JAMES M. CALVIN

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I. EDUCATION

Ph.D.	Operations Research	1990	Stanford University
M.S.	Operations Research	1979	University of California, Berkeley
A.B.	Mathematics	1978	University of California, Berkeley

II. RESEARCH INTERESTS

- Global optimization.
- Probabilistic analysis of algorithms.
- Information-based complexity.
- Discrete-event simulation and modeling.
- Simulation-output analysis.
- Scheduling.

III. EXPERIENCE

A. Academic Appointments

Associate Professor	New Jersey Institute of Technology	8/2001 – present
Assistant Professor	New Jersey Institute of Technology	9/1996 – 8/2001
Assistant Professor	Georgia Institute of Technology	9/1989 – 7/1996

B. Non-Academic Appointments

Summer Intern	RAND Corporation	6/1988 – 8/1988
Member of Technical Staff	Bell Laboratories	9/1979 – 8/1984

IV. TEACHING ACTIVITIES

A. Courses Taught

Algorithms, Probabilistic Methods in Computer Science, Automata Theory, Complexity Theory, Stochastic Processes.

B. New Course Developed

Probabilistic Methods in Computer Science

C. Manuals Developed and Course or Laboratory Notes

- CIS 435 (Advanced Algorithm Design): Developed course notes for in-class and distance-learning students.

D. Teaching Related Publications

J. M. Calvin, D. Tempelaar, and A. Žilinskas, "Problem Based Learning and Internet Technology for Studying Courses on Algorithms", Svietimo Reforma ir Mokytoju Rengimas, 1999 (Lithuania).

E. Principle advisor for Ph.D. students:

- Vinay Kapoor, NJIT CS (current).
- Anthony Ploski (Rutgers School of Management student), current.
- Hisham Al-Mharmah, PhD (1993, Georgia Tech); Associate Professor, University of Jordan. Thesis: "Global Optimization of Stochastic Functions".

V. SCHOLARLY ACTIVITIES

A. 1. **Refereed Book Chapters**

1. J. M. Calvin and A. Žilinskas. One-dimensional Global Optimization Based on Statistical Models. *Stochastic and Global Optimization*, Kluwer Academic Publishers, Dordrecht, 2002.

2. J. M. Calvin. Adaptive global search. *Encyclopedia of Optimization*, P. Pardalos and C. Floudas (Eds.), Kluwer Academic Publishers, Boston, 2001.

3. J. M. Calvin. Convergence rate of the P-algorithm for optimization of continuous functions. In *Approximation and Complexity in Numerical Optimization: Continuous and Discrete Problems*, P. Pardalos (Ed.), Kluwer Academic Publishers, Boston, 1999, pp. 116–129.

4. J. M. Calvin. Asymptotically optimal deterministic non-adaptive algorithms for minimization of Brownian motion. In *The Mathematics of Numerical Analysis*, J. Renegar, M. Shub, and S. Smale, (Eds.), American Mathematical

Society, Lectures in Applied Mathematics Vol. 32, Providence, 1995, pp 157–163.

5. J. M. Calvin. (1995). Non-adaptive coverings for optimization of Gaussian random fields. In *Monte Carlo and Quasi–Monte Carlo Methods in Scientific Computing.* H. Niederreiter and P. Shiue (Eds.). Lecture Notes in Statistics #106, Springer-Verlag, New York, 1995, pp. 149–157.

B. 1. **Published or Accepted Refereed Journal Papers**

All papers are peer and editor reviewed.

