

CRAIG W. KIRKWOOD

EDUCATION

Massachusetts Institute of Technology: Ph.D., Operations Research, 1972

Massachusetts Institute of Technology: E.E., 1970

Massachusetts Institute of Technology: S.B./S.M., Electrical Eng., 1969

PROFESSIONAL EXPERIENCE

Arizona State University, 1983-present

- Professor, Department of Supply Chain Management/Department of Management/Department of Decision and Information Systems (1983-present).
- Chair, Department of Supply Chain Management, W. P. Carey School of Business (2006-08). Leadership of 22 faculty in supply chain management; ranked among the top three departments of its type in the country.
- Chair, Department of Decision and Information Systems (1983-85, 1986-89).
- Acting Dean, College of Business (1985-86).

Woodward-Clyde Consultants, 1977-78, 1979-83

- Manager, Decision Analysis Group and senior project engineer.

University of Michigan, 1974-77, 1978-79

- Assistant Professor, Department of Industrial and Operations Engineering.

University of Colorado, 1972-74

- Assistant Professor, Department of Electrical Engineering.

Massachusetts Institute of Technology, 1969-72

- Teaching Assistant, Department of Electrical Engineering.

Bell Telephone Laboratories, Inc., 1966-68

- Cooperative Student.

PUBLICATIONS

Books and Book Chapters

D. L. Keefer, C. W. Kirkwood, and J. L. Corner, "Chapter 28: Perspective on Decision Analysis Applications," in W. Edwards, R. F. Miles, Jr., and D. von Winterfeldt (eds.), *Advances in Decision Analysis: From Foundations to Applications*, pp. 582-610, Cambridge University Press, Cambridge, UK, 2007.

C. W. Kirkwood, "Chapter 28, Decision Analysis," in A. P. Sage and W. B. Rouse (eds.), *Handbook of Systems Engineering and Management*, pp. 1119-1145, Wiley, New York, 1999.

C. W. Kirkwood, *Strategic Decision Making: Multiobjective Decision Analysis with Spreadsheets*, Duxbury Press, Belmont, CA, 1997.

C. W. Kirkwood, *Instructor's Manual for Strategic Decision Making: Multiobjective Decision Analysis with Spreadsheets*, Duxbury Press, Belmont, CA, 1997.

C. W. Kirkwood, Social Decision Analysis Using Multiattribute Utility Theory. In: S. Zionts (ed.), *Multiple Criteria Problem Solving*, Springer-Verlag, Berlin, 1978, pp. 335-344.

