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LINDA V. GREEN

Cain Brothers & Company Professor Emerita of Healthcare Management

Graduate School of Business
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EDUCATION

1978	**Yale University** Ph.D. in Operations Research
1973	**Courant Institute of Mathematical Sciences, NYU** M.S. in Mathematics
1970	**The City College of New York** B.S. in Mathematics Phi Beta Kappa

WORK EXPERIENCE

Columbia Business School

1987- 2020	*Professor*
1982-1987	*Associate Professor*
1978-1982	*Assistant Professor* *Decision, Risk, and Operations Division*

Develop and teach courses in operations management, operations research,

probability theory and healthcare management.
Current research focuses on developing and implementing models for improving healthcare delivery efficiency and effectiveness, including decision support for hospital and physician practices.

2006 to 2021 — *Faculty Director, Columbia Business School Healthcare and Pharmaceutical Management Program*. Responsible for curriculum development and management; provide guidance for extra-curricular student activities; mentor students.

2000 to 2016 — *Founder and Co-director, Columbia Alliance for Healthcare Management.* Developed and managed a partnership of the schools of Business, Medicine and Public Health for fostering interdisciplinary research and education in healthcare management. Managed industry advisory board, organized nationally attended conferences, supported student activities.

1989 to 2012 — *Coordinator, Police Management Institute-- Operations Management.* Designed, organized and taught in one-week program on managing operations and quality for middle/senior managers of N.Y.C. Police Department.

1986-1992 — *Director, Executive Program in Operations and Production Management.* Designed, managed and taught in one week non-degree executive program on achieving competitive advantage through integration of manufacturing and service functions with business strategy.

1989-1991 — *Senior Vice Dean for Academic Affairs*
Helped develop new strategic plan. Managed all teaching and curricular aspects of MBA and doctoral programs. Hired full-time, visiting and adjunct faculty and handled faculty hires and promotions at school and university level. Directed research budget.

1990-1991 — *Chairperson, Curriculum Review Committee*
Headed 11 person committee of faculty and students resulting in major redesign of MBA core curriculum, implemented in 1992. Interviewed executives, ran focus groups of recruiters, students and faculty and conducted formal surveys of alumni and students. Managed process of gaining consensus among faculty and students.

1988-1989 — *Chairperson, Dean's Search Committee*
Headed 11 person committee of faculty, students, alumni

and administrators. Interviewed business and educational leaders. Acted as intermediary in negotiations.

1987-1989 *Divisional Coordinator, Management Science/ Operations Management*
Scheduled and staffed courses, advised students, coordinated with school administrators.

American Telephone & Telegraph

1986-1987 *Consultant, Bell Laboratories*
Analyzed impact on inventory costs of design changes to major products. Interviewed senior corporate executives, factory managers and senior engineers. Wrote and presented report on findings for use by corporate management.

1973-1974 *Engineering Staff Specialist*
Conducted statistical analyses of telephone installation and repair data. Prepared manuals and presented seminars for Operating Telephone Company managers on developing operating costs.

1971-1973 *Member of Technical Staff, Bell Laboratories*
Developed computerized discounted cash flow model for selection of proposed development projects. Performed revenue requirement studies on new and existing products. Studied inventory requirements for high cost, low demand products.

1970-1971 *Senior Technical Aide Programmer*
Performed computer simulations of speech processing.

OUTSIDE ACTIVITIES

CONSULTING EXPERIENCE

New York City Burn Project - development of patient transfer policies for disaster planning.

Columbia-Bassett MD program -innovative new medical school program stressing cost-

effectiveness and quality

Lutheran Hospital, New York - physician staffing in the emergency department.

Columbia Presbyterian Hospital, New York - alleviating emergency department delays.

U.S. Open Healthcare Management, Inc. on developing an operational strategy.

Maimonides Hospital, Brooklyn, New York - nurse staffing.

Citicorp - cost-of-quality issues for financial services.

Personal Products division of Johnson & Johnson - productivity and quality improvement.

New York City Office of Management and Budget - the feasibility of a one-officer patrol car system in New York City.

The Fresh Air Fund of New York - the development of methods for scheduling and routing buses to transport inner city children to vacation destinations.

Citibank - developing service standards for various customer classes.

Richard Schultz Design, Inc. - the development of a manufacturing strategy.

