

**A. B. (Ton) Dieker**  
**Assistant Professor**  
**School for Industrial and Systems Engineering**

**September 12, 2013**

**I. EARNED DEGREES**

March 2006: **Ph.D. in Mathematics** (*cum laude*),  
University of Amsterdam, The Netherlands.  
April 2002: **M.Sc. in Operations Research** (*cum laude*),  
Vrije Universiteit Amsterdam, The Netherlands.

**II. EMPLOYMENT**

August 2008 – present: **Assistant Professor**,  
As of August 2013: **Fouts Family Assistant Professor**,  
Georgia Institute of Technology,  
School for Industrial and Systems Engineering (ISyE),  
Atlanta, Georgia, United States.  
August 2007 – July 2008: **Goldstine postdoctoral fellow**,  
IBM Watson Research Center,  
Yorktown Heights, New York, United States.  
April 2006 – July 2007: **Postdoctoral researcher**,  
University College Cork, Cork, Ireland.  
Mentor: Dr. Neil O'Connell.  
April 2002 – March 2006: **Ph.D. student**, (with full Research Assistant support)  
Advisor: Dr. Michel Mandjes.  
Thesis: *Extremes and fluid queues*.

**III. TEACHING**

**A. Individual Student Guidance**

**Postdoctoral mentoring**

- Dr. Jinwoo Shin (co-mentor: Prasad Tetali): Fall 2010 – Summer 2012  
Current position: Postdoctoral researcher at IBM Research  
Position as of July 2013: Assistant Professor KAIST, Korea.

**Ph.D. students**

- Guido Lagos Barrios: Spring 2013 – present  
Project title: *Sensitivity analysis for stochastic networks*  
Passed comprehensive PhD exam in Operations Research (Fall 2012).
- Richard Birge: Fall 2012 – present  
Project title: *Simulation of rare events*
- Tonghoon Suk: Fall 2010 – present  
Project title: *Resource sharing in large-scale systems*  
Passed comprehensive PhD exam in Operations Research (Fall 2011).

- Xuefeng Gao (co-advisor: Jim Dai): Fall 2008 – Summer 2013  
Thesis title: *Stochastic models for service systems and limit order books*  
Thesis defense date: August 5, 2013  
Position after graduation: Assistant Professor Chinese University of Hong Kong.

### **Undergraduate students**

- Diana Lim and Kevin Chen (Spring 2010)  
Project title: *Parrondo's paradox*.

### **B. Other Teaching Activities**

- Developed *Theme Park*, a web-based game on probability and statistics for high school students, along with teaching materials. <http://themepark.gatech.edu>  
The game has been used during various activities for high school students and teachers (often in collaboration with CEISMC), including participation in professional development courses and ISyE's *Mission Possible* summer program.
- Delivered short course (ten lectures) on "*Stochastic processes and algorithms*" at Wroclaw University, Poland, October 2012.

## **IV. SCHOLARLY ACCOMPLISHMENTS**

### **B. Refereed Publications**

#### **Journal publications**

1. J. G. Dai, A. B. Dieker, X. F. Gao.  
Validity of heavy-traffic steady-state approximations in many-server queues with abandonment.  
Submitted for publication (6/2013).
2. A. B. Dieker and S. Vempala.  
Stochastic billiards for sampling from the boundary of a convex set.  
Submitted for publication (6/2013).
3. A. B. Dieker and T. Suk.  
Randomized longest-queue-first scheduling for large-scale buffered systems.  
Submitted for publication (5/2013).
4. A. B. Dieker, S. Ghosh, M. Squillante.  
Optimal resource capacity management for stochastic networks.  
Submitted for publication (9/2012).
5. A. B. Dieker, X. F. Gao.  
Sensitivity analysis for diffusion processes constrained to an orthant.  
*The Annals of Applied Probability*, to appear.
6. I. Iyooob, E. Zarifoglu, A. B. Dieker.  
Cloud computing operations research.  
*Service Science*, 5, p. 88-101, 2013.
7. A. B. Dieker, B. Yakir.  
On asymptotic constants in the theory of Gaussian processes.  
*Bernoulli*, to appear.
8. A. B. Dieker, X. F. Gao.  
Positive recurrence of piecewise Ornstein-Uhlenbeck processes and common quadratic

Lyapunov functions.

*The Annals of Applied Probability*, 23, p. 1291-1317, 2013.

