

Joe Zhu

Professor of Operations Analytics

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ACADEMIC APPOINTMENTS

2010 – present, *Professor*, Foisie School of Business, Worcester Polytechnic Institute

2003 – 2010, *Associate Professor*, Department of Management, Worcester Polytechnic Institute

1998 – 2003, *Assistant Professor*, Department of Management, Worcester Polytechnic Institute

VISITING POSITIONS

2017-2018, *Feng Tay Chair Professor*, National Yunlin University of Science and Technology, Taiwan.

2015-2017, *Chang Jiang Scholar Chair Professor*, Ministry of Education of China, hosted by Hefei University of Technology, Hefei, China.

2014-present, *Distinguished Professor*, Nanjing Audit University, Nanjing, China.

June-July, 2010, *William Evans Visiting Fellow*, Department of Finance & Quantitative Analysis, University of Otago, Dunedin, New Zealand.

May-June, 2007, *Visiting Research Fellow*, Graduate School of Information Science and Technology, Osaka University, Japan.

2007, *Visiting Associate Professor*, Department of Industrial and Information Management, the National Cheng Kung University, Taiwan.

May-July, 2002, *Japan Society for Promotion of Science (JSPS) Fellow*, Graduate School of Information Science and Technology, Osaka University, Japan.

EDUCATION

Ph.D., Industrial Engineering & Operations Research
University of Massachusetts at Amherst, 1998

M.S., Systems Engineering
Southeast University, China, 1992

PUBLICATIONS IN REFERRED JOURNALS

146. Khezrimotlagh, D., Cook, W.D., and Zhu, Joe, Number of performance measures versus number of decision making units in DEA, *Annals of Operations Research*, in press
145. Zhang, Q., Koutmos, D., Chen, K., and Zhu, Joe, Using operational and stock analytics to measure airline performance: network DEA approach, *Decision Sciences*, in press
144. Li, W., Cook, W.D., Li, Z, and Zhu, Joe, Efficiency measurement for hierarchical situations, *Journal of the Operational Research Society*, in press
143. Avilés-Sacoto, S., Cook, W.D., Güemes-Castorena, D., and Zhu, Joe, Measuring efficiency in DEA in the presence of common inputs, *Journal of the Operational Research Society*,
142. Cook, W.D., Li, W-H, Li, Z, Liang, L., and Zhu, Joe, Efficiency measurement with products and partially desirably co-products, *Journal of the Operational Research Society*,
141. Kaffash, S., Azizi, R., Huang, Y. and Zhu, Joe, A survey of data envelopment analysis applications in the insurance industry 1993-2018, *European Journal of Operational Research*,
140. Chen, K., and Zhu, Joe, Additive slacks-based measure: computational strategy and extension to network DEA, *OMEGA*, Vol. 91, March (2020), 102022.
139. Chen, K., Cook, W.D., and Zhu, Joe, A conic relaxation model for searching global optimum of network data envelopment analysis, *European Journal of Operational Research*, Vol. 280, Issue 1 (2020), 242-253.
138. Charles, V., Aparicio, J., and Zhu, Joe, The curse of dimensionality of decision-making units: A simple approach to increase the discriminatory power of data envelopment analysis, *European Journal of Operational Research*, Vol. 279, Issue 3 (2019), 929-940.
137. Chen, Y., Wang, J., Zhu, Joe, Sherman, H.D. and Chou, S-Y, How the great

- recession affects performance: A case of Pennsylvania hospitals using DEA, *Annals of Operations Research*, Vol. 278, Issue 1-2 (2019), 77-99.
136. Gong, Y., Liu, J., and Zhu, Joe, When to increase firms' sustainable operations for efficiency? A data envelopment analysis in the retailing industry, *European Journal of Operational Research*, Vol. 277, Issue 3 (2019), 1010-1026.
 135. Chen, K., and Zhu, Joe, Scale efficiency in two-stage network DEA, *Journal of the Operational Research Society*, Vol. 70, Issue 1 (2019), 101-110.
 134. Khezrimotlagh, D., Zhu, Joe, Cook, W.D., and Toloo, M., Data envelopment analysis and big data, *European Journal of Operational Research*, Vol. 274, Issue 3 (2019), 1047-1054.
 133. Chen, K., and Zhu, Joe, Computational tractability of chance constrained data envelopment analysis, *European Journal of Operational Research*, Vol. 274, Issue 3 (2019), 1037-1046.
 132. Cook, W.D., Ramón, N., Ruiz, J.L., Sirvent, I., and Zhu, Joe, Goal-adjusted benchmarking for performance evaluation in pay-for-performance incentive plans, *OMEGA*, Vol. 84 (2019), 45-54.
 131. Lim, S., and Zhu, Joe, Primal-dual correspondence and frontier projections in two-stage network DEA models, *OMEGA*, Vol. 83 (2019), 236-248.
 130. Avilés-Sacoto, S., Cook, W.D, Güemes-Castorena, Benita, D.F. Ceballos, H. and Zhu, Joe, Evaluating the efficiencies of academic research groups: A problem of shared outputs, *Asia-Pacific Journal of Operational Research*, Vol. 35, No. 6 (2018), 1850042 (22 pages).
 129. Liu, J., Gong, Y., Zhu, Joe, and Zhang, J., A DEA-based approach for competitive environment analysis in global operations strategies, *International Journal of Production Economics*, Vol. 203 (2018), 110-123.
 128. He, W., Yang, Y., Wang, Z., and Zhu, Joe, Estimation and allocation of cost savings from collaborative CO₂ abatement in China, *Energy Economics*, Vol. 72 (2018), 62-74.
 127. Gong, Y., Zhu, Joe, Chen, Y., and Cook, W.D., DEA as a tool for auditing: Application to Chinese manufacturing industry with parallel network structures, *Annals of Operations Research*, Vol. 263 (2018), Issue 1-2, 247-269.
 126. Galagedera, D.U.A., Roshdi, I., Fukuyama, H. and Zhu, Joe, A new network DEA model for mutual fund performance appraisal: An application to U.S. equity mutual funds, *OMEGA*, Vol. 77 (2018), 168-179.
 125. Mehdiloozad, M., Zhu, Joe, and Sahoo, B., Identification of congestion in data envelopment analysis under the occurrence of multiple projections: A reliable method capable of dealing with negative data, *European Journal of Operational Research*, Vol. 265, Issue 2 (2018), 644-654.
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121. Ding, J-J, Dong, W., Liang, L., and Zhu, Joe, Goal congruence analysis in multi-division organization with shared resources based on data envelopment analysis, *European Journal of Operational Research*, Vol. 263, Issue 3 (2017), 961-973.
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119. Cook, W.D., Du, J., and Zhu, Joe, Units invariant DEA when weight restrictions are present: Ecological performance of US electricity industry, *Annals of Operations Research*, Vol. 255, Issue 1-2 (2017), 323-346.
118. Chen, K, and Zhu, Joe, Second order cone programming approach to two-stage network data envelopment analysis, *European Journal of Operational Research*, Vol. 262, Issue 1 (2017), 231-238.
117. Li, W.H., Liang, L., Aviles-Sacoto, S., Imanirad, R., Cook, W.D., and Zhu, Joe, Modeling efficiency in the presence of multiple partial input to output processes, *Annals of Operations Research*, Vol. 250, Issue 1 (2017), 235-248.
116. Miller, F., Wang, J., Zhu, Joe, Chen, Y., and Hockenberry, J., Investigation of the impact of the Massachusetts health care reform on hospital costs and quality of care, *Annals of Operations Research*, Vol. 250, Issue 1 (2017), 129-146.
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114. Guo, C., Abbasi Shureshjani, R., Foroughi, A. and Zhu, Joe, Decomposition weights and overall efficiency in two-stage additive network DEA, *European Journal of Operational Research*, Vol. 257, Issue 3 (2017), 896-906.
113. Cook, W.D., Ruiz, J.L., Sirvent, I. and Zhu, Joe, Within-group common benchmarking using DEA, *European Journal of Operational Research*, Vol. 256, Issue 3 (2017), 901-910.
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111. Du, J., Huo, J-Z, and Zhu, Joe, Data envelopment analysis with output-bounded data, *Asia-Pacific Journal of Operational Research*, Vol. 33, Number 6 (2016), 1650050 [17 pages].

