

June 2007

**RESUME: JEFFERY L. KENNINGTON**

**ACADEMIC RANK:** Professor (With Tenure 1984 –present)

**VITAL STATISTICS:**

Born 1945

Married 1973, two grown children

Phone No. (214) –768 –3088

E–mail jlk at engr.smu.edu

Web Page www.engr.smu/~jlk/

**EDUCATION:**

B.S.	Industrial Engineering	University of Arkansas	(1968)
M.S.	Industrial Engineering	Georgia Institute of Technology	(1970)
Ph.D.		Georgia Institute of Technology	(1973)

**EXPERIENCE:**

**Southern Methodist University, Dallas, Texas**

Computer Science/Operations Research Center	1973 –1975
Department of Industrial Engineering and Operations Research	1975 –1976
Department of Operations Research and Engineering Management (Department Chair 1980-1989)	1976 –1989
Department of Computer Science and Engineering (Department Chair 1989-1994)	1989 – 2001
Department of Engineering Management, Information and Systems	2001 – present

**RESEARCH:**

**Areas of Interest:**

Telecommunication Design, Network Flows, Integer Programming

**Book and Chapters:**

J. Kennington and R. Helgason, *Algorithms for Network Programming*, John Wiley and Sons, (1980).

J. Kennington and K. Lewis, Generalized Networks, *Encyclopedia of Optimization*, Editors C. Floudas and P. Pardalos, Kluwer Academic Publishers, Norwell, MA. (2001), Vol. II 240-245.

J. L. Kennington and R. V. Helgason. Chapter 6 Minimum cost network flow algorithms, *Handbook of Optimization in Telecommunications*, Editors M. Resende and P. Pardalos, Springer 2006.

**Refereed Publications:**

1. J. Kennington and V. Unger, The Group Theoretic Structure in the Fixed-Charge Transportation Problem, *Operations Research*, 21(5), (1973), 1142–1153.
2. W. Langley, J. Kennington, and M. Shetty, Efficient Computational Devices for the Capacitated Transportation Problem, *Naval Research Logistics Quarterly*, 21(4), (1974), 637–647.
3. J. Kennington and V. Unger, A New Branch–And–Bound Algorithm for the Fixed–Charge Transportation Problem, *Management Science*, 22(10), (1976), 1116–1126.
4. J. Kennington, The Fixed–Charge Transportation Problem: A Computational Study with a Branch and Bound Code, *AIIE Transactions*, 8(2), (1976), 241–247.
5. J. Kennington and M. Shalaby, An Effective Subgradient Procedure for Minimal Cost Multicommodity Flow Problems, *Management Science*, 23(9), (1977), 994–1004.
6. R. Helgason and J. Kennington, An Efficient Procedure for Implementing a Dual Simplex Network Flow Algorithm, *AIIE Transactions*, 9(1), (1977), 297–322.
7. R. Helgason and J. Kennington, A Product Form Representative of the Inverse of a Multicommodity Cycle Matrix, *Networks*, 7(4), (1977), 63–68.
8. J. Kennington, Solving Multicommodity Transportation Problems Using a Primal Partitioning Simplex Technique, *Naval Research Logistics Quarterly*, 24(2), (1977), 309–325.
9. M. Collins and J. Kennington, Discussion of 'Extended Period Simulation of Water Systems–Part B'; by Rao et al., *Jo. of Hydraulics Division, Proc. ASCE*, 103, No. HY12, (1977), 1496–1500.
10. J. Kennington, A Survey of Multicommodity Network Flows, *Operations Research*, 26(2), (1978), 209–236.