Refereed Journal Publications

- C. W. Kirkwood, M. P. Slaven, and A. Maltz, Improving Supply-Chain-Reconfiguration Decisions at IBM. *Interfaces*, **35**:460-473 (2005). The work reported in this article was the winner of the 2004 INFORMS Decision Analysis Society Practice Award.
- R. F. Bordley and C. W. Kirkwood, Multiattribute Preference Analysis with Performance Targets. *Operations Research*, **52**:823-835 (2004). Winner of the 2006 INFORMS Decision Analysis Society Publication Award for the best decision analysis journal article or book published in 2004.
- C. W. Kirkwood, Selecting Student Project Teams When it Really Matters: An Optimization-Based Approach Using Internet Resources. *INFORMS Transactions on Education*, **4**:3:<http://ite.pubs.informs.org/Vol4No3/Kirkwood/> (2004).
- C. W. Kirkwood, Prospects for a Decision Language (Comment on Howard 2004). *Decision Analysis*, **1**:84-85 (2004).
- C. W. Kirkwood, Approximating Risk Aversion in Decision Analysis Applications. *Decision Analysis*, **1**:51-67 (2004).
- D. L. Keefer, C. W. Kirkwood, and J. L. Corner, Response to Comments on Keefer et al. (2004). *Decision Analysis*, **1**:32-34 (2004).
- D. L. Keefer, C. W. Kirkwood, and J. L. Corner, Perspective on Decision Analysis Applications, 1990-2001. *Decision Analysis*, **1**:4-22 (2004).
- L. A. Schaefer and C. W. Kirkwood, Model Selection for Simulation Design: A Multiobjective Decision Analysis Approach, with an Application to Simulating Transport Agents. *Simulation*, **79**:83-93 (2003).
- L. R. Keller and C. W. Kirkwood, The Founding of INFORMS: A Decision Analysis Perspective. *Operations Research*, **47**:16-28 (1999).
- C. W. Kirkwood, Recursive Calculation of Probability Distributions for Sequential Decision Analysis Models. *IEEE Transactions on Systems, Man, and Cybernetics-Part C: Applications and Reviews*, **28**:104-111 (1998).
- J. S. Stonebraker and C. W. Kirkwood, Formulating and Solving Sequential Decision Analysis Models with Continuous Variables. *IEEE Transactions on Engineering Management*, **44**:43-53 (1997).
- J. L. Corner and C. W. Kirkwood, The Magnitude of Errors in Proximal Multiattribute Decision Analysis with Probabilistically Dependent Attributes. *Management Science*, **42**:1033-1042 (1996).
- G. G. Shephard and C. W. Kirkwood, Managing the Judgmental Probability Elicitation Process: A Case Study of Analyst/Manager Interaction. *IEEE Transactions on Engineering Management*, **41**:414-425 (1994).
- C. W. Kirkwood, Implementing an Algorithm to Solve Large Sequential Decision Analysis Models. *IEEE Transactions on Systems, Man, and Cybernetics*, **24**:1425-1432 (1994).
- C. W. Kirkwood, An Algebraic Approach to Formulating and Solving Large Models for Sequential Decisions Under Uncertainty. *Management Science*, **39**:900-913 (1993).
- C. W. Kirkwood and J. L. Corner, The Effectiveness of Partial Information about Attribute Weights for Ranking Alternatives in Multiattribute Decision Making. *Organizational Behavior and Human Decision Processes*, **54**:456-476 (1993).
- C. W. Kirkwood, An Overview of Methods for Applied Decision Analysis. *Interfaces*, **22**:6:28-39 (November-December 1992).
- C. W. Kirkwood, Estimating the Impact of Uncertainty on a Deterministic Multiattribute Evaluation, *Management Science*, **38**:819-826 (1992).

- J. L. Corner and C. W. Kirkwood, Decision Analysis Applications in the Operations Research Literature, 1970-1989. *Operations Research*, **39**:206-219 (1991).
- C. W. Kirkwood, Does Operations Research Address Strategy? *Operations Research*, **38**:747-751 (1990).
- D. G. Brooks and C. W. Kirkwood, Decision Analysis to Select a Microcomputer Networking Strategy: A Procedure and a Case Study. *Journal of the Operational Research Society*, **39**:23-32 (1988).
- C. W. Kirkwood and L. C. van der Feltz, Microcomputer Programs for Multi-Objective Decision Analysis. *Operations Research Letters*, **6**:105-106 (1987).
- C. W. Kirkwood, Risk Assessment to Support Management of a Hazardous Spill Cleanup. *IEEE Transactions on Systems, Man and Cybernetics*, **SMC-15**:601-607 (1985).
- C. W. Kirkwood and R. K. Sarin, Ranking With Partial Information: A Method and an Application. *Operations Research*, **33**:38-48 (1985).
- C. W. Kirkwood and S. M. Pollock, Multiple Attribute Scenarios, Bounded Probabilities, and Threats of Nuclear Theft. *Futures*, **14**:545-553 (1982).
- M. B. Bennedsen and C. W. Kirkwood, Selecting Sites for Coal-Fired Power Plants. *Journal of the Energy Division, Proceedings of the American Society of Civil Engineers*, **108**:69-78 (1982).
- C. W. Kirkwood, A Case History of Nuclear Power Plant Site Selection. *Journal of the Operational Research Society*, **33**:353-363 (1982).
- K. Golabi, C. W. Kirkwood, and A. Sicherman, Selecting a Portfolio of Solar Energy Projects Using Multiattribute Preference Theory. *Management Science*, **27**:174-189 (1981).
- C. W. Kirkwood and R. K. Sarin, Preference Conditions for Multiattribute Value Functions. *Operations Research*, **28**:225-232 (1980).
- C. W. Kirkwood, Pareto Optimality and Equity in Social Decision Analysis. *IEEE Transactions on Systems, Man, and Cybernetics*, **SMC-9**:89-91 (1979).
- C. K. Ford, R. L. Keeney, and C. W. Kirkwood, Evaluating Methodologies: A Procedure and Application to Nuclear Power Plant Siting Methodologies. *Management Science*, **25**:1-10 (1979).
- D. M. Crawford, B. C. Huntzinger, and C. W. Kirkwood, Multiobjective Decision Analysis for Transmission Conductor Selection. *Management Science*, **24**:1700-1709 (1978).
- D. L. Keefer and C. W. Kirkwood, A Multiobjective Decision Analysis: Budget Planning for Product Engineering. *Journal of the Operational Research Society* **29**:435-442 (1978). Also in S. French, *Readings in Decision Analysis*, Chapman and Hall, London, 1989, pp. 83-93.
- C. W. Kirkwood, Superiority Conditions in Decision Problems with Multiple Objectives. *IEEE Transactions on Systems, Man, and Cybernetics*, **SMC-7**:542-544 (1977).
- K. Chen, C. W. Kirkwood, J. Lathrop, and S. M. Pollock, Energy R&D Modeling for Budgetary Decisions. *IEEE Transactions on Systems, Man, and Cybernetics*, **SMC-7**:222-227 (1977).
- C. W. Kirkwood, Parametrically Dependent Preferences for Multiattributed Consequences. *Operations Research*, **24**:92-103 (1976).
- R. L. Keeney and C. W. Kirkwood, Group Decision Making Using Social Welfare Functions. *Management Science*, **22**:430-437 (1975).