1. Calvin, J. 2003. Lower Bound on Complexity of Optimization of Continuous Functions. To appear in Journal of Complexity.
2. Calvin, J. and J. Y-T. Leung. 2003. Average-case analysis of a greedy algorithm for the 0/1 knapsack problem. *Operations Research Letters* **31-3** pp. 202–210.
3. Calvin, J. and M. Nakayama. Permuted derivative and importance-sampling estimators for regenerative simulations. To appear in *European Journal of Operations Research.*
4. Calvin, J. and A. Žilinskas. On convergence of a P-algorithm based on a statistical model of continuously differentiable functions. *Journal of Global Optimization* **19**, pp. 229–245.
5. Calvin, J. A one-dimensional optimization algorithm and its convergence rate under the Wiener measure. *Journal of Complexity* **17-2**, pp. 306–344, 2001.
6. Calvin, J. and M. Nakayama. Central limit theorems for permuted regenerative estimators. *Operations Research* **48**, 2000, pp. 776–787.
7. Calvin, J. and A. Žilinskas. A one-dimensional P-algorithm with convergence rate $O(n^{-3+\delta})$ for smooth functions. *Journal of Optimization Theory and Applications*, Vol. 106, No. 2, 2000, pp. 297–307.
8. Calvin, J. and M. Nakayama. Simulation of processes with multiple regeneration sequences. *Probability in the Engineering and Informational Sciences*, Vol 14, 2000, pp. 179–201.
9. Calvin, J. and A. Žilinskas. On the choice of statistical model for one-dimensional P-algorithms. *Cybernetics and Control*, Vol. 29, 2000, pp. 555–565.
10. Calvin, J. and A. Žilinskas. On convergence of the P-algorithm for one dimensional global optimization of smooth functions. *Journal of Optimization Theory and Applications*, Vol. 102, No. 3, 2000, pp. 479–495.

11. Al-Mharmah, H. and J. Calvin. Comparison of one-dimensional composite and non-composite passive algorithms. *Journal of Global Optimization*, Vol. 15, 2000, pp. 169–180.

12. Calvin, J. and M. Nakayama (1997). Using permutations in regenerative simulations to reduce variance. *ACM Transactions on Modeling and Computer Simulation*, **8** 153–193.

13. Calvin, J. and P. Glynn. Average case behavior of random search for the maximum. *Journal of Applied Probability* **34**, 1997, pp. 632-643.

14. Calvin, J. Average performance of a class of adaptive algorithms for global optimization. *Annals of Applied Probability* **7**, 1997, pp. 711-730.

15. Calvin, J. and P. Glynn. Complexity of non-adaptive optimization algorithms for a class of diffusions. *Communications in Statistics. Stochastic Models* **12** No. 3, 1996, pp. 343-365.

16. Al-Mharmah, H. and J. Calvin. Optimal random non-adaptive algorithm for global optimization of Brownian motion. *Journal of Global Optimization* **8** No. 1, 1996, pp. 81–90.

17. Calvin, J. Average performance of passive algorithms for global optimization. *Journal of Mathematical Analysis and Applications*, **191**, 1995, pp. 608–617.

18. Andraddótir, S., J. Calvin and P. W. Glynn. Accelerated regeneration for Markov chain simulations. *Probability in the Engineering and Informational Sciences* **9**, 1995, pp. 497–523.

19. Calvin, J. Return state independent quantities in regenerative simulation. *Operations Research* **42**, 1994, pp. 531–542.

20. Ramudhin, A., Bartholdi, J., Calvin, J., VandeVate, J., and G. Weiss. A probabilistic analysis of 2-machine flowshops. *Operations Research* **44**, 1993, pp. 899–908.

21. Calvin, J. Consistency of a myopic Bayesian algorithm for one-dimensional global optimization. *Journal of Global Optimization* **3**, 1993, pp. 223–232.

2. **Published (or Accepted) Refereed Conference Papers**

   1. Calvin, J. Efficient Simulation for Discrete Path-Dependent Option Pricing. Proceedings of the 2001 Winter Simulation Conference, B. A. Peters, J. S. Smith, D. J. Medeiros and M. W. Rohrer, eds. (IEEE Press), Washington, DC, pp. 325–328.

   2. Calvin, J. and M. K. Nakayama. Improving Standardized Time Series Methods by Permuting Path Segments. Proceedings of the 2001 Winter Simulation Conference, B. A. Peters, J. S. Smith, D. J. Medeiros and M. W. Rohrer, eds.

(IEEE Press), Washington, DC, pp. 348–353.

3. Calvin, J., Glynn, P. W. and M. K. Nakayama. Importance Sampling Using the Semiregenerative Method. Proceedings of the 2001 Winter Simulation Conference, B. A. Peters, J. S. Smith, D. J. Medeiros and M. W. Rohrer, eds. (IEEE Press), Washington, DC, pp. 441–450.

