**Michael H. Veatch** mike.veatch@gordon.edu

**Education**

**Massachusetts Institute of Technology,** Cambridge, MA
Ph.D.. in Operations Research, 1992.
Thesis title: Queueing Control Problems for Production/Inventory Systems.
Thesis advisor: Lawrence M. Wein
Minor: International Economic Development

**Rensselaer Polytechnic Institute,** Troy, NY
M.S. in Operations Research and Statistics, 1980.

**Whitman College,** Walla Walla, WA
B.A. in Mathematics and Physics, 1979. Magna cum laude.

**Academic Experience**

**Gordon College** (1992-present and 1987-1990) *Professor of Mathematics*
Courses taught: probability, mathematical statistics, biostatistics, operations research, calculus, and liberal arts math.

2005, 1999 Visiting scientist, MIT
1995 Visiting scientist, AT&T Merrimack Valley Works studying inventory control procedures
Summer 1995 Visiting scientist, MIT and Boston University

2006-2009 NSF grant: Controlling complex networks: Approximate linear programming techniques
Summer 2006 NSF Research Experience for Undergraduates mentor: A design methodology for operational flexibility
2006 Gordon College initiative grant: Assessing operational flexibility
Summer 2004 NSF REU mentor: Planning, coordination, and control of supply chains
2002 Gordon College grant to run a workshop on mathematical modeling and complexity
1998 Gordon College initiative grant: Flow control models
1996-1998 MIT Leaders for Manufacturing grant: Cost of quality

1990-1992 **Sloan School of Management, MIT** *Research Assistant*

1979-1980 **Rensselaer Polytechnic Institute** *Teaching Assistant*

1978-1979 **Whitman College** *Teaching Assistant*

**Professional Experience**

**The Analytic Sciences Corporation,** Reading, MA *Department Staff Analyst*
1981-1987
Responsible for developing and marketing logistics analysis techniques and for managing team projects. Developed a model relating logistics resources to flying capability for the E-3 AWACS aircraft. This model was instrumental in obtaining a $2,000,000 contract from the E-3 manager to develop a database management system. Developed a structural reliability model for fault-tolerant systems and applied it to an advanced U.S. Air Force radio system. Developed software related to these studies.

1980 **New York State Higher Education Services Corporation,** Albany, NY
*Statistical Analyst:* Performed an enrollment projection of their Tuition Assistance Program using Markov birth/death processes, based on demographic data. This projection was used for budgetary planning.

**Michael H. Veatch**

**Honors, Awards, Misc.** Honorable mention, 1993 Nicholson student paper competition, Operations Research Society of America
Phi Beta Kappa; National Merit Scholar.
Took three-week study tour of Central America.

**Affiliations** Institute for Operations Research and Management Science

**Publications**

with A.B. Calvo 1983. Reliability/Logistics Analysis Techniques for Fault-Tolerant Architectures. *IEEE NAECON 83 Proceedings*, May 17-19, pp. 675-681.

with A.B. Calvo and J. McManus 1984. R&M Analysis Techniques for Fault-Tolerant Systems. *1984 Proceedings Annual Reliability and Maintainability Symposium*, pp. 530-536.

with A.B. Calvo 1986. SOAR-Systems Dynamic Approach to Equipment Readiness. *Budgeting for Sustainability*, J.C. Honig, ed., Military Applications Section of ORSA, pp. 211-228.

1986. Reliability of Periodic Coherent Systems. *IEEE Trans. on Reliability* **R-35**: 504-507.

with P.B. Mirchandani 1986. Hot Job Routing Through a Stochastic Job-Shop Network. *Large Scale Systems* **11**:131-148.

with L.M. Wein 1992. Monotone Control of Queueing Networks. *Queueing Systems* **12**: 391-408.

with L.M. Wein 1994. Optimal Control of a Two-Station Tandem Production/Inventory System. *Operations Research* **42**:337-350.

with L.M. Wein 1996. Scheduling a Make-to-Stock Queue: Index Policies and Hedging Points. *Operations Research* **44**:634-647.

with M.C. Caramanis 1999. Optimal Manufacturing Flow Controllers: Zero-Inventory Policies and Control Switching Sets. *IEEE Transactions on Automatic Control* **44:** 779-783.

with M.C. Caramanis 1999. Optimal Average Cost Manufacturing Flow Controllers: Convexity and Differentiability. *IEEE Transactions on Automatic Control* **44:** 914-921.