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103. Du, J., Wang, J., Chen, Y., Chou, S-Y, and Zhu, Joe, Incorporating health outcomes in Pennsylvania hospital efficiency: An additive super-efficiency DEA approach, *Annals of Operations Research*, Vol. 221, Issue 1 (2014), 161-172.
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101. Lim, S., Oh, K.W., and Zhu, Joe, Use of DEA cross-efficiency evaluation in portfolio selection: an application to Korean stock market, *European Journal of Operational Research*, Vol. 236 (2014), 361-368.
100. Du, J., Zhu, W.D., Liang, L., and Zhu, Joe, Fixed cost and resource allocation based on DEA cross-efficiency, *European Journal of Operational Research*, Vol. 235 (2014), 206-214.
99. Cook, W.D., and Zhu, Joe, DEA Cobb-Douglas frontier and cross efficiency, *Journal of the Operational Research Society*, Vol. 65, Issue 2 (2014), 265-268.
98. Cook, W.D., Tone, K., and Zhu, Joe, Data envelopment analysis: Prior to choosing a model, *OMEGA*, Vol. 44 (2014), 1-4.
97. Sahoo, Bires K., Zhu, Joe, Tone, K., and Klemen, B.M., Decomposing technical

- efficiency and scale elasticity in two-stage network DEA, *European Journal of Operational Research*, Vol. 233, Issue 3 (2014), 584-594.
96. Cook, W.D., Harrison, J., Imanirad, R., Rouse, P., and Zhu, Joe, Data envelopment analysis with nonhomogeneous DMUs, *Operations Research*, Vol. 61, No. 3 (2013), 666-676.
 95. Lim, S., and Zhu, Joe, Incorporating performance measures with target levels in data envelopment analysis, *European Journal of Operational Research*, Vol. 230, Issue 3 (2013), 634-642. [Corrigendum EJOR, Vol. 231, Issue 3 (2013), page 790]
 94. Sherman, H.D., and Zhu, Joe, Analyzing performance in service organizations, *Sloan Management Review*, Vol. 54, No. 4 (Summer 2013), 36-42. [translated and published: Analizar el desempeño en organizaciones de servicio, Harvard Deusto business review, No. 228 (2013), 6-15.]
 93. Imanirad, R., Cook, W.D., and Zhu, Joe, Partial input to output impacts in DEA: Production considerations and resource sharing among business subunits, *Naval Research Logistics*, Vol. 60, Issue 3 (2013), 190-207.
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 91. Chen, Y., Cook, W.D., Kao, C., and Zhu, Joe, Network DEA pitfalls: Divisional efficiency and frontier projection under general network structures, *European Journal of Operational Research*, Vol. 226 (2013), 507-515.
 90. Premachandra, I.M., Zhu, Joe, Watson, J., and Galagedera, D.U.A., Best-performing US mutual fund families from 1993 to 2008: Evidence from a novel two-stage DEA model for efficiency decomposition, *Journal of Banking and Finance*, Vol. 36, Issue 12 (2012), 3302-3317.
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 87. Cook, W.D., Harrison, J., Rouse, P., and Zhu, Joe, Relative efficiency measurement: The problem of a missing output in a subset of decision making units, *European Journal of Operational Research*, Vol. 220, Issue 1 (2012), 79-84.
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77. Cook, W.D., Zhu, Joe, Bi, G-B, and Yang, F., Network DEA: Additive efficiency decomposition, *European Journal of Operational Research*, Vol. 207, Issue 2 (2010), 1122-1129.
76. Chen, Y., Du, J., Sherman, H.D., and Zhu, Joe, DEA model with shared resources and efficiency decomposition, *European Journal of Operational Research*, Vol. 207 (2010), 339-349.
75. Cook, W.D., Liang, L., and Zhu, Joe, Measuring performance of two-stage network structures by DEA: A review and future perspective, *OMEGA*, Vol. 38 (2010), 423-430.
74. Cook, W.D., and Zhu, Joe, Context-dependent performance standards in DEA, *Annals of Operations Research*, Vol. 173, No. 1 (2010), 163-175.
73. Du, J., Liang, L., and Zhu, Joe, A slacks-based measure of super-efficiency in data envelopment analysis: A Comment, *European Journal of Operational Research*, Vol. 204 (2010), 694-697.
72. Chen, Y., Cook, W.D., and Zhu, Joe, Deriving the DEA frontier for two-stage processes, *European Journal of Operational Research*, Vol. 202 (2010), 138-142.
71. Cook, W.D., and Zhu, Joe, Piecewise linear output measures in DEA, *European Journal of Operational Research*, Vol. 197 (2009), 312-319.
70. Cook, W.D., Yang, F., and Zhu, Joe, Nonlinear inputs and diminishing marginal value in DEA, *Journal of the Operational Research Society*, Vol. 60, No. 11 (2009), 1567-1574.
69. Chen, Y., Cook, W.D., Li, N., and Zhu, Joe, Additive efficiency decomposition in two-stage DEA, *European Journal of Operational Research*, Vol. 196 (2009),