ADVISORY & GOVERNING BOARDS

Current

Trustee - Lehigh Valley Health Network, Pennsylvania

Journal of the Operational Research Society, International Advisory Board

Past

City Health Works, New York

SLIM@ Physicians & Surgeons Advisory Board, Columbia University

New York State Department of Health, ED Overcrowding Workgroup

Emergency Department Patient Safety Initiative, MCIC Vermont

"Health Care System Preparedness and Surge Capacity for Bioterrorism and Public Health Emergencies", Agency for Healthcare Research and Quality Contract

Dennis Gillings Professorship of Health Management, Cambridge University

Lion Strategy

MphRx

Inwood House - Treasurer and Member of Finance, Investment and Compensation Committees

New York-Presbyterian Hospital Quality Task Force

Commonwealth Fund Project - "Regionalization of Selected Hospital Services"

Harriman School, SUNY at Stony Brook

New York City Police Advisory Board

PUBLICATIONS

Journal Articles

"A Queueing System in Which Customers Require a Random Number of Servers," Operations Research, November - December, 1980.

"Comparing Operating Characteristics of Queues in Which Customers Require a Random Number of Servers," Management Science, January, 1981.

"A Limit Theorem on Subintervals of Interrenewal Times," Operations Research, January - February, 1982.

"Queues in Which Customers Receive Simultaneous Service from a Random Number of Servers - A System Point Approach," with P.H. Brill, Management Science, January, 1984.

"A Multiple Dispatch Queueing Model of Police Patrol Operations," Management Science, June, 1984.

A Comparison of the Multiple Dispatch and M/M/c Priority Queueing Models of Police Patrol with P.J. Kolesar, Management Science, June 1984.

"The Feasibility of One-Officer Patrol in New York City," with. P.J. Kolesar, Management Science, August 1984.

"An M/G/c Queue in Which Customers Require a Random Number of Servers," with A. Federgruen, Journal of Applied Probability, September, 1984.

"A Queueing System with Auxiliary Servers," Management Science, October, 1984.

"Queues with General-Use and Limited-Use Servers," Operations Research, January - February, 1985.

"Queueing Systems with Service Interruptions," with A. Federgruen, Operations Research, September - October, 1986.

"On the Validity and Utility of Queueing Models of Human Service Systems," with P.J. Kolesar, Annals of Operations Research, Volumes 8,9, 1986.

"The N Seasons, S Servers Loss System," with A. Svoronos, Naval Research Logistics, August, 1987.

"A Convexity Result for Single Server Exponential Loss Systems with Nonstationary Arrivals," with A. Svoronos, Journal of Applied Probability, March, 1988.

"Queueing Systems with Service Interruptions II," with A. Federgruen, Naval Research Logistics, June, 1988.

"Testing the Validity of a Queueing Model of Police Patrol" with P.J. Kolesar, Management Science, February, 1989.

"An AntiPASTA Result for Markovian Systems," with B. Melamed, Operations Research, January - February, 1990.

"The Pointwise Stationary Approximation for Queues with Nonstationary Arrivals," with P.J. Kolesar, Management Science, January 1991.

"Some Effects of Nonstationarity on Multiserver Markovian Queueing Systems," with P.J. Kolesar and A. Svoronos, Operations Research, May - June 1991.

"On the Efficiency of Imbalance in Multi-Facility Multi-Server Service Systems with D. Guha, Management Science, January 1995.

"On the Accuracy of the Simple Peak Hour Approximation for Markovian Queues," with P.J. Kolesar, Management Science, August 1995.

“Time Perceptions in Service Systems: An Overview of the TPM Framework,” with D.R. Lehmann and B.H. Schmitt, Advances in Services Marketing Research and Management, Vol. 5, 1996.

"International Comparisons in Health Care: What We Can and Can't Learn," N.Y. Health Sciences Journal, Spring 1996.

"The Lagged PSA for Estimating Peak Congestion in Multiserver Markovian Queues with Periodic Arrival Rates," with P.J. Kolesar, Management Science, January 1997.

"A Note on Approximating Peak Congestion in $M_t/G/\infty$ Queues with Sinusoidal Arrivals," with P.J. Kolesar, Management Science, November 1998.