Other Articles and Conference Proceedings

- C. W. Kirkwood, From the President, *Decision Analysis Newsletter*, Vol. 24, No. 3; Vol. 25, Nos. 1, 2, 3; Vol. 26, Nos. 1, 2 (2006-08).
- C. W. Kirkwood and S. R. Clinton, A Capstone Project Course for Supply Chain Management in the MBA Program. *redefininglogistics.com: Proceedings of the Twenty-Ninth Annual Transportation and Logistics Educators Conference*, New Orleans, LA, pp. 38-57, September 24, 2000.
- D. G. Brooks and C. W. Kirkwood, Underadjusting for Overconfidence. *Business*, **3(2)**: 42-44 (Spring/Summer 1990).
- C. W. Kirkwood and D. G. Brooks, Computer-Based Decision Analysis Instruction. *OR/MS Today*, **17(2)**:24-27 (April, 1990).
- C. W. Kirkwood and L. W. Seidman, Avoiding Decision-Making Errors. *Pace*, **12(9)**:65-69 (September 1985).
- C. W. Kirkwood, Siting Coal-Fired Power Plants. *National Development*, **24(4)**:32-34 (May 1983).
- C. W. Kirkwood and S. C. Ko, Screening for Monitored Retrievable Storage Facility Locations. *Transactions of the American Nuclear Society*, **41**:126-127 (1982).
- C. W. Kirkwood, System Analysis for Siting Nuclear Power Plants: A Case History. In: M. D. Martin, A. J. Rowe, and H. A. Sherman (eds.), *Proceedings of Workshop on Management of Risk and Uncertainty in the Acquisition of Major Programs*, Colorado Springs, CO, 1981, pp. 138-147.
- C. W. Kirkwood, Preface to Decision Analysis Special Issue. *Operations Research*, **28**:1-2 (1980).
- C. W. Kirkwood, Book review of A. V. Cabot and D. L. Harnett, *An Introduction to Management Science*, Addison-Wesley, Reading, MA, 1977. *Interfaces*, **9(6)**:114-115 (November 1978).
- C. W. Kirkwood, Parametrically Dependent Preferences for Multiattributed Consequences. *Proceedings, 1973 International Conference on Cybernetics and Society*, Boston, MA, 1973, pp. 313-317.