4. Calvin, J. Polynomial acceleration of Monte Carlo global search. Proceedings of the Winter Simulation Conference 1999 (IEEE Press), Phoenix, Arizona, 1999, pp. 673–677.

5. Calvin, J., Glynn, P. and M. Nakayama (1999). On the small-sample optimality of multiple-regenerative estimators. Proceedings of the Winter Simulation Conference 1999, IEEE Press.

6. Calvin, J. and A. Žilinskas (1998). IFORS Special Conference on Organizational Structures, Management, and Simulation of Business Sectors and Systems, Kaunas, Lithuania.

7. Calvin, J. and A. Žilinskas (1999). On convergence of the P-algorithm for one dimensional global optimization. Fifth International Conference on Pattern Recognition and Information Processing. Minsk, Belarus, May 1999.

8. Calvin, J. and M. Nakayama (1998). Permuted regenerative estimators. Proceedings of the Third St. Petersburg Workshop on Simulation.

9. Calvin, J. and M. Nakayama (1998). Exploiting multiple regeneration sequences in simulation output analysis. Proceedings of the Winter Simulation Conference 1997, IEEE Press.

10. Al-Mharmah, H. and J. Calvin (1997). Comparison of Monte Carlo and deterministic methods for global optimization. Proceedings of the Winter Simulation Conference 1997, IEEE Press.

11. Calvin, J. and M. Nakayama (1997). A new variance reduction technique for regenerative simulations of Markov chains. Proceedings of the Winter Simulation Conference 1997, IEEE Press.

12. Calvin, J. (1988). Covariance of regenerative mean and standard deviation estimators for Markov chains. Proceedings Winter Simulation Conference, 1988.

13. Calvin, J. (1994). Average performance of Monte-Carlo and quasi-Monte Carlo methods for global optimization. Proceedings Winter Simulation Conference, 1994.

14. Andraddótir, S., J. Calvin, and P. W. Glynn (1994). Increasing the frequency of regeneration for Markov processes. Proceedings Winter Simulation Conference, 1994.

C. 1. **Published Non-Refereed Conference Papers**

1. J. M. Calvin and M. K. Nakayama, "Efficiency Improvement for Simulation of Complex Systems," *Proceedings of the 2001 NSF Design. Service and Manufacturing Grantees and Research Conference*, Tampa, Florida (2001), (invited paper).
2. J. M. Calvin and M. K. Nakayama, "Efficient Simulation of Large-Scale Systems," *Proceedings of the 2000 NSF Design and Manufacturing Research Conference*, Vancouver, British Columbia (2000), (invited paper).
3. J. M. Calvin, "Complexity of Global Optimization," *Proceedings of the 1999 NSF Design and Manufacturing Grantees Conference*, Long Beach, California, (1999), (invited paper).
4. J. M. Calvin, "Probabilistic Analysis of Global Optimiztion Algorithms," *Proceedings of the 1997 NSF Design and Manufacturing Systems Conference*, Monterrey, Mexico, (1998), (invited paper).
5. J. M. Calvin, "Markovian Algorithms for Global Optimization," *Proceedings of the 1997 NSF Design and Manufacturing Systems Conference*, Seattle, WA, (1997), (invited paper).
6. J. M. Calvin, "Frequency Properties of Bayesian Algorithms for Global Optimization," *Proceedings of the 1992 NSF Design and Manufacturing Systems Conference*, Atlanta, GA, (1992), 545–548. (invited paper).

3. **Published Reports**

1. J. M. Calvin. Planning accessions of Air Force Enlisted Personnel. RAND Corp. Working Draft, 1988. (pages)

D. **Professional Presentations**
(presenter's name underlined)

Invited Presentations

1. <u>J. M. Calvin</u>, "Upper Bound on Convergence Rate for Global Optimization of Smooth Functions," Foundations of Computational Mathematics, Minneapolis, USA, August, 2002.
2. <u>J. M. Calvin</u>, "Impossibility of exponential convergence rate for optimization on the Wiener space," Seminar on algorithms and complexity for continuous problems, Schloss Dagstuhl, Germany, October, 2000.
3. <u>J. M. Calvin</u>, "One-dimensional optimization algorithms based on probabilistic models", AMS-IMS-SIAM Joint Summer Research Conference in Algorithms,

Computational Complexity, and Models of Computation for Nonlinear and Multivariate Problems, Mount Holyoke College, July, 2000.