11. M. Collins, L. Cooper, R. Helgason, J. Kennington, and L. LeBlanc, Solving the Pipe Network Analysis Problem Using Optimization Techniques, *Management Science*, 24(7), (1978), 747–760.
12. I. Ali, R. Helgason, J. Kennington, and H. Lall, Primal Simplex Network Codes: State-Of-The-Art Implementation Technology, *Networks*, 8(4), (1978), 315–340.
13. M. Collins, L. Cooper, and J. Kennington, Multiple Operations Points in Complex Pump Networks, *Jo. of Hydraulics Division, Proc. ASCE*, Vol. 105, No. HY3, (1979), 229–244.
14. L. Cooper and J. Kennington, Nonextreme Point Solution Strategies For Linear Programs, *Naval Research Logistics Quarterly*, 26(3), (1979), 447–461.
15. R. Helgason and J. Kennington, A New Storage Reduction Technique for the Solution of the Group Problem, *Naval Research Logistics Quarterly*, 26(4), (1979), 681–687.
16. R. Helgason, J. Kennington, and H. Lall, A Polynomially Bounded Algorithm for a Singly Constrained Quadratic Program, *Mathematical Programming*, 18(3), (1980), 338–343.
17. I. Ali, R. Helgason, J. Kennington, and H. Lall, Computational Comparison Among Three Multicommodity Network Flow Algorithms, *Operations Research*, 28(4), (1980), 995–1000.
18. R. Helgason and J. Kennington, Spike Swapping in Basis Reinversion, *Naval Research Logistics Quarterly*, 27(4), (1980), 697–701.
19. R. Helgason and J. Kennington, Splitting the Bump in an Elimination Factorization, *Naval Research Logistics Quarterly*, 29(1), (1982), 169–178.
20. A. Bessent, W. Bessent, J. Kennington, and B. Reagan, An Application of Mathematical Programming to Assess Productivity in the Houston Independent School District, *Management Science*, 28(12), (1982), 1355–1367.
21. J. Kennington and B. Patty, A Computational Comparison of Specialized Versus General Codes for Multicommodity Network Problems, *COAL Newsletter*, 10, (1984), 8–14.
22. I. Ali, D. Barnett, K. Farhangian, J. Kennington, B. McCarl, B. Patty, and P. Wong, Multicommodity Network Problems: Applications and Computations, *IIE Transactions*, 16(2), (1984), 127–134.
23. I. Ali, E. Allen, J. Kennington, and R. Barr, Reoptimization Procedures for Bounded Variable Primal Simplex Network Algorithms, *European Journal of Operations Research*, 23, (1986), 256–263.
24. R. Barr, K. Farhangian, and J. Kennington, Networks with Side Constraints: An LU Factorization Update, *The Annals of the Society of Logistics Engineering*, 1(1), (1986), 66–85.

25. I. Ali and J. Kennington, The M-Traveling Salesmen Problem: A Duality Based Branch-And-Bound Algorithm, *Discrete Applied Mathematics*, 13, (1986), 259-276.
26. D. Allen, R. Helgason, and J. Kennington, The Frequency Assignment Problem: A Solution Via Nonlinear Programming, *Naval Research Logistics Quarterly*, 34, (1987), 133-139.
27. E. Allen, R. Helgason, J. Kennington, and B. Shetty, A Generalization of Polyak's Convergence Results for Subgradient Optimization, *Mathematical Programming*, 37, (1987), 309-318.
28. I. Alielgason, and J. Kenningt