- 1170-1176.
68. Cook, W.D., Liang, L., Zha, Y. and Zhu, Joe, A modified super-efficiency DEA model for infeasibility, *Journal of the Operational Research Society*, Vol. 69 (2009), 276-281.
 67. Chen, Y., Liang, L., and Zhu, Joe, Equivalence in two-stage DEA approaches, *European Journal of Operational Research*, Vol. 193 (2009), Issue 2, 600-604.
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 65. Liang, L., Cook, W.D., and Zhu, Joe, DEA Models for two-stage processes: Game approach and efficiency decomposition, *Naval Research Logistics*, Vol. 55 (2008), 643-653.
 64. Liang, L., Wu, J., Cook, W.D., and Zhu, Joe, Alternative secondary goals in DEA cross-efficiency evaluation, *International Journal of Production Economics*, Vol. 113 (2008), 1025-1030.
 63. Cook, W.D., and Zhu, Joe, CAR-DEA: Context-dependent assurance regions in DEA, *Operations Research*, Vol. 56, No. 1 (2008), 69-78.
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 56. Liang, L., Yang, F. Cook, W.D., and Zhu, Joe, DEA models for supply chain efficiency evaluation, *Annals of Operations Research*, Vol. 145, No. 1 (2006), 35-49.
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 48. Seiford, L.M., and Zhu, Joe, Notes on sensitivity and stability of the classifications of returns to scale in data envelopment analysis: A comment, *Journal of Productivity Analysis*, Vol. 23, No. 3 (2005), 315-316.
 47. Morita, H., Hirokawa, K., and Zhu, Joe, A slack-based measure of efficiency in context-dependent data envelopment analysis, *OMEGA*, Vol. 33, Issue 4 (2005), 357-362.
 46. Cook, W.D., and Zhu, Joe, Allocation of shared costs among decision making units: A DEA approach, *Computers & Operations Research*, Vol 32, Issue 8 (2005), 2171-2178.
 45. Cook, W.D., and Zhu, Joe, Building performance standards into data envelopment analysis structures, *IIE Transactions*, Vol 37, Issue 3 (2005), 267-275.
 44. Gregoriou, G.N., Sedzro, K., and Zhu, Joe, Hedge fund performance appraisal using data envelopment analysis, *European Journal of Operational Research*, Vol. 164, Issue 2 (2005), 555-571.
 43. Seiford, L.M., and Zhu, Joe, A response to comments on modeling undesirable factors in efficiency evaluation, *European Journal of Operational Research*, Vol. 161, Issue 2 (2005), 579-581.
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26. Seiford, L.M., and Zhu, Joe, Modeling undesirable factors in efficiency evaluation, *European Journal of Operational Research*, Vol. 142, Issue 1 (2002), 16-20.
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 1. Zhu, Joe, and Shen, Z.H., A discussion of testing DMUs' returns to scale. *European Journal of Operational Research*, Vol. 81, Issue 3 (1995), 590-596.

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5. Zhu, Joe, Quantitative Models for Performance Evaluation and Benchmarking: Data Envelopment Analysis with Spreadsheets. 2nd edition. Springer Science, Boston. 2009.
4. Sherman, D.H., and Zhu, Joe, Service Productivity Management: Improving Service Performance using Data Envelopment Analysis (DEA), Springer Science, Boston. 2006.

3. Gregoriou, G.N., and Zhu, Joe, *Evaluating Hedge Fund and CTA Performance: Data Envelopment Analysis Approach*, John Wiley & Sons, New York. 2005.
2. Cook, W.D., and Zhu, Joe, *Modeling Performance Measurement: Applications and Implementation Issues in DEA*, Springer Science, 2005.
1. Zhu, Joe, *Quantitative Models for Performance Evaluation and Benchmarking: Data Envelopment Analysis with Spreadsheets*. Kluwer Academic Publishers, Boston. 2003.