4. J. M. Calvin, "Average-case complexity of global optimization", 17th International Symposium on Mathematical Programming, Atlanta, Georgia, August, 2000.

5. J. M. Calvin, "Multidimensional Optimization with Bounded Information", Third Biennial Meeting of Foundations of Computational Mathematics, Oxford University, July, 1999.

6. J. M. Calvin, "Multi-Dimensional Adaptive Global Search with Bounded Memory," Approximation and Complexity in Numerical Optimization: Continuous and Discrete Problems, University of Florida, March, 1999.

7. J. .M. Calvin, "Average Complexity of Global Optimization," Department of Industrial and Systems Engineering, Virginia Tech, Blacksburg, VA, March, 2000.

8. J. M. Calvin, "Average Convergence Rate of the P-Algorithm," Seminar on algorithms and complexity for continuous problems, Schloss Dagstuhl, Germany, May, 1998.

9. J. M. Calvin, "Permuted Estimators for Regenerative Simulations," Industrial and Manufacturing Systems Engineering Department Seminar, Lehigh University, February, 1998.

10. J. M. Calvin and M. K. Nakayama, "Permuted Estimators for Regenerative Simulations"; INFORMS International Meeting; Tel Aviv, Israel; June, 1998.

11. J. M. Calvin and M. K. Nakayama, "Variance Reduction with Permuted Regenerative Estimators"; INFORMS National Meeting; Montreal, Canada; April 28, 1998.

12. J. M. Calvin, "Adaptive Random Search for the Minimum"; INFORMS National Meeting; Montreal, Canada; April 28, 1998.

13. J. M. Calvin and M. K. Nakayama, "Central Limit Theorems for Permuted Regenerative Estimators"; INFORMS National Meeting; Montreal, Canada; April 28, 1998.

14. J. M. Calvin and M. K. Nakayama, "Permuted Importance-Sampling Estimators for Regenerative Simulations"; INFORMS National Meeting; Montreal, Canada; April 27, 1998.

15. J. M. Calvin and M. K. Nakayama, "Permuted Regenerative Estimators"; Management Science and Information Systems Department; Rutgers University; New Brunswick, NJ; February 20, 1998.

16. J. M. Calvin and A. Žilinskas, "On the Choice of Probability Model for One-dimensional P-Algorithms", Advances in Modeling: Paradigms, Methods and

Applications, AMAP Workshop IFIP WG 7.6 IIASA, International Institute for Applied Systems Analysis, Laxenburg, Austria, May 1998.

17. J. M. Calvin and M. K. Nakayama, "Permuted Regenerative Estimators"; Systems Engineering Department; University of Pennsylvania; Philadelphia, PA; November 24, 1997.

18. J. M. Calvin, "A New Bound on the Average-Case Complexity of Global Optimization Under Wiener Measure Based on Probabilistic Analysis of the P Algorithm," Second Biennial Meeting of Foundations of Computational Mathematics, Rio de Janeiro, Brazil, January 1997.

19. J. M. Calvin, "Probabilistic Analysis of Global Optimization Algorithms," Seminar on algorithms and complexity for continuous problems, Schloss Dagstuhl, Germany, October, 1996.

20. J. M. Calvin, "Average Performance of Global Optimization Algorithms under Wiener Measure," AMS/SIAM Summer Seminar on Real Number Algorithms, Park City, July 1995.

21. Andraddótir, S., J. Calvin and P. W. Glynn, Increasing the frequency of regeneration for Markov processes. Winter Simulation Conference, Orlando, Florida, 1994.

22. J. M. Calvin, "Average-Case Optimal Non-Adaptive Algorithm for Global Optimization of Brownian Motion," Stanford University, Department of Operations Research Special Seminar, August 15, 1994.

23. J. M. Calvin, "Average Performance of Passive Algorithms for Global Optimization," RAND Corp. Operations Research Colloquium, April 15, 1994.