9. A. B. Dieker, J. Shin.  
From local to global stability in stochastic processing networks through quadratic Lyapunov functions.  
*Mathematics of Operations Research*, to appear.
10. A. B. Dieker, M. Mandjes.  
Extremes of Markov-additive processes with one-sided jumps, with queueing applications.  
*Methodology and Computing in Applied Probability*, 13, p. 221-267, 2011.
11. J. G. Dai, A. B. Dieker.  
Nonnegativity of solutions to the basic adjoint relationship for some diffusion processes.  
*Queueing Systems*, 68, p. 295-303, 2011.
12. A. B. Dieker, J. Warren.  
Series Jackson networks and non-crossing probabilities.  
*Mathematics of Operations Research*, 35, p. 257-266, 2010.
13. A. B. Dieker.  
Interlacings for random walks on weighted graphs and the interchange process.  
*SIAM Journal on Discrete Mathematics* 24, p. 191-206, 2010.
14. A. B. Dieker, J. Moriarty.  
Reflected Brownian motion in a wedge: sum-of-exponential stationary densities.  
*Electronic Communications in Probability*, 14, p. 1-16, 2009.
15. A. B. Dieker, J. Warren.  
On the largest-eigenvalue process of generalized Wishart random matrices.  
*Latin American Journal of Probability and Mathematical Statistics*, 6, p. 369-376, 2009.
16. D. Denisov, A. B. Dieker, V. Shneer.  
Large deviations for random walks under subexponentiality: the big-jump domain.  
*The Annals of Probability*, 36, p. 1946-1991, 2008.
17. A. B. Dieker, J. Warren.  
Determinantal transition kernels for some interacting particles on the line.  
*Annales de l'Institut Henri Poincaré (B) Probabilités et Statistiques*, 44, p. 1162-1172, 2008.
18. K. Dębicki, A. B. Dieker, T. Rolski.  
Quasi-product forms for Lévy-driven fluid networks.  
*Mathematics of Operations Research*, 32, p. 629-647, 2007.
19. A. B. Dieker.  
Applications of factorization embeddings for Lévy processes.  
*Advances in Applied Probability*, 38, p. 768-791, 2006.
20. A. B. Dieker, M. Lelarge.  
Tails for (max,plus) recursions under subexponentiality.  
*Queueing systems*, 53, p. 213-230, 2006.
21. A. B. Dieker, M. Mandjes.  
Efficient simulation of random walks exceeding a non-linear boundary.  
*Stochastic Models*, 22, 459-481, 2006.
22. A. B. Dieker, M. Mandjes.  
Fast simulation of overflow probabilities in a queue with Gaussian input.  
*ACM Transactions on Modeling and Computer Simulation*, 16, 119-151, 2006.

23. A. B. Dieker, M. Mandjes.  
On asymptotically efficient simulation of large deviation probabilities.  
*Advances in Applied Probability*, 37, p. 539–552, 2005.
24. A. B. Dieker.  
Conditional limit theorems for queues with Gaussian input, a weak convergence approach.  
*Stochastic Processes and their Applications*, 115, p. 849–873, 2005.
25. A. B. Dieker.  
Extremes of Gaussian processes over an infinite horizon.  
*Stochastic Processes and their Applications*, 115, p. 207–248, 2005.
26. A. B. Dieker.  
Reduced-load equivalence for queues with Gaussian input.  
*Queueing Systems*, 49, p. 405–414, 2005.
27. A. B. Dieker, M. Mandjes.  
On spectral simulation of fractional Brownian motion.  
*Probability in the Engineering and Informational Sciences*, 17, p. 417–434, 2003.

### **Refereed conference proceedings**

1. A. B. Dieker, T. Suk.  
Diffusion approximations for large-scale buffered systems.  
*ACM/SIGMETRICS Performance Evaluation Review*, to appear.
2. A. B. Dieker, S.-H. Kim.  
Selecting the best by comparing simulated systems in a group of three when variances are known and unequal.  
*Winter Simulation Conference 2012*, paper 44.
3. S.-H. Kim, A. B. Dieker.  
Selecting the best by comparing simulated systems in a group of three.  
*Winter Simulation Conference 2011*, p. 3992 – 4003.
4. A. B. Dieker, S. Ghosh, M. S. Squillante.  
Capacity optimization in feedforward Brownian networks.  
*ACM/SIGMETRICS Performance Evaluation Review*, 36, p. 137 – 139, 2008.

### **Other refereed materials**

1. A. B. Dieker.  
Reflected Brownian motion.  
*Wiley Encyclopedia of Operations Research and Management Science*, 2011.