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9. Aparicio, J. Lovell, C.A.K., Pastor, J.T. and Zhu, Joe, *Advances in Efficiency and Productivity II*, Springer Nature, New York, 2020.
8. Charles, V., Aparicio, J. and Zhu, Joe, *Data Science and Productivity Analytics*, Springer Nature, New York, 2020.
7. Hwang, S-N, Lee, H-S, and Zhu, Joe, *Handbook of Decision Making Using Data Envelopment Analysis*, Springer, New York. 2016.
6. Zhu, Joe, *Data Envelopment Analysis - A Handbook of Empirical Studies and Applications*, Springer, New York, 2016.
5. Zhu, Joe, *Data Envelopment Analysis - A Handbook of Models and Methods*, Springer, New York. 2015.
4. Cook, W.D., and Zhu, Joe, *Data Envelopment Analysis - A Handbook of Modeling Internal Structures and Networks*, Springer, New York. 2014.
3. Cooper, W.W., Seiford, L.M., and Zhu, Joe, *Handbook on Data Envelopment Analysis*, Springer, New York. 2011 (2nd edition)
2. Zhu, Joe, and Cook, W.D., *Modeling Data Irregularities and Structural Complexities in Data Envelopment Analysis*, Springer Science, 2007
1. Cooper, W.W., Seiford, L.M., and Zhu, Joe, *Handbook on Data Envelopment Analysis*. Kluwer Academic Publishers, Boston. 2004.

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3. Zhu, Joe, *Data Envelopment Analysis: Let the Data Speak for Themselves*, amazon.com, 2014. This book is translated into the following language:

Translated by Dr. Yande Gong and Dr. Xiang Li and published in Chinese: 数据包络分析: 让数据自己说话.

2. Cook, W.D., and Zhu, Joe, *Data Envelopment Analysis: Balanced Benchmarking*, amazon.com, 2013. This book is translated into the following languages:

Translated by Dr. Hiroshi Morita and published in Japanese: データ包絡分析法 DEA, 静岡学術出版 (2014/2/28), ISBN-10: 4864740305; Shizuoka Scholarly Publishing.

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1. Cook, W.D., and Zhu, Joe, *Data Envelopment Analysis: Modeling Operational Processes and Measuring Productivity*, amazon.com, 2008.

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11. Charles, V., Aparicio, J. and Zhu, Joe, Data Science for Better Productivity, *Journal of the Operational Research Society*,
10. Lim, S. and Zhu, Joe, DEA and Its Applications in Operations, Part II, *INFOR*, Vol. 56, Issue 3, 2018.
9. Lim, S. and Zhu, Joe, DEA and Its Applications in Operations, Part I, *INFOR*, Vol. 55, Issue 3, 2017.
8. Gonzalez, E., Zhu, Joe, J., Zanoni, S., and Maculan, N., Trends in Operational Research Approaches for Sustainability, *European Journal of Operational Research*, Vol. 269, Issue 1, 2018
7. Chen, C., Zhou, S., and Zhu, Joe, New Research Frontiers in Sustainability, *OMEGA, The International Journal of Management Science*, Vol. 66, Part B, 2017.
6. Cook, W.D., Seiford, L.M., and Zhu, Joe, Data Envelopment Analysis: The Research Frontier - This Special Issue is dedicated to the memory of William W. Cooper 1914-2012, *OMEGA, The International Journal of Management Science*, Vol. 41, Issue 1, 2013.
5. Charles, V., Färe, R., and Zhu, Joe, Special Issue on Business Performance Management, *Journal of CENTRUM Cathedra: The Business and Economics Research Journal*, Vol. 5 (2012), Issue 2. Business school of the Pontificia Universidad Católica del Perú.
4. Charles, V., Cook, W.D., and Zhu, Joe, Special Issue on Data Envelopment Analysis and Its Applications to Management, *Journal of CENTRUM Cathedra: The Business and Economics Research Journal*, Vol. 4 (2011), Issue 2. Business school of the Pontificia Universidad Católica del Perú.
3. Zhu, Joe, Management Science Research in China: A Special Issue Dedicated to the 2008 Beijing Olympic Games, *OMEGA, The International Journal of Management Science*, Vol. 36, Issue 6, 2008.
2. Cook, W.D., and Zhu, Joe, Performance Evaluation and Beyond: Data Envelopment Analysis Research Frontiers, *Annals of Operations Research Special*

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1. Huang, Z.M., Li, S.X., and Zhu, Joe, Data Envelopment Analysis: Theories and Applications, *International Journal of Information Technology and Decision Making* Special Issue, Vol. 4, No. 3, 2005.

EDITORIAL REVIEWED ARTICLES

1. Sherman, D.H., and Zhu, Joe, Case study: Improving branch profitability and service with data envelopment analysis, *Banking, Accounting and Finance*, Vol. 22, No. 3 (2009), 15-24.

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29. Cook, W.D., and Zhu, Joe, DEA cross efficiency, in *Data Envelopment Analysis: A Handbook of Models and Methods*, Chapter 13, 23-43, ed. J. Zhu, Springer, New York, 2015.
28. Lim, S. and Zhu, Joe, DEA cross efficiency under variable returns to scale, in *Data Envelopment Analysis: A Handbook of Models and Methods*, Chapter 3, 45-66, ed. J. Zhu, Springer, New York, 2015.
27. Zhu, Joe, DEA based benchmarking models, in *Data Envelopment Analysis: A Handbook of Models and Methods*, Chapter 10, 291-308, ed. J. Zhu, Springer, New York, 2015.
26. Cook, W.D., Harrison, J., Imanirad, R., Rouse, P., and Zhu, Joe, Data envelopment analysis with non-homogeneous DMUs, in *Data Envelopment Analysis: A Handbook of Models and Methods*, Chapter 11, 309-340, ed. J. Zhu, Springer, New York, 2015.
25. Imanirad, R., Cook, W.D., and Zhu, Joe, Partial inputs to outputs impacts in DEA: production considerations and resource sharing among business sub-units, in *Data Envelopment Analysis: A Handbook of Models and Methods*, Chapter 13, 355-380, ed. J. Zhu, Springer, New York, 2015.
24. Chen, Y., Du, J., Sherman, D.H., and Zhu, Joe, Shared resources and efficiency decomposition in two-stage networks, in *Data Envelopment Analysis: A Handbook of Modeling Internal Structures and Networks*, Chapter 9, 189-208, eds W.D. Cook, and J. Zhu, Springer, New York, 2014.
23. Du, J., Chen, Y., Cook, W.D., Liang, L., and Zhu, Joe, Evaluating two-stage network structures: Bargaining game approach, in *Data Envelopment Analysis: A Handbook of Modeling Internal Structures and Networks*, Chapter 8, 165-187, eds W.D. Cook, and J. Zhu, Springer, New York, 2014.