Other Presentations

1. Calvin, J. Efficient Simulation for Discrete Path-Dependent Option Pricing. 2001 Winter Simulation Conference, Washington, DC, Dec. 2001.

2. Calvin, J. Improving Standardized Time Series Methods by Permuting Path Segments. 2001 Winter Simulation Conference, Washington, DC, Dec. 2001.

3. Calvin, J., Glynn, P. W. and M. K. Nakayama. Importance Sampling Using the Semiregenerative Method. 2001 Winter Simulation Conference, Washington, DC, Dec. 2001.

4. J. M. Calvin, (1999). "Polynomial acceleration of Monte Carlo global search"; Winter Simulation Conference, Phoenix, Arizona, 1999.

5. Calvin, J., "Polynomial acceleration of Monte Carlo global search", Winter Simulation Conference, Phoenix, Arizona, 1999.

6. Calvin, J. and A. Žilinskas, IFORS Special Conference on Organizational Structures, Management, and Simulation of Business Sectors and Systems, Kaunas, Lithuania, 1998.

7. Calvin, J. and A. Žilinskas, On convergence of the P-algorithm for one dimensional global optimization. Fifth International Conference on Pattern Recognition and Information Processing. Minsk, Belarus, May 1999.

8. J. M. Calvin and M. K. Nakayama, "A New Variance-Reduction Technique for Regenerative Simulations of Markov Chains"; 1997 Winter Simulation Conference; Atlanta, GA; December 8, 1997.

9. J. M. Calvin, "Average Convergence Rate for a Class of Adaptive Algorithms for Optimization of Brownian Motion Paths," Third International Conference on Global Optimization, Szeged, Hungary, December 1995.

10. H. Al-Mharmah and J. M. Calvin, "Average Performance of Composite and Non-Composite Algorithms for Global Optimization of Stochastic Functions," Third International Conference on Global Optimization, Szeged, Hungary, December 1995.

11. H. Al-Mharmah and J. M. Calvin, "Adaptive Algorithms for Global Optimization"; 1993 ORSA/TIMS Joint National meeting, Phoenix, 1993.

12. J. M. Calvin, P. Griffin and J. R. Villalobos, "Sequential Decision Making in Form Tolerance Estimation"; 1993 ORSA/TIMS Joint National meeting, Phoenix, 1993.

VI. PROPOSALS AND GRANTS

AWARDED

1. PI: James M. Calvin; National Science Foundation Research Initiation Award; "Stochastic Optimization and Search Algorithms" (DDM-9010770); $50,000; 9/1990 – 8/1992.

2. PI: James M. Calvin; National Science Foundation; "Average Complexity of Global Optimization" (DMI-9500173); $126,000; 9/1995 – 8/1998.

3. PI: James M. Calvin; National Science Foundation; "Average Complexity of Global Optimization" (DMI-9696243); $102,000; 9/1996 – 8/1999 (transfer of grant DMI-9500173 to NJIT).

4. PI: James M. Calvin; National Research Council; "Global Optimization Algorithms" (with A. Žilinskas); $13,800; 12/1997 – 8/2000.

5. PI: James M. Calvin; National Science Foundation; "Efficient Simulation of Large-Scale Systems," (with M. Nakayama); $189,406; 7/1999 – 6/2004.

VII. SERVICE ACTIVITIES

A. Summary of Referee and Reviewing Activities:

1. Referee or reviewer for *Journal of Complexity*; *Annals of Applied Probability*; *Computers and Mathematics with Applications*; *Communications in Statistics: Stochastic Models*; *Journal of Global Optimization*; *Operations Research*; *Management Science*; *IEEE Transactions on Automatic Control*; *IEEE Transactions on Parallel and Distributed Systems*; *Winter Simulation Conference*;
2. Reviewer for the National Science Foundation.
3. Reviewer for a stochastic models book for Springer Verlag.
4. Reviewer for *Mathematical Reviews*.

B. Editorial Activity

Associate Editor, ACM *Transactions on Modeling and Computer Simulation*.

C. Professional Societies

1. Member of Association for Computing Machinery.
2. Member of INFORMS.
3. Member of INFORMS Speaker Committee.
4. Member of Mathematical Programming Society.