## **D. Presentations**

### **Invited presentations**

- *On simulation of constants from the theory of Gaussian processes*
  - Applied Probability Society Conference 2013,  
San Jose, Costa Rica, July 2013.
- *Optimal resource capacity management for stochastic networks*
  - IE Seminar,  
University of Pittsburgh, January 31, 2013.
  - IEOR-DRO Seminar,  
Columbia University, January 24, 2013.

- INFORMS annual meeting 2012,  
Phoenix AZ, October 15, 2012.
- *High-dimensional sampling and shake-and-bake algorithms*
  - INFORMS annual meeting 2011,  
Phoenix AZ, October 17, 2012.
- *Sensitivity analysis for diffusion processes constrained to an orthant*
  - Department of Statistics Seminar,  
Colorado State University, November 28, 2011.
  - INFORMS annual meeting 2011,  
Charlotte NC, November 16, 2011.
- *Global stability of stochastic processing networks using local quadratic Lyapunov functions*
  - Applied Probability Society Conference 2013,  
San Jose, Costa Rica, July 2013.
  - Eindhoven Stochastics Seminar,  
EURANDOM, Eindhoven, The Netherlands, November 4, 2011.
- *Positive recurrence of piecewise Ornstein-Uhlenbeck processes and common quadratic Lyapunov functions*
  - Probability Seminar,  
University of Amsterdam, The Netherlands, November 8, 2011.
  - Probability Seminar,  
University of Virginia, January 30, 2011.
- *Small-scale algorithms for large-scale Markov processes*
  - Mathematical Research Institute Oberwolfach,  
Oberwolfach, Germany, October 19, 2010.
- *Interlacings for random walks on weighted graphs and the interchange process*
  - Probability Forum Seminar, University of Warwick,  
Coventry, United Kingdom, June 2, 2010.
  - Algebraic Combinatorics Seminar,  
Fields Institute, Toronto, Canada, February 12, 2010.
  - Math Probability Seminar,  
University of Wisconsin at Madison, November 19, 2009.
  - Colloquium on Statistics and Probability,  
Michigan State University, November 17, 2009.
  - INFORMS Applied Probability Society Conference 2009,  
Ithaca, NY, July 14, 2009.
- *Departures from queues in series and the largest-eigenvalue process for Wishart random matrices*
  - INFORMS Applied Probability Society Conference 2009,  
Ithaca, NY, July 13, 2009.
- *Series Jackson networks and non-crossing probabilities*
  - Seminario Dipartimento di Matematica, Università di Roma Tre,  
Rome, Italy, June 22, 2010.
  - Workshop 'Interacting Stochastic Particle Systems',  
Montréal, Canada, May 18, 2009.
  - Probability Seminar,  
Georgia Institute of Technology, School of Mathematics, October 21, 2009.

- *On capacity allocation in queueing networks*
  - Workshop ‘Stochastic processes for communication sciences’, International Center for Mathematical Sciences, Edinburgh, Scotland, June 10, 2010.
  - Industrial and Systems Engineering Seminar, Auburn University, October 26, 2009.
  - CDSNS Colloquium, Georgia Institute of Technology, School of Mathematics, March 30, 2009.
  - ARC Thinktank Seminar, Georgia Institute of Technology, School of Computer Science, October 21, 2008.
- *Extremes and fluid queues*
  - 34<sup>th</sup> Conference on the Mathematics of Operations Research, (plenary) Lunteren, The Netherlands, January 14, 2009.
  - Stieltjes Afternoon, Delft Institute of Technology, The Netherlands, June 30, 2008.
- *Large deviations for random walks under subexponentiality*
  - Graybill VIII 'Extreme Value Analysis' Conference, Fort Collins CO, June 23, 2009.
  - INFORMS Annual Meeting 2008, Washington DC, October 13, 2008.
  - LIDS-ORC Seminar, Massachusetts Institute of Technology, April 18, 2008.
- *On the stationary measure of a reflected Brownian motion in a wedge*
  - Probability and Computational Finance Seminar, Carnegie Mellon University, October 12, 2009.
  - Stochastic Systems Seminar, Georgia Institute of Technology, January 29, 2009.
  - Conference 'Stochastic Networks', (plenary) Ecole Normale Supérieure, Paris, France, June 2008.
  - ORIE Seminar, Cornell University, April 1, 2008.
  - INFORMS Applied Probability Society Conference 2007, Eindhoven, The Netherlands, July 9, 2007.
- *On series Jackson networks and determinantal transition kernels*
  - Math Probability Seminar, University of Wisconsin at Madison, November 15, 2007.
  - INFORMS Annual Meeting 2007, Seattle WA, November 6, 2007.
- *Time-dependent behavior of Jackson series networks and determinants*
  - EURANDOM, Eindhoven, The Netherlands, October 19, 2007.
  - Conference 'Stochastic Networks and Related Topics 2007', Bedlewo, Poland, May 28, 2007.
- *Queues in series, combinatorial correspondences, and determinants*
  - National University of Ireland Galway, Ireland, April 16, 2007.
  - National University of Ireland Maynooth, Ireland, March 28, 2007.
  - Columbia University, New York NY, February 20, 2007.