38. R. Helgason, J. Kennington, and B. Stewart, Computational Comparison of Sequential and Parallel Algorithms for the One-To-One Shortest Path Problem, *Computational Optimization and Applications*, 1, (1993) 47–75.
39. J. Kennington and F. Mohammadi, The Singly Constrained Assignment Problem: A Lagrangean Relaxation Heuristic Algorithm, *Computational Optimization and Applications*, 3, (1994) 7–26.
40. R. Helgason and J. Kennington, Primal Simplex Algorithms for Minimum Cost Network Flows, *Handbook on Operations Research and Management Science*, Volume 7, Editors M. Ball, T. Magnanti, C. Monma, and G. Nemhauser, North-Holland, Amsterdam, (1995) 85–133.
41. J. Kennington and F. Mohammadi, The Singly Constrained Assignment Problem: An AP Basis Algorithm, *Computational Optimization and Applications*, 4, (1995), 375–392.
42. J. Kennington and R. Mohammed, An Efficient Dual Simplex Optimizer for Generalized Networks, *Interfaces in Computer Science and Operations Research*, Editors, R. Barr, R. Helgason, and J. Kennington, Kluwer Academic Publishers, Norwell Massachusetts, (1997), 153–182.
43. J. Kennington and R. Mohammed, Recovery from Numerical Instability during Basis Reversion, *Computational Optimization and Applications*, 8, (1997) 57–71.
44. J. Kennington and F. Mohammadi, A Truncated Exponential Algorithm for the Lightly Constrained Assignment Problem, *Computational Optimization and Applications*, 8, (1997) 287–299.
45. A. Apte, A. Jayasuriya, J. Kennington, I. Krass, R. Mohammed, S. Sorensen, and J. Whitler, Class Scheduling Algorithms for Navy Training Schools, *Naval Research Logistics*, 45, (1998) 533–551.
46. J. L. Kennington and J. E. Whitler, An Efficient Decomposition Algorithm to Optimize Spare Capacity in a Telecommunications Network, *INFORMS Journal on Computing*, 11, (1999) 149–160.
47. J. L. Kennington, V. S. S. Nair, and M. H. Rahman, Optimization Based Algorithms for Finding Minimal Cost Ring Covers in Survivable Networks, *Computational Optimization and Applications*, 14, (1999) 219-230.
48. J. L. Kennington and M. W. Lewis, The Path Restoration Version of the Spare Capacity Allocation Problem with Modularity Restrictions: Models, Algorithms, and an Empirical Analysis, *INFORMS Journal on Computing*, 13, (2001) 181-190.

49. R. V. Helgason, J. L. Kennington, and K. R. Lewis, Cruise Missile Mission Planning: A Heuristic Algorithm for Automatic Path Generation, *Journal of Heuristics*, 7, (2001) 473-494.
50. J. Kennington, E. Olinick, A. Ortyński, and G. Spiride, Wavelength Routing and Assignment in a Survivable WDM Mesh Network, *Operations Research*, 51, (2003) 67-79.
51. J. Kennington, E. Olinick, K. Lewis, A. Ortyński, and G. Spiride, Robust Solutions for the DWDM Routing and Provisioning Problem: Models and Algorithms, *Optical Networks Magazine*, 4 (2003) 74-84.
52. G. Birkan, J. Kennington, E. Olinick, A. Ortyński, G. Spiride, Making a Case for Using Integer Programming to Design DWDM Networks, *Optical Networks Magazine*, 4 (2003) 107-120.
53. D. Allen, I. Ismail, J. Kennington, E. Olinick, An Incremental Procedure for Improving Path Assignment in a Telecommunications Network, *Journal of Heuristics*, 9 (2003) 374-399.
54. J. Kennington, K. Lewis, Generalized Networks: The Theory of Preprocessing and an Empirical Analysis, *INFORMS Journal on Computing*, 16 (2004) 162-173.
55. J. Kennington, E. Olinick, Wavelength Translation in WDM Networks: Optimization Models and Solution Procedures, *INFORMS Journal on Computing*, 16 (2004) 174-187.
56. J. Kalvenes, J. Kennington, E. Olinick, Hierarchical Cellular Network Design with Channel Allocation, *European Journal of Operational Research*, 160 (2005) 3-18.
57. G. Birkan, J. Kennington, E. Olinick, A. Ortyński, G. Spiride, Practical Integrated Design Strategies for Opaque and All-optical DWDM Networks: Optimization Models and Solution Procedures, *Telecommunication Systems*, 31 (2006) 61-83.
58. J. Kalvenes, J. Kennington, E. Olinick, Base Station Location and Service Assignments in W-CDMA Networks, *INFORMS Journal on Computing*, 18 (2006) 366-376.
59. G. Birkan, J. Kennington, E. Olinick, A. Ortyński, G. Spiride, Design Strategies for Meeting Unavailability Targets Using Dedicated Protection in DWDM Networks, *Journal of Lightwave Technology*, 25 (2007) 1120-1129.

60. J. Kennington, E. Olinick, G. Spiride, Basic Mathematical Programming Models for Capacity Allocation in Mesh-based Survivable Networks, *Omega*, 35 (2007) 629-644.