2000. Inspection Strategies for Multistage Production Systems with Time-Varying Quality. *International Journal of Production Research* **38:** 837-853.

with M. J. Yee 2000. Just-in-time policies for single-machine manufacturing flow controllers. *IEEE Transactions on Automatic Control* **45:** 336-339.

2001. Fluid Analysis of Arrival Routing. *IEEE Transactions on Automatic Control* **46:** 1254-1257.

2001. Mathematics and Values. *Mathematics in a Postmodern Age: A Christian Perspective*, R. W. Howell and W. J. Bradley, eds., Grand Rapids, Michigan: Eerdmans.

**Publications** **Michael H. Veatch**

2002. Using Fluid Solutions in Dynamic Scheduling. In S. B. Gershwin, Y. Dallery, C. T. Papadopoulos, J. M. Smith, eds., *Analysis and modeling of manufacturing systems*, pp. 399-426. Kluwer, New York.

with Francis de Vericourt 2003. Zero-inventory conditions for a two-part type make-to-stock production system. *Queueing Systems* **43:** 251-266.

with Mark Van Oyen 2002. Cross-trained labor: Perspectives on OR models. Working paper.

M. H. Veatch and J. R. Senning, Fluid analysis of an input control problem. *Queueing Systems*, **61**(2), 87-112, 2009. **http://www.springerlink.com/openurl.asp?genre=article&id=doi:10.1007/s11134-008-9101-x**.

M. H. Veatch, Enhanced dynamic programming algorithms for series line optimization, *IEEE Transactions on Automatic Control*, **51**(1): 159-164, 2006.

C. H. Wu, M. E. Lewis and M. H. Veatch, Dynamic allocation of reconfigurable resources in a two-stage tandem queueing system with reliability considerations, *IEEE Transactions on Automatic Control*, 51(2):309 – 314, 2006.

M. H. Veatch, Approximate dynamic programming for networks: Fluid models and constraint reduction. Submitted for publication, 2005; revised 2009.

M.H. Veatch. The impact of customer impatience on production control. *IIE Transactions*, 41(2), 95-102, 2009.

S. B. Gershwin, B. Tan and M. H. Veatch, Production control with backlog-dependent demand. *IIE Transactions*, 41(6):511 – 523, 2009.

M. H. Veatch. Approximating Sequences of LPs for Networks and Related MDPs. Working paper, 2007.

M. H. Veatch and N. Walker. Approximate Linear Programming for Network Control: Column Generation and Subproblems. Submitted for publication, 2008.

M. C. Russell, J. Fraser, S. Rizzo and M. H. Veatch, Comparing LP bounds for queueing networks. To appear, *IEEE Transactions on Automatic Control,* 2009.

S. Rizzo and M. H. Veatch, Performance Bounds and Differential Cost Approximations for Queueing Networks. Working paper, 2008.

M. H. Veatch. A c$\mu$ rule for parallel servers with two-tiered c$\mu$ preferences. Submitted for publication, 2008.

with P.B. Mirchandani and H. Soroush 1981. Shortest Paths Through Stochastic Networks. Presented at TIMS/ORSA meeting in Toronto.

1982. Myopic Strategies in Search for a Moving Target. Presented at ORSA/TIMS conference in San Diego.

1983. Reliability of Integrated Fault-Tolerant Avionics. Presented at TIMS/ORSA conference in Orlando.

1984. Endurability of Relocating Forces. Presented at TIMS/ORSA conference in Dallas.

with J.H. Simonson 1986. Estimating Demands from Stock-Out Data Under (S-1,S) Stocking Policies. Presented at TIMS/ORSA conference in Los Angeles.