22. Sahoo, B.K., Zhu, Joe, and Tone, K., Decomposing efficiency and returns to scale in two-stage network systems, in *Data Envelopment Analysis: A Handbook of Modeling Internal Structures and Networks*, Chapter 7, 137-164, eds W.D. Cook, and J. Zhu, Springer, New York, 2014.
21. Chen, Y., Cook, W.D., and Zhu, Joe, Additive efficiency decomposition in network DEA, in *Data Envelopment Analysis: A Handbook of Modeling Internal Structures and Networks*, Chapter 5, 91-118, eds W.D. Cook, and J. Zhu, Springer, New York, 2014.
20. Chen, Y., Cook, W.D. and Zhu, Joe, Two-stage network processes: DEA frontier identification, in *Data Envelopment Analysis: A Handbook of Modeling Internal Structures and Networks*, Chapter 4, 79-89, eds W.D. Cook, and J. Zhu, Springer, New York, 2014.
19. Chen, Y., Cook, W.D., Kao, C., and Zhu, Joe, Network DEA pitfalls: Divisional efficiency and frontier projection, in *Data Envelopment Analysis: A Handbook of Modeling Internal Structures and Networks*, Chapter 2, 31-54, eds W.D. Cook, and J. Zhu, Springer, New York, 2014.
18. Cook, W.D., and Zhu, Joe, DEA for two-stage networks: Efficiency decompositions and modeling techniques, in *Data Envelopment Analysis: A Handbook of Modeling Internal Structures and Networks*, Chapter 1, 1-29, eds W.D. Cook, and J. Zhu, Springer, New York, 2014.
17. Cook, W.D., Liang, L., and Zhu, Joe, Modeling DMU's internal structures: cooperative and noncooperative approaches, in *Handbook on Data Envelopment Analysis*, 2nd edition, Chapter 12, 297-313, eds W.W. Cooper, L.M. Seiford, and J. Zhu, Springer, New York. 2011.
16. Cooper, W.W., Deng, H. Seiford, L.M., and Zhu, Joe, Congestion: Its identification and management with DEA, in *Handbook on Data Envelopment Analysis*, 2nd edition, Chapter 7, 173-193, eds W.W. Cooper, L.M. Seiford, and J. Zhu, Springer, New York. 2011.
15. Cooper, W.W., Li, S., Seiford, L.M., and Zhu, Joe, Sensitivity analysis in data envelopment analysis, in *Handbook on Data Envelopment Analysis*, 2nd edition, Chapter 3, 71-91, eds W.W. Cooper, L.M. Seiford, and J. Zhu, Springer, New York. 2011.
14. Banker, R.D., Cooper, W.W., Seiford, L.M., and Zhu, Joe, Returns to scale in data envelopment analysis, in *Handbook on Data Envelopment Analysis*, 2nd edition, Chapter 2, 41-70, eds W.W. Cooper, L.M. Seiford, and J. Zhu, Springer, New York. 2011.
13. Cooper, W.W., Seiford, L.M., and Zhu, Joe, Data envelopment analysis: History, models and interpretations, in *Handbook on Data Envelopment Analysis*, 2nd edition, Chapter 1, 1-39, eds W.W. Cooper, L.M. Seiford, and J. Zhu, Springer, New York. 2011.
12. Morita, H., and Zhu, Joe, Context-dependent DEA and its use, in *Modeling Data Irregularities and Structural Complexities in Data Envelopment Analysis*,

- Chapter 13, 241-260, eds J. Zhu, and W.D. Cook, Springer, Boston, 2007.
11. Cook, W.D., Liang, L., Yang, F., and Zhu, Joe, DEA models for supply chain or multi-stage structure, in *Modeling Data Irregularities and Structural Complexities in Data Envelopment Analysis*, Chapter 11, 189-208, eds J. Zhu, and W.D. Cook, Springer, Boston, 2007.
 10. Chen, Y., and Zhu, Joe, Interval and ordinal data, in *Modeling Data Irregularities and Structural Complexities in Data Envelopment Analysis*, Chapter 3, 35-62, eds J. Zhu, and W.D. Cook, Springer, Boston, 2007.
 9. Cook, W.D., and Zhu, Joe, Rank order data in DEA, in *Modeling Data Irregularities and Structural Complexities in Data Envelopment Analysis*, Chapter 2, 13-34, eds J. Zhu, and W.D. Cook, Springer, Boston, 2007.
 8. Cook, W.D., and Zhu, Joe, Data irregularities and structural complexities in DEA, in *Modeling Data Irregularities and Structural Complexities in Data Envelopment Analysis*, Chapter 1, 1-12, eds J. Zhu, and W.D. Cook, Springer, Boston, 2007.
 7. Morita, H., and Zhu, Joe, Context-dependent DEA--public libraries, in *Productivity Analysis in the Service Sector with Data Envelopment Analysis*, Chapter 19, ed N. Avkiran, Australia, 2006.
 6. Cooper, W.W., Deng, H. Seiford, L.M., and Zhu, Joe, Congestion: Its identification and management with DEA, in *Handbook on Data Envelopment Analysis*, Chapter 7, 177-201, eds W.W. Cooper, L.M. Seiford, and J. Zhu, Kluwer Academic Publishers, Boston. 2004.
 5. Cooper, W.W., Li, S., Seiford, L.M., and Zhu, Joe, Sensitivity analysis in data envelopment analysis, in *Handbook on Data Envelopment Analysis*, Chapter 3, 75-97, eds W.W. Cooper, L.M. Seiford, and J. Zhu, Kluwer Academic Publishers, Boston. 2004.
 4. Banker, R.D., Cooper, W.W., Seiford, L.M., and Zhu, Joe, Returns to scale in data envelopment analysis, in *Handbook on Data Envelopment Analysis*, Chapter 2, 41-73, eds W.W. Cooper, L.M. Seiford, and J. Zhu, Kluwer Academic Publishers, Boston. 2004.
 3. Cooper, W.W., Seiford, L.M., and Zhu, Joe, Data envelopment analysis: History, models and interpretations, in *Handbook on Data Envelopment Analysis*, Chapter 1, 1-39, eds W.W. Cooper, L.M. Seiford, and J. Zhu, Kluwer Academic Publishers, Boston. 2004.
 2. Wilkens, K., and Zhu, Joe, Classifying hedge funds using data envelopment analysis, in *Hedge Funds: Strategies, Risk Assessment, and Returns*, Chapter 10, 161-175, eds G.N. Gregoriou, V.N. Karavas, and F. Rouah, BeardBooks, Washington, D.C. 2003.
 1. Seiford, L.M., and Zhu, Joe, Classification invariance in data envelopment analysis, in *Uncertainty and Optimality: Probability, Statistics & Operations Research*, Chapter 10, 331-342, ed. J.C. Misra, World Scientific, Singapore, 2002.