### **Proceedings:**

1. M. Collins, L. Cooper, and J. Kennington, Analysis of Hydraulic Networks Using Minimization Principles, *Proceedings of the XVIIth Congress International Association for Hydraulic Research*, (1977), 241–248.
2. J. Kennington, Using KORBX for Military Airlift Applications, *Proceedings of the 28<sup>th</sup> Conference on Decision and Control*, (1989), 1603–1605.
3. A. Ali, H. Han, and J. Kennington, Use of Hidden Network Structure in the Set Partitioning Problem, *Proceedings 4<sup>th</sup> International Integer Programming and Combinatorial Optimization Conference*, Copenhagen, Denmark, May 29–31, (1995), 172–184.
4. T. Oh, T. Chen, and J. Kennington, Fault Restoration and Spare Capacity Allocation with QoS Constraints for MPLS Networks, *IEEE Globecom 2000*, San Francisco, November 27-30, 2000 pp. 1731-1735.

### **Sponsored Research:**

1. An Analysis of the LOGAIR DISTRIBUTION SYSTEM Using Optimization Principles, Grant AFOSR 77–3151, 1 October 1976 – 30 September 1981, \$209,144, (J. Kennington – Principal Investigator).
2. Solution of Large Scale Pipe Networks by Extremum Principles, O.W.R.T. Project No. c–7115, 1 June 1976 – 31 May 1977, \$59,739, (J. Kennington – Associate Investigator).
3. A Microprocessor – Based Interactive Capital Budgeting System, 1 September 1982 – 30 September 1983, \$100,000, (J. Kennington – Associate Investigator).
4. Using Operations Research Techniques to Solve the Reservoir Management Problem, Grant from Dallas Water Utilities, 1 September 1983 – 31 May 1984, \$18,435, (J. Kennington – Co–Principal Investigator).
5. Development and Evaluation of a Casualty Evacuation Model for a European Conflict, Grant AFOSR–83–0278, 1 September 1983 – 30 November 1986. (J. Kennington – Principal Investigator).

6. Network Management of Highly Adaptive Communication Networks, Grant from US Air Force RADC, 1 August 1986 – 30 September 1988, \$65,332, (J. Kennington – Principal Investigator).
7. Optimization Algorithms for New Computer Architectures with Applications to Routing and Scheduling, Grant AFOSR–87–0199, 1 May 1987 – 30 September 1990, \$265,278, (J. Kennington – Principal Investigator).
8. Optimization Algorithms for New Computer Architectures with Applications to Personnel Assignment, Grant ONR N00014–87–K–0223, 1 May 1987 – 30 April 1989, \$205,895, (J. Kennington – Principal Investigator).
9. Parallel Processing for Communications, Grant from US Air Force RADC, 1 January 1988 – 30 September 1988, \$42,544, (J. Kennington – Principal Investigator).
10. Optimization Algorithms for New Computer Architectures with Applications to Personnel Assignment Models, Grant ONR N00014–89–J–1784, 1 May 1989 – 31 August 1991, \$233,068, (J. Kennington – Principal Investigator).
11. Optimization Algorithms for New Computer Architectures with Applications to Routing and Scheduling, Grant AFOSR–91–0028, 1 October 1990 – 30 September 1991, \$59,267, (J. Kennington – Principal Investigator).
12. Optimization Algorithms for Integer Networks with Side Constraints for Application in Routing and Scheduling, Grant AFOSR–F49620–92–J–0032, 1 October 1992 – 31 December 1992, \$57,977, (J. Kennington – Principal Investigator).
13. High Speed Heuristics for Real – Time Personnel Assignment Models, Grant ONR N00014–91–J–1234, 1 May 1992 – 31 December 1993, \$100,000, (J. Kennington – Principal Investigator).
14. Integer Networks with Side Constraints, AFOSR Grant FQ8671–9300734, 1 January 1993 – 31 May 1994, \$60,000, (J. Kennington – Principal Investigator).
15. Development of Optimization Algorithms to Solve Navy Class Scheduling Problems, Navy Personnel Research and Development Center Grant #95–01, 30 January 1995 – 29 January 1996, \$50,912, (J. Kennington – Principal Investigator).
16. Real Time Optimization: Algorithms and Applications, ONR Grant N00014–95–1–0645, 1 April 1995 – 31 August 1996, \$88,189, (J. Kennington – Principal Investigator).
17. Design Tools for Highly Survivable SONET Networks, Advanced Technology Program, State of Texas, Grant Number THECB 003613–002, 1 January 1996 – 31 December 1997, \$290,592, (J. Kennington – Principal Investigator).

