 41-58.
- “Fast Transient Simulation of Markovian Models of Highly Dependable Systems”, **Proceedings of the PERFORMANCE’93 Conference, Rome, Italy**, pps 274-289.
- “Fast Simulation of Steady State Availability in Non-Markovian Highly Dependable Systems” (with V.F. Nicola, P. Heidelberger and P.W. Glynn), **Proceedings of the 23rd International Symposium on Fault Tolerant Computing, Toulouse, France, 1993**, IEEE Press, pps 38-47.
- “Estimation of Reliability and its Derivatives for Large Time Horizons in Markovian Systems ” (with M. K. Nakayama), **Proceedings of the 1993 Winter Simulation Conference, Los Angeles, California**, IEEE Press, pps 422-429.
- “Uniformization and Exponential Transformation: Techniques for Fast Simulation of Highly Dependable Non-Markovian Systems” (with V. F. Nicola and P. Heidelberger), **Proceedings of 22nd International Symposium on Fault Tolerant Computing, Boston, 1992**, IEEE Press, pps 130-139.
- “Fast Simulation of Markovian Reliability/Availability Models with General Repair Policies” (with S. Juneja), **Proceedings of the 22nd International Symposium on Fault Tolerant Computing, Boston, 1992**, IEEE Press, pps 150-159.

Invited Conference Proceedings Papers

- “A unified approach for finite dimensional, rare-event Monte Carlo simulation” (with Zhi Huang). **Proceedings of the 2004 Winter Simulation Conference**, IEEE Press, pps. 1616-1624.
- “Rare-event, heavy-tailed simulations using hazard function transformations, with applications in finance” (with Zhi Huang). **Proceedings of the 2003 Winter Simulation Conference**, IEEE Press, pps. 276-284.

- “Simulating ruin probabilities in insurance risk processes with sub-exponential claims” (with N.K.Boots). **Proceedings of the 2001 Winter Simulation Conference**, IEEE Press, pps. 468-476.
- “Simulating GI/GI/1 queues and insurance risk processes with sub-exponential distributions” (with N.K. Boots). **Proceedings of the 2000 Winter Simulation Conference**, IEEE Press, pps 656-665.
- “Variance reduction techniques for value-at-risk with heavy-tailed risk factors” (with P. Glasserman, and P. Heidelberger). **Proceedings of the 2000 Winter Simulation Conference**, IEEE Press, pps 604-609.
- “Stratification issues in estimating value-at-risk” (with P. Glasserman, and P. Heidelberger). **Proceedings of the 1999 Winter Simulation Conference**, IEEE Press, pps 351-358.
- “Simulating Heavy Tailed Processes Using Delayed Hazard Rate Twisting” (with S.Juneja and A. Chandra). **Proceedings of the 1999 Winter Simulation Conference**, IEEE Press, pps 420-427.
- “Gaussian Importance Sampling and Stratification: Computational Issues,” (with P. Glasserman, and P. Heidelberger). **Proceedings of the 1998 Winter Simulation Conference**, IEEE Press, pps 685-693.
- “Splitting for Rare Event Simulation: Analysis for Simple Cases” (with P. Glasserman, P. Heidelberger and T. Zajic), **Proceedings of the 1996 Winter Simulation Conference**, IEEE Press, pps 302-308.
- “Rare Event Simulation of Stochastic Systems,” **Proceedings of the 1995 Winter Simulation Conference**, IEEE Press, pps 178-185.
- “Fast Simulation of Packet Loss Rates in Communications Networks with Priorities,” **Proceedings of the 1994 Winter Simulation Conference**, IEEE Press, pps 274-281.
- “Techniques for Fast Simulation of Highly Dependable Systems” (with P. Heidelberger, V. F. Nicola), **Proceedings of the Second International Workshop on Performability Modeling of Computer and Communication Systems**, June 1993.
- “Efficient Estimation of the Mean Time Between Failures in Non-Regenerative Dependability Models” (with P. W. Glynn, P. Heidelberger and V. F. Nicola), **Proceedings of the 1993 Winter Simulation Conference**, IEEE Press, pps 311-316.
- “Simultaneous and Efficient Simulation of Highly Dependable Systems for Different Underlying Distributions” (with P. Heidelberger and V. F. Nicola), IBM Research Report RC 18213. **Proceedings of the 1992 Winter Simulation Conference**, IEEE Press, pps 458-465.
- “Modelling and Analysis of Computer System Availability Using SAVE ” (with A. Blum, P. Heidelberger, S.S. Lavenberg, M.K. Nakayama and L.F. Spainhower), **Proceedings of 1992 Reliability and Applied Statistics ITL Conference**, IBM Thornwood, New York, pps 134-141.