Selected Instructional and Research Software

- C. W. Kirkwood, Computer Programs for Multiattribute Evaluation: Version 2.5 User Manual, May 1994.
- C. W. Kirkwood, ADAM2: An Algebraic Decision Analysis Modeling System for Research. Technical Report DIS 91/92-9, Department of Decision and Information Systems, Arizona State University, Tempe, October 1991.
- D. C. Cheung and C. W. Kirkwood, EXPRESSION TREE: A Decision Tree Analyzer with Variables and Expressions. Technical Report DIS 88/89-9, Department of Decision and Information Systems, Arizona State University, Tempe, June 1989.
- C. W. Kirkwood and H. Ureta, Calculator and Computer Programs for Elementary Multiobjective Decision Analysis. Technical Report No. 77-11, Department of Industrial and Operations Engineering, The University of Michigan, Ann Arbor, December 1977.

Selected Technical Reports

- C. W. Kirkwood, R. D. St. Louis, and G. B. Schymik, Simulation Study of Factors Impacting Uncertainty about Project Staffing Demand Forecasts: Final Report, IBM-ASU Joint Study Agreement, IBM Agreement No. 4905B10392, ASU Agreement No. 05083410, Tempe, AZ, July 17, 2007.
- G. B. Schymik, R. D. St. Louis, and C. W. Kirkwood, Simulation Study of Factors Impacting Uncertainty about Project Staffing Demand Forecasts: Two Illustrative Simulation Model Applications—Testing the Usefulness of Time Series Forecasting and Exploring Potential Approaches to Reducing Staffing Variability,

Technical Report No. 2007-4, IBM-ASU Joint Study Agreement, IBM Agreement No. 4905B10392, ASU Agreement No. 05083410, Tempe, AZ, July 17, 2007.

G. B. Schymik, R. D. St. Louis, and C. W. Kirkwood, Simulation Study of Factors Impacting Uncertainty about Project Staffing Demand Forecasts: Metrics for Summarizing the Uncertainty in Skills Demand Forecasts, Technical Report No. 2007-3, IBM-ASU Joint Study Agreement, IBM Agreement No. 4905B10392, ASU Agreement No. 05083410, Tempe, AZ, June 4, 2007 (Minor corrections: July 1, 2007).

G. B. Schymik, R. D. St. Louis, and C. W. Kirkwood, Simulation Study of Factors Impacting Uncertainty about Project Staffing Demand Forecasts: Model Users Guide, Technical Report No. 2007-2, IBM-ASU Joint Study Agreement, IBM Agreement No. 4905B10392, ASU Agreement No. 05083410, Tempe, AZ, March 7, 2007 (Minor corrections: June 4, 2007).

G. B. Schymik, R. D. St. Louis, and C. W. Kirkwood, Simulation Study of Factors Impacting Uncertainty about Project Staffing Demand Forecasts: Model Validation Study Results, Technical Report No. 2007-1, IBM-ASU Joint Study Agreement, IBM Agreement No. 4905B10392, ASU Agreement No. 05083410, Tempe, AZ, January 31, 2007 (Minor corrections: May 29, 2007).

C. W. Kirkwood, R. D. St. Louis, and G. B. Schymik, Rapid Forecasting and Response Options for Managing Human Resources Supply Chain Uncertainties: 2005-2006 Final Technical Report, IBM-ASU Joint Study Agreement, IBM Agreement No. 4905B10392, ASU Agreement No. 05083410, Tempe, AZ, August 11, 2006, revised August 30, 2006.

C. W. Kirkwood and A. Maltz, Decision Process Handbook for Global Supply Chain Design and Reconfiguration, Working Paper No. 5, Joint IBM-ASU Research Project on Using Adaptive Decision Analysis Methods to Design Global Supply Chains, July 2003.

D. L. Keefer, C. W. Kirkwood, and J. L. Corner, Summary of Decision Analysis Applications in the Operations Research Literature, 1990-2001, Department of Supply Chain Management, Arizona State University, November 2002.

C. W. Kirkwood, Optimizing Distribution Networks, Department of Supply Chain Management, Arizona State University, 2002.

C. W. Kirkwood, Excel Solver Tutorial, Department of Supply Chain Management, Arizona State University, 2002.

C. W. Kirkwood, Decision Tree Primer, Department of Supply Chain Management, Arizona State University, Tempe, 2002.

C. W. Kirkwood, Project Planning Sourcebook with Spreadsheets and Microsoft Project, College of Business, Arizona State University, Tempe, 2000.

C. W. Kirkwood, New Product Dynamics: Illustrative System Dynamics Models, College of Business, Arizona State University, Tempe, 1998.