18. Shortest Path Algorithms on Grid Graphs with Applications to Strike Planning, ONR Grant N00014-96-I-0315, 1 February 1996 – 31 January 1997, \$112,407, (J. Kennington – Principal Investigator).
19. Grid Free Algorithms for Strike Planning for Cruise Missiles, ONR, 1 February 1997 – 31 January 1998, \$93,383, (J. Kennington and R. Helgason Co-Principal Investigators).
20. Preprocessing Algorithms for Pure and Generalized Network Optimizers, ONR, 1 February 1998 – 31 January 1999, \$84,103, (J. Kennington and R. Helgason Co-Principal Investigators).
21. Algorithms for Assigning Sailors to Vacant Billets, Battelle, 1 April 1998 – 31 March 1999, \$83,658, (J. Kennington – Principal Investigator).
22. Preprocessing Network Programs: Theory and Practical Applications, ONR, 1 February 1999 – 31 January 2000, \$79,105, (J. Kennington and R. Helgason Co-Principal Investigators).
23. Development of Algorithms to Forecast Navy Enlisted Personnel, Battelle, 15 March 1999 - 31 October 1999, \$15,996, (J. Kennington-Principal Investigator).
24. Preprocessing Algorithms for Network Programs: Theory and Software Implementations, ONR, 1 February 2000-31 January 2001, \$100,232, (J. Kennington – Principal Investigator).
25. Robust Designs for WDM Routing and Provisioning: Models, Algorithms, and Software, Nortel Networks, 15 December 2000-30 September 2001, \$50,000, (J. Kennington – Principal Investigator).
26. Optimization-Based Techniques for Designing Optical Networks, ONR, 1 February 2001-30 September 2002, \$122,688 (J. Kennington – Principal Investigator).
27. Optimization-Based Techniques for Designing Optical Networks, ONR, 1 October 2002-30 September 2003, \$135,458 (J. Kennington – Principal Investigator).
28. Optimization-Based Design Strategies for DWDM Networks: Opaque Versus All-Optical Networks, ONR, 1 October 2003-30 September 2004, \$139,465 (J. Kennington-Principal Investigator).
29. Improved Scheduling Procedures for SST Truck Company, SST Truck Company, 1 January 2004-30 June 2004, \$20,000 (J. Kennington-Principal Investigator).
30. Protection Strategies for DWDM All-Optical Networks, ONR, 1 October 2004-30 September 2005, \$144,041 (J. Kennington-Principal Investigator).

31. Discrete Optimization Models and Efficient Algorithms for Designing Reliable Optical Networks, ONR, 1, January 2006-31 December 2006, \$152,522 (J. Kennington-Principal Investigator).
32. Optimization-based Design Procedures for Backbone Transport Networks, ONR, 1 January 2007-31 December 2007, \$157,548 (J. Kennington –Principal Investigator.)

**AWARDS:**

United Methodist Church Scholar/Teacher of the Year at SMU - 2003.

SMU Distinguished Teaching Professor (2004) and membership in the SMU Academy of Distinguished Teachers - (2004-2006).