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- “Measure Specific Dynamic Importance Sampling for Availability Estimation” (with A. Goyal and P. Heidelberger), **Proceedings of the 1987 Winter Simulation Conference**, IEEE Press, pps 351-357.

Extended Abstracts

- “Rare event simulation techniques for models of computer, telecommunications and financial systems”, **Proceedings of 2001 NSF Design and Manufacturing Grantees Conference**.
- “Rare event simulation techniques and their application to models of computer and telecommunication systems”, **Proceedings of 1998 NSF Design and Manufacturing Grantees Conference**, pps 203-204.

Expert Statements and Commentaries

- “Rare Event Simulation: Accomplishments of the Past and Challenges for the Future”, Expert Statement, **International Journal of Electronics and Communications**, Vol 52, No. 3, 116-118, 1998.
- “Rare Event Simulation Techniques for Models of Computer and Telecommunication Systems, ” Commentary, **IEEE Transactions on Reliability**, Vol 45, No. 4, pps 571-572, 1996.

Book Reviews

- Book: “Performance and Reliability Analysis of Computer Systems ” (1996; Kluwer Academic Publishers) by R.A. Sahner, K.S. Trivedi, A. Puliafito. In **IEEE Transactions on Reliability**, Vol 46, No. 3, pps. 441, 1997.
- Book: “Reliability Engineering” (1996; Addison Wesley) by Elsayed A. Elsayed. To appear in **Probability in the Engineering and Informational Sciences**, Vol. 12, No. 4, 1998.

User Manuals

- “System Availability Estimator (SAVE) Language Reference and User’s Manual Version 4.0” (with A. Blum, P. Heidelberger, S.S. Lavenberg and M.K. Nakayama), IBM Research Report, RA 219 S, June 1993.

Patents

- “Pricing of Options Using Importance Sampling and Stratification/Quasi Monte-Carlo” (with P. Glasserman and P. Heidelberger). US Patent No. US06381586, April, 2002.
- “Channel Conservation for Anticipated Load Surge in Video Servers” (with A. Dan, D. Sitaram and W.H. Tetzlaff). U.S. Patent No. US05768681, issued 16th June, 1998.

- “Scheduling Policies with Grouping for Providing VCR Control Functions in a Multimedia Video Server ” (with A. Dan and D. Sitaram). US Patent No. US05453779, issued 26th September, 1995.
- “Fast Monte Carlo Evaluation of Value-at-risk.” (with P. Glasserman and P. Heidelberger). Patent filed.

Invention Disclosures

- “An Uniformization-based Approach to Importance Sampling in the Simulation of Non-Markovian Highly Dependable Systems” (with P. Heidelberger and V.F. Nicola).
- “Exponential Transformation: A Technique for Fast Simulation of Non-Markovian Highly Dependable Systems” (with P. Heidelberger and V.F. Nicola).

Tutorials

- “Rare Event Simulation of Stochastic Systems, ” State of the Art Review, Winter Simulation Conference, Washington, D.C., December 1995.

Software Demonstrations

- System Availability Estimator (SAVE) demo at the *24th Annual International Symposium on Fault Tolerant Computing*, Austin, Texas, June 1994.