C. W. Kirkwood, Integrated Business Process Analysis: A System Dynamics Sourcebook, College of Business, Arizona State University, Tempe, 1998.

A. E. Andrews and C. W. Kirkwood, Non-Lethal Defense Research and Development Planning, Report LAUR-92-4324, Los Alamos National Laboratory, Los Alamos, NM, January 1993.

C. W. Kirkwood, Notes on Attitude Toward Risk Taking and the Exponential Utility Function. Technical Report DIS 91/92-8, Department of Decision and Information Systems, Arizona State University, Tempe, September 1991.

G. Benford, C. W. Kirkwood, H. Otway, and M. J. Pasqualetti, Ten Thousand Years of Solitude? On Inadvertent Intrusion into the Waste Isolation Pilot Project Repository. Report LA-12048-MS, Los Alamos National Laboratory, Los Alamos, NM, March 1991.

- C. W. Kirkwood and J. L. Corner, Documentation of Computer Programs Used in “The Effectiveness of Partial Information about Attribute Weights for Ranking Alternatives in Multiattribute Decision Making.” Technical Report DIS 90/91-2, Department of Decision and Information Systems, Arizona State University, Tempe, September 1990.
- C. W. Kirkwood, Improving Expertise in Problem Structuring for Quantitative Analysis. Technical Report DIS-87/88-2, Department of Decision and Information Systems, Arizona State University, Tempe, October 1987.
- C. W. Kirkwood, Toward Wider Use of Decision Analysis. Technical Report DIS-86/87-6, Department of Decision and Information Systems, Arizona State University, Tempe, January 1987.
- C. W. Kirkwood and S. C. Ko, Geographic Screening for Monitored Retrievable Storage Facilities. Decision Analysis Technical Report No. 82-1, Woodward-Clyde Consultants, San Francisco, March 1982.
- R. L. Keeney, J. R. Beley, P. Fleischauer, C. W. Kirkwood, and A. Sicherman, Decision Framework for Technology Choice, Volume 1: A Case Study of One Utility’s Coal-Nuclear Choice. EA-2153, Volume 1, Research Project 1433-1, Electric Power Research Institute, Palo Alto, CA, December 1981.
- G. R. Smith and C. W. Kirkwood, Forecasting Peak Electrical Demand for Alaska’s Railbelt. Woodward-Clyde Consultants, San Francisco, December 1980.
- C. W. Kirkwood and R. L. Keeney, Analysis to Aid Nuclear Regulation. Woodward-Clyde Consultants, San Francisco, January 1980.
- R. L. Keeney, C. W. Kirkwood, C. K. Ford, J. A. Robinson, and P. Gottlieb, An Evaluation and Comparison of Nuclear Powerplant Siting Methodologies. NUREG/CR-0407, SAND78-1248, RA, Sandia Laboratories, Albuquerque, NM, March 1979.
- C. W. Kirkwood and S. M. Pollock, Methodology for Characterizing Potential Adversaries of Nuclear Material Safeguards Systems. Woodward-Clyde Consultants, San Francisco, November 1978.
- K. Golabi, C. W. Kirkwood, and A. Sicherman, Evaluating and Selecting Photovoltaic Concentrator Applications Experiments. Woodward-Clyde Consultants, San Francisco, April 1978.
- C. W. Kirkwood, A. Sicherman, and M. S. Kahn, Evaluating Safeguard Capability Assessment Results for Licensed Nuclear Facilities. Woodward-Clyde Consultants, San Francisco, October 1977.
- K. Chen, C. W. Kirkwood, J. W. Lathrop, and S. M. Pollock, Coal Energy R&D Planning Under Uncertainty. Research Report ERD-RR-1, Project ERAND, The University of Michigan, Ann Arbor, July 1976.
- C. W. Kirkwood, Planning on Uncertainty in Foundation Portfolios. Technical Report No. 75-3, Department of Industrial and Operations Engineering, The University of Michigan, Ann Arbor, May 1975.
- C. W. Kirkwood, Decision Analysis Incorporating Preferences of Groups. Technical Report No. 74, Operations Research Center, Massachusetts Institute of Technology, Cambridge, June 1972.
- C. W. Kirkwood, Models for Nonlinear Piezoelectric Effects in Solids. Technical Memorandum MM68-2211-6, Bell Telephone Laboratories, Inc., Murray Hill, NJ, August 26, 1968.