INVITED TALKS

45. Big Data Applications in Intelligent Transportation Systems, The 5th NYUAD Transportation Symposium, November 25, 2019, Abu Dhabi, UAE.
44. Data-oriented Analytics: Network DEA, 2019 International Conference on Intelligent Transportation and Logistics with Big Data, July 26-29, 2019, Windsor, Canada (**Keynote**)
43. Decomposition Weights and Overall Efficiency in Two-stage Additive Network DEA, 2016 Asian Pacific Productivity Conference, July 8, 2016, Tianjin, China. (**Keynote**)
42. Data Envelopment Analysis: New Perspectives, Beijing Institute of Technology, August 7, 2015, Beijing, China.
41. Data Envelopment Analysis: Future Directions, International Workshop on Data Envelopment Analysis, Chinese Academy of Sciences, August 4, 2015, Beijing, China. (**Keynote**)
40. Some New Developments in Data Envelopment Analysis, School of Management, Huazhong University of Science and Technology, July 31, 2015, Wuhan, China
39. Some Basic Issues in DEA, Advance Lecture Series, 2015 Taiwan Productivity and Efficiency Conference, School of Business, Soochow University, Taipei, Taiwan, July 8, 2015.
38. Data Envelopment Analysis: Data Mining and Analytics, 2015 Taiwan Productivity and Efficiency Conference, School of Business, Soochow University, Taipei, Taiwan, July 9, 2015. (**Plenary Session**)
37. Data Envelopment Analysis: New Perspectives, Osaka University, June 27, 2015, Osaka, Japan
36. Data Envelopment Analysis: New Perspectives, Hefei University of Technology, June 13, 2015, Hefei, China
35. VRS Cross Evaluation, 2014 Taiwan Productivity and Efficiency Conference, School of Business, Soochow University, Taipei, Taiwan, July 5, 2014. (**Plenary Session**)
34. An Integrated Approach for Ship Block Manufacturing Process Performance Evaluation: Case from a Korean Shipbuilding Company, Advance Lecture Series, 2014 Taiwan Productivity and Efficiency Conference, School of Business, Soochow University, Taipei, Taiwan, July 4, 2014.
33. What are Inputs and Outputs in DEA? 2013 Taiwan Productivity and Efficiency Conference, School of Business, Soochow University, Taipei, Taiwan, July 20, 2013. (**Plenary Session**)
32. Cross Efficiency in DEA, Advance Lecture Series, 2013 Taiwan Productivity and Efficiency Conference, School of Business, Soochow University, Taipei, Taiwan, July 17, 2013.

32. Data Envelopment Analysis, Sheldon B. Lubar School of Business, University of Wisconsin-Milwaukee, Milwaukee, WI, November 2, 2012.
31. Data Envelopment Analysis as a Tool for Performance Evaluation, International Conference on Business Performance Measurement and Management, CENTRUM, Pontificia Universidad Católica del Perú, Lima, Peru, September 11-13, 2012. **(Keynote speech)**
30. Network DEA pitfalls, 2012 Taiwan Productivity and Efficiency Conference, School of Business, Soochow University, Taipei, Taiwan, July 20, 2012. **(Plenary Session)**
29. Data Envelopment Analysis: Models and Applications, Advance Lecture Series, 2012 Taiwan Productivity and Efficiency Conference, National Taiwan University, Taipei, Taiwan, July 19, 2012.
28. Data Envelopment Analysis: Models and Methods, Graduate Institute of Hospitality Management, National Taiwan Normal University, Taipei, Taiwan, July 16, 2012.
27. Research and Publish: Targeting High Quality International Journals, Institute of Business & Management, National Chiao Tung University, Taipei, Taiwan, July 16, 2012.
26. Data Envelopment Analysis: An Introduction, Institute of Business & Management, National Chiao Tung University, Taipei, Taiwan, July 16, 2012.
25. Efficiency and Productivity: Seaports and Marine Fleets Performance, National Taiwan Ocean University, December 28, 2011.
24. DEA Game Cross Efficiency and Modeling DEA in Excel, Soochow University, Taipei, Taiwan, December 16, 2011.
23. DEA Game Cross Efficiency and Applications, International Conference on Data Envelopment Analysis and Its Applications to Management, September 14-16, 2011, CENTRUM, Pontificia Universidad Católica del Perú, Lima, Peru. **(Keynote speech)**
22. DEA Methodology and Applications, Nanjing University of Posts and Telecommunications (NUPT), June 21, 2011, Nanjing, China.
21. How to Publish in Top Journals and Do High Quality PhD Research, School of Management, University of Science & Technology of China, Hefei, China, June 14, 2011.
20. DEA Methodology and Applications, Auhui University, June 13, 2011, Hefei, China.
19. DEA Game Cross Efficiency, International DEA Symposium, 27-29 September 2010, Brisbane, Australia. **(Keynote speech)**
18. Data Envelopment Analysis (DEA) –How and Where Do We Apply It? Department of Finance and Quantitative Analysis, University of Otago, Dunedin, New Zealand, June 28, 2010.