- Michigan State University, Lansing MI, January 29, 2007.
- Georgia Institute of Technology, Atlanta GA, January 18, 2007.
- CWI, Amsterdam, The Netherlands, January 15, 2007.
- *Fluid systems with Markov-additive input, an approach based on extremes*
  - Workshop 'Queues, fluid queues and extremes', EURANDOM, Eindhoven, The Netherlands, March 14, 2006.
- *On factorization identities and embeddings for Lévy processes*
  - Universiteit Utrecht, The Netherlands, February 23, 2005.
  - Workshop 'Rare events in communication networks', EURANDOM, Eindhoven, The Netherlands, February 3, 2005.
- *Extremes of Gaussian processes with stationary increments*
  - Ecole Normale Supérieure, Paris, France, May 12, 2004.
  - EURANDOM, Eindhoven, The Netherlands, January 20, 2004.
- *Exact large-buffer asymptotics for Gaussian queues*
  - INFORMS Applied Probability Society Conference 2005, Ottawa, Canada, July 6, 2005.

### **Contributed presentations**

- *On the buffer content and length of a busy period in a queue with Gaussian input*
  - 29<sup>th</sup> Conference on the Mathematics of Operations Research, Lunteren, The Netherlands, January 13, 2004.
- *On asymptotically efficient simulation of large deviations probabilities*
  - 29<sup>th</sup> Conference on Stochastic Processes and Their Applications, Angra dos Reis, Brazil, August 3, 2003.
  - 28<sup>th</sup> Conference on the Mathematics of Operations Research, Lunteren, The Netherlands, January 14, 2003.

### **E. Other scholarly accomplishments**

#### **Patents**

- US20120185405: A method and apparatus for commodity sourcing management (with Y. Lu and M. Squillante).
- US20130018829: Managing capacities and structures in stochastic networks (with S. Ghosh and M. Squillante)

#### **Software**

*Theme Park*, a web-based game on probability and statistics for high school students. Available at <http://themepark.gatech.edu>.

### **V. SERVICE**

#### **A. Professional Contributions**

- Journal contributions
  - Associate Editor for *Mathematics of Operations Research*, 2011 – present.
  - Associate Editor for *Operations Research*, 2009 – present.

- Guest Co-editor (with Marc Lelarge) for a special issue of *Queueing Systems on Mathematical performance analysis for computer and communication systems*, scheduled to be published in 2014.
- Conference and workshop organization
  - Co-organizer of the workshop *Queueing theory without limits: transient and asymptotic analysis*, EURANDOM, October 2007 (with Johan van Leeuwen).
  - Organizing Committee (Publication Chair) ACM SIGMETRICS 2013. Also member of Technical Program Committee.
  - Cluster Co-chair *Cloud Computing* INFORMS 2013 Annual Meeting, Session Chair INFORMS 2012 Annual Meeting.
- Program committee membership
  - Program committee member, INFORMS Applied Probability Society Conference 2009, 2011.
  - Program committee member, ACM SIGMETRICS Mathematical performance Modeling and Analysis (MAMA) 2010, 2011, 2012, 2013.
- Award committee membership
  - INFORMS George Nicholson Student Paper Competition committee member, 2013.
- Grant proposal review
  - National Science Foundation panelist CMMI Operations Research (2009, 2010).
  - External reviewer for Research Foundation Flanders (FWO), Belgium (2013).
- Reviewer for 20+ journals in mathematics, operations research, and engineering: *ACM Transactions on Modeling and Computer Simulation, Acta Applicandae Mathematicae, Acta Mathematica Scientia, Annals of Applied Probability, Annals of Operations Research, Arkiv för Matematik, Bernoulli, Communications in Statistics: Simulation and Computation, Electronic Journal of Probability, Extremes, IEEE Transactions on Automatic Control, IIE Transactions, Journal of Applied Mathematics and Stochastic Analysis, Journal of Applied Probability, Journal of the American Mathematical Society, Mathematics of Operations Research, Operations Research, Performance Evaluation, Probability Theory and Related Fields, Queueing Systems, Statistics and Probability Letters, Stochastic Analysis and Applications, Stochastic Models, Stochastic Processes and their Applications, Stochastics and Stochastic Reports.*
- Member of INFORMS, Institute of Mathematical Statistics (IMS), Netherlands Society for Statistics and Operations Research (VVS).