INFORMS Fellow 2005

**PROFESSIONAL SOCIETIES AND ACTIVITIES:**

**Journal Editorships:**

<i>Operations Research</i>	Area Editor	1988-1995
<i>Computational Opt. &amp; Appl. Networks</i>	Editorial Board	1992-present
<i>Telecommunication Systems</i>	Associate Editor	1999-present
<i>INFORMS Journal on Computing</i>	Editorial Board	2000-present
	Associate Editor	2001-present

**Professional Committee Activities:**

Education Committee Member ORSA	1979-1981
Lanchester Prize Committee	1982
Program Chair – ORSA/TIMS Dallas	1984
President, Local Chapter of Sigma Xi	1985
Cluster Chair ORSA/TIMS Los Angeles	1986
Organizer, Computer Science Tech. Section Conf. of INFORMS	1996
Arrangements Chair – INFORMS Dallas	1997
Program Committee - INFORMS Telecom Dallas	2005
INFORMS Teaching Prize Selection Committee	2005-2006

**RECENT COURSES TAUGHT:**

1. Network Programming (*Network Flows: Theory, Algorithms, and Applications*, R. Ahuja, T. Magnanti, and J. Orlin).
2. Integer Programming (*Discrete Optimization*, Parker and Rardin).
3. Principles of Computer Science I (Programming in ANSI C, Kochan).
4. Principles of Computer Science II (Programming Abstractions in C, Roberts).
5. Principles of Computer Science II (C++ How to Program, Deitel and Deitel)
6. Operations Research Models (*Optimization in Operations Research*, Rardin)
7. Introduction to Management Science (*An Introduction to Management Science: Quantitative Approaches to Decision Making*, Anderson, Sweeney, Williams)

#### **PH.D. STUDENTS**

1. R. Helgason, A Lagrangean Relaxation Approach to the Generalized Fixed Charge Multicommodity Minimal Cost Network Flow Problem (1980).
2. A. Ali, Two Node–Routing Problems (1980).
3. K. Farhangian, Networks with Side Constraints: An LU Factorization Update for the Working Basis Inverse (1984).
4. B. Shetty, The Equal Flow Problem (1985).
5. E. Allen, Using Two Sequences of Pure Network Problems to Solve the Multicommodity Network Flow Problem (1985).
6. H. Zaki, A Parallelization of the Simplex Method Using the Quadrant Interlocking Factorization (1986).
7. R. Muthukrishnan, Parallel Algorithms for Generalized Networks (1989).
8. Z. Wang, The Shortest Augmenting Path Algorithm for Bipartite Network Problems (1990).
9. F. Mohammadi, The Constrained Assignment Problem: New Algorithms and an Empirical Analysis (1994).
10. R. Mohammed, Efficient Dual Simplex Optimizers for Generalized Network Models (1995).
11. J. Whitler, Telecommunications Network Design: Optimization Models and Efficient Algorithms (1997).

12. M. Lewis, Spare Capacity Planning for Telecommunication Networks: Models and Algorithms (2000).
13. K. Lewis, Preprocessing Algorithms for Generalized Networks, (2001).
14. G. Birkan, Design Procedures and Restoration Schemes for Backbone Transport Networks: Optimization-Based Models, Heuristic Algorithms, and Unavailability Computations (2006).
15. Q. Cai, Optimization-Based Design Tools for W-CDMA Cellular Networks (2006).

**DOCTOR OF ENGINEERING STUDENTS:**

1. L. Hatay, Sequential and Parallel Algorithms for the Shortest-Path Problem (1989).
2. D. Allen, The Design and Implementation of the Improved Link 11 Simulation Model (1990).
3. R. Pipinich, Manufacturing Efficiency Improvement Through the Industrial Modernization Incentives Program (IMIP) (1992).
4. W. Mann, Decision Business Modeling: A New Methodology and a Case Study (1998).
5. S. Sanders, Data Envelopment Analysis for Benchmarking Public Sector Utilities Operations (1999).
6. H. Rahman, Optimization-Based Methods to Design Ring Covers for Telecommunication Networks (2000).
7. A. Farmehr, Design Strategies for both Survivable and Non-Survivable Personal Communication Networks (2000).
8. D. Bell, Quality and Productivity Comparisons of Object-Oriented and Cleanroom Software Developments (2001).
9. S. Lyons, Optimization-Based Capacity Planning Tools for Semiconductor Final Test (2004).
10. B. Moore, Optimal Time-Variable Pricing for Check-Cashing Transactions (2004).