17. Data Envelopment Analysis (DEA): An Introduction, School of Commerce, University of Otago, Dunedin, New Zealand, June 29, 2010.
16. Additive Efficiency Decomposition in Two-Stage Network, 4th Symposium on Data Envelopment Analysis, Taiwan, Jan 19-21, 2010. (**Keynote speech**)
15. How to Publish in International Journals, Department of Industrial and Information Management, the National Cheng Kung University, Taiwan, December 31, 2009
14. DEA Models and Frontier for Two-Stage Processes, Taiwanese Productivity Conference (**Plenary Session**), National Taiwan University, Taipei, Taiwan, July 15, 2009.
13. Network and Multi-Stage Data Envelopment Analysis, Advanced Lecture Series on Productivity and Efficiency organized by Institute of Economics, Academia Sinica of Taiwan and National Taiwan University, July 14, 2009.
12. Data Envelopment Analysis: How, What, and Where, Erasmus Research Institute of Management (ERIM) Research Seminar, Netherlands, June 18, 2009.
11. Modeling Two-Stage Processes by DEA, DEA Symposium 2009, Osaka University Nakanoshima Center, Osaka, Japan, January 13, 2009.
10. Data Envelopment Analysis 30 Years: New Models, Institute of Policy and Management, Chinese Academy of Sciences, Beijing, China, July 3, 2008.
9. PhD Research: How to Achieve High-Quality, School of Management, University of Science & Technology of China, Hefei, China, June 14, 2008.
8. An Introduction to Data Envelopment Analysis (DEA), Department of Information and Physical Sciences, Osaka University, Osaka, Japan, June 15, 2007.
7. Context-dependent Assurance Region DEA (CAR-DEA), National Graduate Institute for Policy Studies, Tokyo, Japan, May 26, 2007
6. How to Publish in Top Journals, College of Management, Ming Chuan University, Taipei, Taiwan, Jan 10, 2007.
5. Performance Evaluation and Benchmarking Using DEA, Department of Industrial and Information Management, the National Cheng Kung University, Taiwan, Jan 4, 2007.
4. Data Envelopment Analysis: What DEA Can Do, Department of Mechanical & Industrial Engineering, Northeastern University, Boston, October 27, 2006.
3. New Benchmarking Approaches and Applications, MBA Seminar Series, School of Management, University of Science & Technology of China, Hefei, China, May 19, 2005.
2. Data Envelopment Analysis (DEA) and Its Applications, Research Seminar Series, School of Business and Economics, State University of New York, Plattsburgh, New York, November 21, 2003.
1. Context-dependent DEA: A new DEA Approach, Japanese DEA Seminar, National

Graduate Institute for Policy Studies, Tokyo, Japan, June 15-18, 2002.

AWARDS

- Ranked #3 in 'The most productive and influential authors in EJOR' by "Forty years of the European Journal of Operational Research: A bibliometric overview", 262 (2017) 803-816.
- Article selected as a winning paper in the prestigious Emerald Citations of Excellence for 2017
- Article included in EJOR's 40th Anniversary Article Selection Part 2: 20 trendsetting papers of the last 20 years
- Chang Jiang Scholar Chair Professor, Ministry of Education of China, 2014
- Best Reviewer Award, European Journal of Operational Research (2010; 2012, 2015, 2016, 2018)
- Department of Veterans Affairs & Veterans Health Administration Grant "Develop Composite Measures of Quality of Care," 2010-2011
- Taiwan National Science Council, 2012, 2013
- William Evans Visiting Fellow, University of Otago, New Zealand, June-July, 2010.
- Research Fellowship, Osaka University, June, 2007
- Visiting Professorship grant, Department of Industrial and Information Management, the National Cheng Kung University, Taiwan, 2007.
- National Institute of Health Grant "Comparative Evaluation of Nursing Homes", Phase II 2002-2005, sub-contracted as a consultant.
- KPMG Foundation Grant "Hospital Quality Measurement & Reporting," June – September, 2003.
- Japan Society for Promotion of Science (JSPS) Invitation Fellowship for Research in Japan (Short-term), (May-July, 2002)
- Using Discovery-Based Learning to Explore the Lean Design of Global Supply Chains, Educational Development Council, Worcester Polytechnic Institute, 2001. (Co-PI)
- Managing the Information Technology (IT) Investment in E-business and E-Supply Chain Design, WPI Research Development Council 2001.