1987. Simplified Models of Combat Logistics Capability for Tactical Aircraft. Presented at TIMS/ORSA conference in New Orleans.

with L.M. Wein 1991. Optimal Control of a Multistage Production/Inventory System. Presented at Multi-Echelon Inventory Systems conference in Berkeley.

with L.M. Wein 1991. Optimal Production Control of a Tandem Make-to-Stock Queueing System. Presented at ORSA/TIMS conference in Anaheim.

with L.M. Wein 1992. Scheduling a Make-to-Stock Queue: Index Policies and Hedging Points. Presented at ORSA/TIMS conference in Los Angeles.

1994. Characteristics of Optimal Manufacturing Flow Controllers. Presented at Boston University manufacturing engineering seminar.

1995. Beyond Mass Production: Manufacturing Competitiveness and the Role of Labor in the Information Age. Presented at Gordon College faculty forum.

1996. The Parking Meter Game. Presented at MAA/Northeast Section meeting in Boston.

1997. Optimal Manufacturing Flow Controllers: Zero-Inventory Policies and Control Switching Sets. Presented at INFORMS conference in San Diego.

1997. Mathematics and Values. Presented at Association of Christians in the Mathematical Sciences conference in Upland, Indiana.

1998. Structural Properties of Dynamic Scheduling Problems Under Fluid Scaling. Presented at INFORMS conference in Seattle.

1999. Fluid Models of Stochastic Control Problems. Presented at Columbia University Graduate School of Business seminar.

**Presentations** **Michael H. Veatch**

1999. Exact and Asymptotic Optimality Relationships Under Fluid Scaling. Presented at Applied Probability conference in Ulm, Germany.

1999. Fluid Analysis of Arrival Routing. Presented at INFORMS conference in Philadelphia.

1999. Fluid Models of Queueing Control Problems. Presented at Calvin College.

2000. What do fluids tell us about MQNET optimality? Presented University of Rochester Simon School of Business seminar.

2000. Explicit fluid limits for multiclass queueing networks. Presented at INFORMS conference in San Antonio.

2001. Constructing fluid limits for MQNETs. Presented at Applied Probability conference in New York.

2001. Fluid analysis of an input control problem. Presented at INFORMS conference in Miami.

2002. Using fluid solutions in dynamic scheduling. Presented at Northwestern University and Univ. of Illinois at Urbana/Champaign.

2003. Complexity as a theme for the liberal arts math course. Presented at Association of Christians in the Mathematical Sciences conference in San Diego..

2003. Speeding up exact DP for series line optimization. Presented at INFORMS conference in Atlanta.

2003. Improved basis selection for approximate DP on networks. Presented at INFORMS conference in Atlanta.

2004. Approximate DP for networks using constraint reduction. Presented at INFORMS conference in Denver.

2004. What data can't tell you: A little Fisher information theory. Alumni lecture series, Whitman College.

2005. Approximate dynamic programming for networks. Presented at Boston University Center for Information and Systems Engineering seminar.

2005. Approximate dynamic programming for networks: Fluid models and constraint reduction. Presented at Applied Probability Society conference in Ottawa.

2005. Approximate LP sequences for networks. Presented at INFORMS conference in San Francisco.

2006. Complexity: An information-theoretic look at nature and decisions. Gordon College Faculty Forum.

**Presentations** **Michael H. Veatch**

2006. Average cost bounds and performance for open queueing networks via LPs. Presented at INFORMS conference in Pittsburg.

2007. Approximation, structure and performance for average cost queueing network control. Presented at Applied Probability Society conference in Eindhoven.

2007. Optimal and heuristic policies for parallel server systems. Presented at INFORMS conference in Seattle.

2008. A $c\mu$ Rule for Parallel Servers with Nested Preferences. Presented at INFORMS conference in Washington. D.C.

2008. Approximate LP for Network Control: Column Generation and Upper Bounds. Presented at INFORMS conference in Washington. D.C.