“Insights on Service System Design from a Normal Approximation to Erlang’s Delay Formula,” with P.J. Kolesar, Journal of Production and Operations Management, Fall 1998.

“Improving the SIPP Approach for Staffing Service Systems with Cyclic Demand,” with P. J. Kolesar, and J. Soares, Operations Research, July – August 2001

“Strategies for Cutting Hospital Beds: The Impact on Patient Service,” with V. Nguyen, Health Services Research, June 2001

“An Improved Heuristic for Staffing Telephone Call Centers with Limited Operating Hours,” with P.J. Kolesar and J. Soares, Journal of Production and Operations Management, Spring 2003.

“How Many Hospital Beds?” Inquiry, Winter 2002/2003.

“Applying Management Science to Emergency Response Systems: Lessons from the Past,” with P. Kolesar, invited paper, Management Science, August 2004.

“Managing Patient Service in a Diagnostic Medical Facility,” with S. Savin and B. Wang, Operations Research, January – February 2006.

“Using Queueing **T**heory to Increase the Effectiveness of Physician Staffing in the Emergency Department”, with J. Soares, J. Giulio and R. Green, Academic Emergency Medicine, January 2006.

"Computing Time-dependent Waiting Time Probabilities in Nonstationary Markovian Queueing Systems," with J. Soares, Manufacturing and Service Operations Management, Winter 2007.

"Coping with Time-varying Demand when Setting Staffing Requirements for a Service Systems", with P.J. Kolesar and W. Whitt, invited paper, Production and Operations Management, March-April 2007.

"Providing Timely Delivery of Care: What is the Right Panel Size?" with S. Savin and M. Murray, Joint Commission Journal on Quality and Patient Safety, April 2007.

"Reducing Delays for Medical Appointments: A Queueing Model Approach", with S. Savin, Operations Research, Special Issue on Operations Research in Healthcare, November-December 2008.

"Identifying Unit-Specific Nursing Demands Using Nursing Interventions Classification", with S. Hyun, P. de Cordova, K. Price, T. Quinlan and P.W. Stone, Studies in Health Technology and Informatics 146, February 2009.

"Ambulance Diversion and Myocardial Infarction Mortality", with N. Yankovic, S. Glied and M. Grams, Inquiry, Spring 2010

"Identifying Good Nursing Levels: A Queueing Approach", with N. Yankovic, Operations Research, July-August 2011

"Burn Disaster Response Planning in New York City", with R.W. Yurt et al, J. Burn Care and Research, Sept.-Oct. 2012.

"The Vital Role of Operations Analysis in Improving Healthcare Delivery", invited paper for Manufacturing & Service Operations, Fall 2012.

"Primary Care Physician Shortages Could be Eliminated Through the Use of Teams, Nonphysicians and Electronic Communications", with S. Savin and Y. Lu, Health Affairs, Jan. 2013.

"Prioritizing Burn-Injured Patients During a Disaster", with C. Chan, Y. Lu, N. Leahy and R. Yurt, Manufacturing & Services Operations Management, Spring 2013.

"The Nursevendor Problem: Personnel Staffing in the Presence of Endogenous Absenteeism", with S. Savin and N. Savaa, Management Science, Oct. 2013.

"A Study of New York City Obstetrics Units Demonstrates the Potential for Reducing Hospital Inpatient Capacity", with N. Liu, Medical Care Research and Review, Vol. 72-2, 2015.

"Reducing Practice Variation at Crystal Run Healthcare Lowered Costs and Improved Outcomes While Increasing Access, Capacity and Revenues," with S. Hines and J. Nasser, Health Affairs Blog, July 2015.

"Dynamic Control of a Tandem System with Abandonments" with G. Zayas-Cab´an, J. Xie, and M.E. Lewis, Queueing Systems, December 2016.

"Queues with Time-Varying Arrivals and Inspections with Applications to Hospital Discharge Policies", with Carri Chan and Jing Dong, Operations Research, March-April 2017.

"Assessing the Impact of Service Level when Customer Needs are Uncertain: An Empirical Investigation of Hospital Step-Down Units" with C. Chan, L. Lu, S Lekwijit and G. Escobar, Management Science, February 2019.

"Policies for Physician Allocation to Triage and Treatment in Emergency Departments", with G. Zayas-Cab´an, J. Xie, and M.E. Lewis, IIE Transactions on Healthcare Systems Engineering, 2020.