## **B. Campus Contributions**

- Comprehensive PhD Exam committee membership
  - *Operations Research* PhD program, 2009 – 2010, 2012 – 2013.
  - *Stochastics* track for the *Industrial Engineering* PhD program, 2008 – 2009.
- Coordinating Committee membership
  - *Operations Research* PhD program, 2012 – 2013.
  - *Algorithms, Combinatorics, and Optimization (ACO)* PhD program, 2010 – 2013.
- ISyE school committee membership
  - Graduate Committee 7/2013 – 6/2015.
- Seminar organization
  - Stewart School of ISyE colloquiums in Operations Research, 2009 – 2011 (with Renato Monteiro).



- Stochastic Systems seminar series, Spring 2009.
- Student and postdoc selection committee membership
  - Simons Foundation/ARC postdoc search committee, 2009 – 2010.
  - Algorithms and Randomness Center (ARC) student fellowship committee, 2009 – 2012. (Chair 2011-2012)
- PhD Thesis committee
  - Ricardo Restrepo (math, 2011)
  - Jiheng Zhang (ISyE, 2009)
  - Kan Wu (ISyE, 2009)

### C. Other Contributions

- Consulting for John Wiley & Sons (January 2012).

## VI. GRANTS AND CONTRACTS

### A. As Principal and Co-Principal Investigator

- *CAREER: Stochastic processes in high dimensions: from asymptotic analysis to algorithms.* NSF CMMI-1252878, January 2013 – December 2017. \$400K (PI: A. B. Dieker).
- *BRIGE: Capacity allocation for networks of queues.* NSF EEC-0926308, August 2009 – August 2012. \$175K (PI: A. B. Dieker).

### B. As Investigator

- *A novel framework for simulation selection procedures based on multidimensional drifting Brownian motions hitting ellipsoids.* NSF CMMI-1131047, August 2011 – August 2014. \$220K (\$30K for Dieker as non-PI senior personnel; PI: S.-H. Kim).

## VII. AWARDS AND HONORS

- Research awards and honors
  - IBM Faculty Award (July 2013)
  - NSF CAREER award (November 2012).
  - The Erlang Prize (October 2012).  
Awarded every other year by the Applied Probability Society of INFORMS to a researcher within 9 years of PhD.
  - Finalist in the INFORMS JFIG (Junior Faculty Interest Group) paper competition for the paper *Sensitivity analysis for diffusion processes constrained to an orthant*, with Xuefeng Gao, 2011.
- Honorary visiting positions
  - Oberwolfach Leibniz postdoctoral fellowship (2011).  
Position for a summer research visit of 6 weeks at the Mathematical Research Institute in Oberwolfach.
  - Visiting Fellow at the Isaac Newton Institute of the University of Cambridge, UK (May 12, 2010 – June 13, 2010).
  - IBM Goldstine Fellowship (August 2007).  
Postdoctoral position awarded annually to a scientist to advance his or her scholarship as resident department members at the IBM Research Center.

- DYNSTOCH young researcher (May 2004).  
Visiting position at the Probability and Applications Laboratory of Paris VI for three months as a PhD student, funded through a European research network.
- PhD and MSc thesis awards
  - Gijs de Leve Prize (January 2009).  
Best Ph.D. thesis in Mathematics of Operations Research defended during 2006, 2007, and 2008 in The Netherlands.
  - Stieltjes Prize (June 2008).  
Best Ph.D. thesis in Mathematics defended during 2006 in The Netherlands.
  - Ph.D. degree obtained *cum laude* (March 2006)  
Awarded to top 2 percent of Ph.D. theses at University of Amsterdam.
  - Applied Probability Trust Award (March 2006).  
Awarded to selected young researchers in applied probability.
  - Runner-up Master's thesis award 2003, Netherlands Society for Statistics and Operations Research (VVS).  
VVS organizes an annual Master's thesis competition for theses in Statistics and Operations Research.
  - M.Sc. degree obtained *cum laude* (March 2002).
- Teaching awards and honors
  - Thank a Teacher Certificates (April 2010, March 2011, March 2013) for teaching ISYE 2027 (Probability with Applications).