PROFESSIONAL AFFILIATIONS, ACTIVITIES, AND HONORS

The Institute for Operations Research and the Management Sciences

- Fellow, 2007, for outstanding and exceptional accomplishments and experience in operations research and the management sciences.
- Frank P. Ramsey Medal of the INFORMS Decision Analysis Society, 2007, recognizes distinguished contributions to the field of decision analysis, and is the highest award of the Decision Analysis Society.

- President, INFORMS Decision Analysis Society, 2006-present
- Winner (with R. F. Bordley) of the 2006 INFORMS Decision Analysis Society Publication Award for the best decision analysis journal article or book published in 2004.
- Publications Committee, 2006.
- Chair, *Decision Analysis* Editor Search Committee, 2006.
- Vice President/President-elect, INFORMS Decision Analysis Society, 2004-2006
- INFORMS Subdivisions Council, 2004-2006
- Winner (with A. Maltz and M. P. Slaven), INFORMS Decision Analysis Society Practice Award, 2004
- Chair, INFORMS Decision Analysis Society Publication Award Committee, 2004
- Council, INFORMS Decision Analysis Society, 2003-2004
- Editorial Board, *Decision Analysis*, 2002-2006
- Judge for the INFORMS competition resulting in the Franz Edelman Award for Management Science Achievement for outstanding management science and operations research practice, 2003.
- George E. Kimball Medal, 2002: Received in recognition of distinguished service to INFORMS and to the profession of operations research and the management sciences
- Candidate for President, 2001
- Strategic Planning Committee, 2001
- Treasurer and member of the Executive Committee, 1999-2000
- Finance Committee, 1997-2000; Chair, 1999-2000
- Investment Committee, 1995-2000; Chair, 1999-2000
- INFORMS Decision Analysis Society Outstanding Student Paper Committee, 1998, 2005
- INFORMS Decision Analysis Society Publication Award Committee, 1997
- Candidate for Director at Large, 1997
- Ad Hoc Committee on the Liaison Function in INFORMS, 1996

The Institute of Management Sciences and the Operations Research Society of America

- Combined Finance Committee, 1989-1994, Co-Chair, 1990-1993
- *OR/MS Today* Editorial Policy Board, 1990-1992
- Combined Publications Committee, 1987-1990; Chair, 1988-1990
- Vice Chairperson, Joint Northern California Chapter, 1983
- Program Committee, Detroit Joint National Meeting, 1980-82

Operations Research Society of America

- Investment Committee, 1993-94
- Candidate for President, 1993
- Treasurer, 1990-1993
- Publications Committee, 1986-1990; Chair, 1987-1990
- Judge, Decision Analysis Special Interest Group Student Paper Competition, 1989.
- *OR Review* Review Committee, 1987-88
- Secretary/Treasurer, Decision Analysis Special Interest Group, 1980-82

- Editor, special issue on decision analysis, *Operations Research*, January-February, 1980
- Education Committee, 1977-78

The Institute of Management Sciences

- Associate Editor, *Management Science*, 1981-88

National Science Foundation

- Design Theory Review Panel, 1999.
- Small Business Innovation Research (SBIR) Phase I Panel, 1997
- Advisory Panel for the Decision, Risk, and Management Science Program, 1991-1993

Opnix, Inc., Technical Advisory Board, 2001-2003

U. S. Department of Energy expert panel on inadvertent intrusion into the Waste Isolation Pilot Plant, 1990.

Enterprise Network, Inc., Board of Directors, 1985-88; Treasurer, 1987-88

Session chair for professional meetings and reviewer for the National Science Foundation and numerous professional journals.

Honor Societies and Awards: Alpha Iota Delta (decision sciences), Alpha Pi Mu (industrial engineering), Beta Gamma Sigma (business), Eta Kappa Nu (electrical engineering), Tau Beta Pi (engineering), Sigma Xi (scientific research), National Defense Education Act Fellowship, Alfred P. Sloan National Scholarship.

7/29/08