"Two Class Constrained Optimization with Applications to Queueing Control", with G. Zayas-Cab´an, J. Xie, and M.E. Lewis, Naval Research Logistics, 2020.

"The Impact of Step-Down Unit Care on Patient Outcomes After Discharge from the ICU", with S. Lekwijit, C. Chan, V.X. Liu and G. Escobar, Critical Care Explorations, 2020.

"The Impact of Telehealth on Primary Care Physician Panel Sizes", with S. Savin, G. Greenberg, S. Hines, D. Lake, M. Minear and R. Murphy, Journal of the American Board of Family Medicine, September/October 2022.

Book Chapters

"Capacity Planning in Hospitals," in Handbook of Operations Research/Management Science Applications in Health Care, Kluwer Academic Publishers, 2004.

"Queueing Analysis in Healthcare" in Patient Flow: Reducing Delay in Healthcare Delivery, Springer 2006.

"Using Operations Research to Reduce Delays for Healthcare", Tutorials in Operations Research, INFORMS 2008.

"Queueing Theory and Modeling" in Handbook of Healthcare Delivery Systems, edited by Yuehwern Yih, Taylor & Francis Group, 2010.

"Using Queueing Theory to Alleviate Emergency Room Overcrowding" in Wiley Encyclopedia of Operations Research and Management Science, edited by James L. Cochran, 2011.

"Improving Access to Healthcare: The Impact of Adaptive Behavior", with C. Chan, Healthcare Operations Research, edited by B. Denton, Springer 2012.

CASES

The New York City Police Department Patrol System, revised 2010

The Ritz Carlton Hotel Company: The Quest for Service Excellence, with N.M. Fraiman, G.J. van Ryzin and A. Heching, revised 2010

Nemours/Alfred I. DuPont Hospital for Children: Using LEAN Management to Improve Health Care, with F. Chen, 2016

Lehigh Valley Health Network: Using a Population Health Strategy to Transform Care, with C. Chan, 2019

EDITORIAL AND OTHER PROFESSIONAL ACTIVITIES

Member, MSOM Fellows Selection Committee

Advisor, Management and Business Review, 2020-present

Advisory Editor, Surveys in Operations Research and Management Science, 2009-present

Member, Pierskalla Award Committee, INFORMS 2015

Member, Pierskalla Award Committee, INFORMS, 2011

Department Editor, Public Sector Applications, Management Science, Jan. 2003-2010

Chairperson, Lanchester Prize Committee, INFORMS, 2009

Member, Lanchester Prize Committee, INFORMS, 2008

Member, Fellows Selection Committee, INFORMS, 2008-2009

Chairperson, INFORMS Dantzig Prize Competition, 2005

Chairperson, Editorial Review Committee (Editor search), Management Science, 2005

Member, INFORMS Dantzig Prize Competition, 2004.

Reviewer, INFORMS/JFIG Paper Competition finalists, 2004.

Panelist, NSF Service Enterprise Engineering CAREER awards, 2004.

"Grand rounds" presentations:
New York Presbyterian Emergency Medicine department, November, 2009
Jewish General Hospital Emergency Medicine department, Montreal, February 2007
Bellevue Emergency Medicine department, January 2004.
New York Presbyterian Radiology department, November 2003.

Group leader, National Academy of Engineering/ Institute of Medicine workshop on Engineering and the Health Care System, March 2003.

Participant, NSF workshop, "Using Operations Research to Improve Health Care Delivery Systems", September, 2002.

Member, Search Committee for Editor, Management Science, 2001- 2002.

Member, INFORMS Professional Recognition Committee, 1998 –2001

Department Editor, Applied Stochastic Models, Management Science, 1986 - 1998.

Member, Nicholson Prize Committee, 1997.

Chairperson, INFORMS Prize Committee (international prize given to an organization for the effective integration of OR/MS in achieving success), 1996

Member, INFORMS Prize Committee, 1994 - 1995.

Associate Editor, Operations Research, Special issue on public sector applications, 1992.

Associate Editor, Public Sector Applications, Management Science, 1983 - 1986.

Council Member, TIMS (The Institute of Management Sciences), 1983-1985.