EDITORIAL EXPERIENCE

- Area Editor, *OMEGA*, (2008—present)
- Deputy Editor, *OMEGA*, (2019—present)
- Editorial Board Member, *European Journal of Operational Research* (2014—present)
- Associate Editor, *Journal of the Operational Research Society*, (2017—present)
- Associate Editor, *INFOR*, (2007—present)
- Associate Series Editor, **Springer** *International Series on Operations Research and Management Sciences*, (2014—present)
- Editorial Board Member, *Computers & Operations Research* (2005—present)
- Editor, *Data Envelopment Analysis Journal*, (2013—present)
- Associate Editor, *OMEGA*, (2004—2008)
- Associate Editor, *Asia-Pacific Journal of Operational Research* (2004—2008)
- Guest Editor, *Annals of Operations Research*, *European Journal of Operational Research*, *Journal of the Operational Research Society*, *International Journal of Information Technology and Decision Making*, *OMEGA*, *Journal of CENTRUM Cathedra*

PROFESSIONAL ACTIVITIES

- International Advisory Committee Member, International Conference on Competitiveness Evaluation and Conceptual Aspects, CENTRUM, Pontificia Universidad Católica del Perú, Lima, Peru, August 24-27, 2013.
- International Advisory Committee Member, International Conference on Business Performance Measurement and Management, CENTRUM, Pontificia Universidad Católica del Perú, Lima, Peru, September 11-13, 2012.
- International Advisory Committee Member, International Conference on Data Envelopment Analysis and Its Applications to Management, September 14-16, 2011, CENTRUM, Pontificia Universidad Católica del Perú, Lima, Peru.
- Invited as an expert in Data Envelopment Analysis to participate in a National Science Foundation Sponsored Workshop on Engineering Applications of DEA at Union College, Schenectady, NY, December 10-11, 1999.
- Advisory Board Member, North American Productivity Workshop, University of Toronto, Canada, June 23-25, 2004.

- Reviewer and panelist for Division of Design, Manufacture, and Industrial Innovation, National Science Foundation.
- Reviewer for Social Sciences and Humanities Research Council of Canada.
- Reviewer for Natural Sciences and Engineering Research Council of Canada.
- Reviewer for Research Grants Council (RGC) of Hong Kong.
- Reviewer for Czech Science Foundation.
- Book reviewer Kluwer Academic Publishers.

- General Chair, Data Envelopment Analysis International Conference, June 19-21, 2020, Seoul, Korea.

- Session Chair, Data-oriented Performance Evaluation, INFORMS Annual Meeting, October 20-23, 2019, Seattle, USA.
- General Chair, Data Envelopment Analysis International Conference, June 28-30, 2019, Canterbury, UK.
- General Chair, Data Envelopment Analysis International Conference, June 14-16, 2018, Taipei, Taiwan.
- General Chair, Data Envelopment Analysis International Conference, July 7-10, 2017, Hefei, China.
- General Chair, Data Envelopment Analysis International Conference, July 5-7, 2016, Nanjing, China.
- General Chair, International Workshop on Data Envelopment Analysis, Chinese Academy of Sciences, August 4-5, 2015, Beijing, China.
- Session Chairperson, “DEA Theory II”, 26th European Conference on Operational Research, July 1-4, 2013, Rome, Italy.
- Cluster Co-Chairperson, “Data Envelopment Analysis Cluster”, INFORMS Annual Meeting, November 4-7, 2006, Seattle.
- Cluster Co-Chairperson, “Data Envelopment Analysis Cluster”, INFORMS Annual Meeting, November 5-8, 2006, Pittsburgh.
- Cluster Co-Chairperson, “Data Envelopment Analysis Cluster”, INFORMS International Meeting, June 25-28, 2006, Hong Kong, China.
- Cluster Co-Chairperson, “Data Envelopment Analysis Cluster”, INFORMS Annual Meeting, Nov. 13-16, 2005 San Francisco, CA.
- Cluster Co-Chairperson, “Data Envelopment Analysis Cluster”, CORS/INFORMS Joint International Meeting-Banff, May 16-19, 2004, Alberta, Canada.
- Cluster Co-Chairperson, “Data Envelopment Analysis Cluster”, INFORMS Annual Meeting, November 17-20, 2002, San Jose, CA.

- Stream Co-Chairperson, “Data Envelopment Analysis Cluster”, International Federation of Operational Research Societies Meeting, July 8-12, 2002, Edinburgh.
- Cluster Co-Chairperson, “Data Envelopment Analysis Cluster”, INFORMS National Meeting, November 4-7, 2001, Miami, FL.
- Cluster Co-Chairperson, “Data Envelopment Analysis Cluster”, INFORMS International Meeting, June 17-20, 2001, Maui.
- Cluster Co-Chairperson, “Data Envelopment Analysis Cluster”, INFORMS Annual Meeting, November 5-8, 2000, San Antonio, TX.
- Cluster Co-Chairperson, “Data Envelopment Analysis Cluster”, INFORMS/KORMS International Meeting, June 18-21, 2000, Seoul, Korea.
- Cluster Co-Chairperson, “Data Envelopment Analysis Cluster”, INFORMS Annual Meeting, May 7-10, 2000, Salt Lake City, UT.
- Panel Organizer and Panelist, Panel: “DEA Applications in E-commerce”, INFORMS Annual Meeting, November 5-8, 2000, San Antonio, TX.
- Session Chairperson, "Applications of Management Science Techniques", 31st Annual Meeting of the Decision Sciences Institute, November 18-21, 2000, Orlando, FL.
- Session Chairperson, "New DEA Developments and Uses II", Invited Session for INFORMS/KORMS International Meeting, June 18-21, 2000, Seoul, Korea.
- Session Chairperson, "Applications of DEA", Invited Session for INFORMS Annual Meeting, May 7-10, 2000, Salt Lake City, UT.
- Session Chairperson, "Data Envelopment Analysis", Invited session for INFORMS Annual Meeting, November 7-10, 1999, Philadelphia, PA.
- Session Chairperson, "DEA & Application", Invited Session for INFORMS Annual Meeting, May 2-5, 1999, Cincinnati, OH.
- Session Chairperson, “DEA Refinements & Extensions” Invited session, INFORMS Annual Meeting, Oct. 25-28, 1998, Seattle, WA.
- Doctoral Committees
 - Business School, University of Technology Sydney, Australia (2012-2014)
 - School of Business Administration Hebrew University of Jerusalem, Mount Scopus, Israel (2009)
 - Plenary dissertation committee member for Rotterdam School of Management of Erasmus University, Netherlands (2010)