Secretary/Treasurer, Applied Probability Group of ORSA (Operations Research Society of America)/TIMS, 1983-1984.

Council Member, Applied Probability Group of ORSA/TIMS, 1979-1983.

Frequent referee for Operations Research, Management Science, Journal of Applied Probability, and others.

Reviewer for NSF grants.

Organized and chaired sessions and presented papers at numerous national meetings.

Other invited seminars:
University of Toronto, Canada
Eindhoven University, The Netherlands
University of Delft, The Netherlands
Harvard Business School
University of British Columbia, Vancouver, Canada
IBM Research Center, Hawthorne
University of Maryland
Auckland University, New Zealand
McGill University, Canada
University of Coimbra, Portugal
Georgia Institute of Technology
MIT
Northwestern University
Duke University
Casewestern Reserve University
AT&T Laboratories
University of Chicago
University of Michigan
SUNY, Buffalo
University of North Carolina, Chapel Hill
University of Rochester
State University of New York, Stony Brook
Rutgers University
Yale University
Cornell University
Bell Laboratories, Holmdel, N.J.
IBM Thomas J. Watson Research Laboratories, Yorktown Heights

HONORS AND AWARDS

MSOM Fellow, elected 2019

Keynote speaker, INFORMS Conference, 2019

Best Paper, INFORMS Section for Public Programs, Services and Needs, 2011

Agency for Healthcare Research and Quality grant, 2007 - 2009: Using queueing theory to improve nurse staffing effectiveness.

Keynote speaker, Columbia University Alumni Association 2009.

Featured speaker, INFORMS 2005 Practice Conference.

INFORMS Fellow, elected 2004.

Wharton/Lehigh Distinguished Lecturer, 2003.

Featured speaker, New York Academy of Medicine, 2003.

National Institute of Justice Grant, 1981 - 1983: Modernization of methods for allocating police patrol cars in urban areas, with the Rand Corporation. Resulted in development and implementation of new computer-based system for allocation of patrol cars in major U.S. cities and abroad.

U.S. Department of Housing, Education and Welfare Fellow, 1974-76

Phi Beta Kappa, 1970

SELECTED MEDIA EXPOSURE

New York Times 2019
Fox News 2018
Wall Street Journal 2016
Crain's New York 2015
New York Times 2014
Crain's New York 2014
Washington Post 2013
Healthcare Finance News 2013
Kaiser Health News 2013
Business Courier of Cincinnati 2013

American Medical News 2013
Portfolio 2009
New York Post 2008
AMA News 2008
Business Week 2007
NPR 2007
Slate 2007
New York Times (Op Ed) 2006
Denver Post 2004

TEACHING & COURSE DEVELOPMENT EXPERIENCE

Graduate School of Business

Creating Value in Healthcare Delivery
An elective designed to expose students to leading edge healthcare organizations through site visits

Transforming the Delivery of Healthcare Services
An elective developed to survey new and emerging delivery and payment models

The U.S. Healthcare Industry: Strategy and Structure
An introductory elective developed for MBA students

The U.S. Healthcare Industry in the 21st Century
An elective developed for executive MBA students

Probability Theory
The required introductory course for Ph.Ds in business

Operations Management
The core course for MBAs

Operations Management
The core course for the Executive MBA program

Service Operations
An elective for MBA students, involving project work

Operations Research
The introductory OR course for MBAs

Operations Research
The core course for the Executive MBA program

Mathematics
A required mathematics course for MBAs

Applied Probability Models
A doctoral seminar on the theory of stochastic processes and its application to various business areas

Applications of Operations Research Methodology
A course designed for the collaboration of MBA, Executive MBA, and Ph.D. students on actual projects

Department of Industrial Engineering and Operations Research

Queueing Theory
A Ph.D. level course

Other Executive Programs

Session leader, "Managing Customers and Suppliers: The Role of Variability and Information", Columbia Senior Executive Program

Session leader, "Operations Strategy", Columbia Senior Executive Program

Session leader, "Operations Strategy", Transition to General Management program

Co-director and teacher, IBM Brazil Program "Improving Business Processes"

Designer, BOC Gases Program, "Operations and Strategy"

PERSONAL

Married to Hon. Stanley B. Green
One son, Daniel

6/26/17

6/26/17

6/26/17

6/26/17